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Metro | *Memo*

Date: January 18, 2013

To: ATP Stakeholder Advisory Committee (SAC)

From: John Mermin and Lake McTighe, Metro

Subject: **Revised Draft -**Proposed Evaluation Methodology for Regional Bicycle Network Concepts

This memorandum outlines the criteria methodology for evaluating alternative regional bicycle network concepts. For the Regional Active Transportation Plan a total of five regional bicycle networks will be evaluated using Metro's regional bicycle modeling tool and geographic information system (GIS). The intention of the evaluation is to understand the potential benefits and trade-offs of each alternative bicycle network concept. From the five alternative network concepts a preferred Principal Regional Bicycle Parkway Network will be identified. The Principal regional Bicycle Network will be comprised of Regional Bicycle Parkways, the highest functional classification of regional bikeways and will serve as the primary spine of the entire regional and local bicycle network. Other regional bikeways and local bikeways will connect into the spine.

Proposed Regional Bicycle Network Concepts to be Evaluated

Base concepts

1. **2010 Regional Bicycle Network.** This is the existing network of existing local and regional bicycle facilities.
2. **2035 RTP Bicycle Network Projects.** Includes the 2010 network plus future planned bike projects that are included on the RTP project list, including bike improvements that are part of roadway projects. (*Note: Not all gaps in the 2035 RTP bicycle network vision have projects identified in the RTP project list and some of the future projects improve areas outside the RTP bicycle network vision.)*

Regional Bicycle Parkway Concepts

3. **Concept 1- Grid Network of Regional Bicycle Parkways.** Comprised of a grid of regional bicycle parkways spaced approximately every 2 miles north/south and east/west. Connecting to regional centers and areas of higher density employment and households is emphasized. The concept includes the 2035 network. This is the medium density concept.
4. **Concept 2 – Spiderweb Network of Regional Bicycle Parkways.** Comprised of a spiderweb of regional bicycle parkways with connections to regional centers and areas of higher density employment and households emphasized. The concept includes the 2035 network. This is the densest bicycle parkway concepts. The spiderweb is comprised of long radials with circular connectors.
5. **Concept 3 – Mobility Corridors.** Identifies one Regional Bicycle Parkway per regional mobility corridor. Mobility corridors that extend outside the urban growth boundary are not included. The concept includes the 2035 network. This is the sparsest of the bicycle parkway network concepts.

Description of Proposed Regional Bicycle Parkway

The 2035 Regional Transportation Plan (RTP) included a new policy concept for the regional bicycle network, the "Regional Bicycle Parkway." These routes are intended to form the spine of the regional bicycle network, providing for direct and efficient travel with minimal delays in different urban environments and to destinations outside the region. The RTP introduced the concept but did not designate specific routes. It deferred to a future Active Transportation Plan to further develop the concept, including desired spacing, designation of routes and prioritization for implementation. Key experiential aspects that the bicycle parkways should embody:

- Comfort and safety provided by protection from motorized traffic
- Large volumes of cyclists traveling efficiently with minimal delays
- A green environment (some will already be green, while others will be made greener as part of bicycle parkway development, e.g. adding street trees, plantings or bioswales along the route)

The experience of the cyclist will be optimized to such a high level that people will clearly know when they are riding on a Regional Bicycle Parkway. The specific design of a bicycle parkway will vary depending on the land use context within which it passes through. The facility could be designed as an off-street trail along a stream or rail corridor, a cycle track along a main street or town center, or a bicycle boulevard through a residential neighborhood. Priority treatments will be given to cyclists (e.g. signal timing/priority) using the bicycle parkway when they intersect other transportation facilities, and connections to/from other types of bicycle routes will be intuitive.

Criteria to Evaluate the Bicycle Network Concepts

The following criteria were identified by the ATP Stakeholder Advisory Committee to evaluate the bicycle network concepts to aid in determining the best concept or combination of concepts for the principal regional bicycle network.

