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Columbia River Crossing Project

Problem Definition

August 31, 2005

Introduction

Major transportation agencies in the Portland-Vancouver region have joined together to lead development of transportation improvements to the 5-mile segment of I-5 from State Route (SR) 500 in Vancouver to Columbia Boulevard in Portland including the bridges across the Columbia River (the bridge influence area). Improvements are expected to address highway, vehicular freight, transit, pedestrian, and bicycle needs.

Function and Role of the I-5 Bridge Influence Area

I-5 is the only continuous north/south interstate highway on the West Coast, providing a commerce link for the United States, Canada, and Mexico. In the Vancouver-Portland metropolitan region, I-5 is one of two major highways that provide interstate connectivity and mobility. I-5 directly connects the central cities of Vancouver and Portland. Interstate 205 (I-205) provides a more suburban and bypass function and serves travel demand between east Clark County and east Multnomah County. Operation of the I-5 crossing over the Columbia River is directly influenced by the 5-mile segment of I-5 from SR 500 in Vancouver to Columbia Boulevard in Portland. Known as the I-5 bridge influence area, this segment includes interchanges with three state highways (SR 14, SR 500, and SR 501) and six major arterial roadways that serve a variety of land uses, and provides access to downtown Vancouver, two international ports, industrial centers, residential neighborhoods, retail centers, and recreational areas.

The existing I-5 crossing of the Columbia River consists of two side-by-side bridges. The eastern (northbound) bridge was built in 1917, and the western (southbound) bridge was built in 1958. The crossing, which served 30,000 vehicles per day in the 1960s, now carries more than 125,000 automobiles, buses, and trucks each weekday. While many of these trips are regionally oriented (average trip length is 16 miles), 70 to 80 percent of trips using the I-5 bridge actually enter and/or exit I-5 within the bridge influence area.

A second interstate highway river crossing is located six miles east (upstream). The I-205 Glenn Jackson Bridge, which opened in 1982, carries about 140,000 vehicles per

day and is reaching its peak-hour period carrying capacity. No other river crossing options in the metropolitan area are available between the two states. The next closest bridges for automobile use are located at Longview, Washington, 46 miles to the west, and at Cascade Locks, Oregon, 40 miles east of the I-5 bridge.

The I-5 bridge influence area serves four broad travel markets:

- Through travel. These users travel from outside the influence area, through the influence area, and on to destinations outside the influence area---for example, a freight or tourist trip from Seattle, Washington to Eugene, Oregon. These users represent less than XXX percent of the total trips crossing the river.
- Regional travel. These users initiate travel outside the influence area, traverse the influence area, and end their trips in a Portland/Vancouver activity center outside the influence area---for example, a trip from Battleground, Washington to downtown Portland.
- Local travel. These users have an origin or destination within the bridge influence area---for example, a trip from a southeast Portland neighborhood to downtown Vancouver. This constitutes about XXX percent of the trips crossing the I-5 bridge.
- Internal travel. These users stay within the bridge influence area---for example, from downtown Vancouver to Hayden Island. This constitutes about XXX percent of the trips crossing the I-5 bridge.

Definition of the Problem

Current Problems	Details/Background
1. Travel demand exceeds capacity in the I-5 bridge influence area, causing heavy congestion and delay during peak travel periods for automobile, transit and freight traffic. This limits mobility within the region and impedes access to major activity centers.	Heavy congestion has resulted from growth in regional population and employment and in interstate commerce over the last two decades. The existing bridge crossing provides three lanes of capacity in each direction, with a directional capacity of about 5,500 vehicles per hour. Travel demand currently exceeds that capacity during peak periods. As a result, stop-and-go traffic conditions last 2 to 5 hours in the mornings and afternoons. These conditions are aggravated by vehicle merges, traffic accidents, and vehicle breakdowns. Due to excess travel demand in the bridge influence area, many travelers take longer, alternative routes such as I-205. Although the lift span is used only in off-peak hours, it affects travel reliability and creates extensive traffic delays. The span is opened 20 to 30 times a month. More lifts occur during the winter when water levels are higher. Each lift takes approximately 10 minutes, creating traffic delays for up to an hour.

2. Transit service between Vancouver and Portland is slow, inefficient, and uncompetitive with the automobile.	The I-5 bridge is a critical bi-state transit link for transit patrons traveling between Vancouver and Portland. Bi-state transit service includes local fixed-route bus service between downtown Portland and downtown Vancouver (using the I-5 bridge), peak period express routes from Clark County park-and-rides and transit centers to downtown Portland on both I-5 and I-205, and I-205 shuttle service between Fisher's Landing Transit Center and the Parkrose Transit Center. Current congestion in the bridge influence area has an adverse impact on transit travel speed and service reliability; making transit an unattractive option and exacerbating auto congestion. Between 1998 and 2005, bus travel times between the Vancouver Transit Center and Jantzen Beach increased 50% during the peak period. Buses crossing the I-5 bridge in the southbound direction currently take three times longer during parts of the morning peak period (13.1 minutes) compared to off peak periods (3.4 minutes). As a result, transit travel times between Vancouver and Portland have increased. Slower transit travel times have also translated into increased service hours, greater operating costs, and more buses to maintain a constant level of service. The result has been a loss of transit operating efficiency and productivity.
3. The access of truck-hauled freight to the Ports of Vancouver and Portland and to regionally significant industrial and commercial districts is impaired by congestion in the I-5 bridge influence area.	I-5 is the primary commerce corridor serving the Vancouver-Portland region and the Northwestern United States. Access to the Ports of Vancouver and Portland and regionally significant industrial and commercial districts is adversely affected by congestion in the I-5 bridge influence area, which is increasingly spreading into the off-peak periods (including weekends) used by freight carriers. Declining freight carrier access to these key locations slows delivery times and increases shipping costs, diminishing the attractiveness of the Ports and negatively affecting the region's economy.
4. The I-5 bridge crossing area and its approach sections experience crash rates up to 2.5 times higher than	Nearly 300 reported crashes occur annually in the I-5 bridge crossing area, with many involving large tractor-trailer trucks. Crashes have resulted in substantial property damage and injury; some have

statewide averages for comparable urban freeways in Washington and Oregon , largely due to substandard design. Incident evaluations attribute crashes to congestion, closely spaced interchanges, short weave and merge sections, vertical grade changes in the bridge span, and narrow shoulders.	resulted in fatalities. The causes are: Close Interchange Spacing The 5-mile bridge influence area contains eight closely spaced interchanges. These interchanges provide access to several east-west highways and arterial roadways that serve a mix of interstate, regional, and local trip purposes. The average distance between the interchanges is 1/2 mile, as compared with a recommended minimum spacing of one mile between interchanges for urban areas. Short Weave and Merge Sections Short weave sections for vehicles entering and exiting the freeway generate backups and delay due to difficulty in maneuvering, especially for large trucks. The proportion of trucks is high because this segment provides arterial street access to both ports. Outdated designs for entrance and exit ramps cause backups onto the mainline at exit ramps. The entrance ramps do not provide enough space for vehicles to merge safely with through traffic. Vertical Grade Changes Vertical grade changes in the bridge span over the Columbia River and its alignment with the highway create sight distance limitations that reduce speeds and create potential hazards to motorists. Narrow Highway Shoulder Width Several segments of the I-5 bridge crossing area, including the I-5 bridge, have narrow inside and outside shoulders in both travel directions. In several locations, shoulders are as little as 1-foot-wide (10- to 12-foot shoulders are standard). The lack of shoulders positions many motorists undesirably close to physical barriers that border I-