Criteria
Access: Improved access to destinations, including transit, schools, jobs, parks, social services, town centers, etc.
Equity: Providing access (see criterion above) to serve low income, minority, non-white, non-English speaking, youth (under 18), disabled and elderly populations (65 and over)
Safety: Solves a safety problem, provides safe crossings, safety on high volume/speed roads.
Increased Activity: Measures the increase or decrease in the number of trips made by walking and bicycling. (Metro will evaluate this criterion using the Metro bicycle modeling tool.)

Process

Potential Regional Bicycle Parkways (e.g. the I-205 Trail, SW Barbur Blvd, etc) identified by Metro staff and the Stakeholder Advisory Committee are coded into Metro's bicycle modeling tool. Actual facilities and/or right-of-way are identified in order to use the modeling tool. While the ATP will propose a set of Regional Bicycle Parkways, for the purposes of the evaluation the identified facilities and/or rights-of-way are proxies for the corridors where it is assumed a regional bicycle parkway is needed.

To test a "what-if" scenario of the impact of narrowing a roadway (i.e. a road diet) to accommodate in-roadway bikeways, such as a cycle track, staff identified a set of roadways in the Spiderweb and Mobility Corridor concepts. Roadways were chosen to reflect different areas of the region and are merely to test the "what-if" scenario No lanes were removed from any bike parkways in the Grid concept to provide a comparison. The lane removed is from the planned 2035 cross-sections. Note – in the 2035 RTP, some of these roads are widened from their existing cross-sections, e.g. 172nd, TV Hwy, .

<u>Corridors with one auto travel lane replaced with bikeway</u>

1. SW Barbur Blvd. I-405 to future Tonquin trail (just South of Sherwood Blvd) (Remove lane from Mobility Corridor and Spiderweb, not on Grid)
2. SE Halsey, I-205 Trail to Gresham-Fairview Trail (Remove lane from Mobility Corridor and Spiderweb, not on Grid)
3. SE Foster Powell Blvd. to SE 172nd and Powerline Trail(Remove lane from Spiderweb)
4. SE Sandy, Burnside Couch couplet to I-205 Trail (Remove lane from Spiderweb)
5. SE Tualatin Valley Hwy, Westside trail to 10th Ave in Hillsboro (Remove lane from Mobility Corridor and Spiderweb, not on Grid)
6. Hillsboro to Forest Grove (Baseline/Adair/Pacific) (Remove lane from Spiderweb, not Grid)
7. SE 172nd, Sunnyside Rd. to Powerline Trail(Remove lane from Spiderweb, not Grid)

Evaluation Methodology

Access

1. The increase/decrease in the ease of access for bicycle trips by way of the bicycle network and roadway network. The Metro bicycle modeling tool will be used to measure the utility from Transportation Analysis Zones (TAZs) and Cycle Analysis Zones (CAZs) to regional destinations such as the CBD, Regional Centers such as Gateway, Gresham, and Hillsboro, large employers, e.g. OHSU, Intel. Higher utility, identified by a number, indicates better access from the identified TAZ or CAZ to the regional destinations. Metro will identify set of "origin-destination" trips, attached, that will be reviewed by the Stakeholder Advisory Committee.

2. Increase in bikeway density. Measures the number of new miles (compared to 2010 network) of bike lanes, bike boulevards and trails in each network concept. Metro will utilize the bicycle modeling tools and GIS to calculate the miles of new bicycle lanes, bicycle boulevards, trails and cycletracks. The density the bicycle network in each concept will be calculated for each cycle analysis zone. A map will depict whether the facilities are improved existing or are new. Facilities such as buffered bike lanes and cycle tracks were not in existence in the region when the bicycle modeling tool was developed. These facilities will be identified (in the bicycle modeling tools) as having a similar comfort level as "bicycle boulevards". If possible, report out the mileage of mileage traveled on buffered bike lanes and cycle tracks separately from bicycle boulevards.

3. Bikeway connectivity for each of the network concepts will be calculated using GIS. The ratio of three-way or more intersections for the bikeway network concepts will be calculated. Bikeway connectivity for the existing bicycle network has already been calculated in Metro's Cycle Zone Analysis.

4. Increase in bicycle volumes on new parkway bridges that cross barriers such as rivers, freeways or railroads. Metro will utilize the bicycle modeling tool to calculate the bicycle volumes. The level of attractiveness for the new crossings to "attract" new bicycle trips will also be calculated.

5. Measure change in directness of trips and/or travel time savings

Safety

1. Measures increased separation from roadway traffic. Using the bicycle modeling tools, the percentage of miles of bicycle (and pedestrian) traveled made on trails and cycle tracks will be calculated and compared with the percentage of miles of each facility type.

2. Number of high crash locations/corridors that intersect with improvements to the bicycle network.

3. Develop a Bicycle Comfort Index (BCI) for the 2035 network and each of the three concepts for comparison to the 2010 BCI developed in the existing conditions. This measure looks at auto speeds, auto volumes and the number of lanes for on-street bicycle facilities. It is proposed that Cycle tracks will be identified as completely separated and treated like trails; 0 lanes, 0 auto volumes, and 0 auto speeds.

Equity

1. Increase in the miles of all new bicycle facilities and new bicycle parkways in U.S. Census block groups that have a higher than average percentage of low income, minority, non-English speaking, youth (under age 18) or elderly (over age 65) populations. Metro will use the demographic calculations developed in the Transportation Equity Analysis for the 2014-15 Regional Flexible Fund Allocation (RFFA). Using GIS, the miles of new facilities in each block group will be determined for each bicycle network concept. Since we cannot forecast the distribution of future populations by sub-group, the analysis will assume a distribution of population sub-groups similar to 2010 in the 2035 bicycle network concepts. Metro will assign an equity score to each of the network concepts based on the calculations.

Increased activity

1. Increase or decrease in the percentage of all trips made by bicycling and walking for the overall network concept and for some individual bicycle parkways. The bicycle modeling tool will be used to measure the change (decrease/increase) in mode share for all modes region wide by trip length for all types of trips under 12 miles. The calculations can be aggregated by CAZ.

2. Increase or decrease in the number of miles traveled by bicycle and foot for all types of trips. Using the bicycle modeling tool the change in VMT, BMT (bicycle miles traveled) and PMT (pedestrian miles traveled), total and per person will be calculated. The calculations can be aggregated by CAZ.

3. Number of short trips made by bicycle and foot for all types of trips. Using the bicycle modeling tool, the percentage of trips under three miles and change in VMT, BMT, PMT under 3 miles will be calculated. The data can be aggregated by CAZ.

4. Average trip length on new bicycle parkways for all types of trips. Using the bicycle modeling tool, Metro will identify a few illustrative examples and compare to the overall average bike trip length. Helps answer the question, “do longer trails/seamless corridors allow longer trips to be made by bicycle?”

5. Calculate change in mode share by geographic areas used in the 2011 Oregon Household Activity Survey (e.g. CBD, city center minus CBD, inner east side, counties, other cities)

Potential Presentation of Evaluation Outcomes

1. Schematic representation of each bicycle network concept overlaid on 2035 bicycle network. Each map will include a matrix of the criteria with evaluation measure outcomes (e.g. increase in bicycle miles traveled, equity score, etc.).

2. Metro will explore the possibility of calculating the evaluation measures by cycle analysis zone (CAZ) and displaying the changes graphically by CAZ.

3. Map depicting whether the Regional Bicycle Parkways consist of improved existing facilities or are new.

4. Network flow maps. These maps provide a graphic representation of the modeled volume of bicycle trips on the bicycle network.

5. Maps of each regional center showing level of access (utility) from TAZs and CAZs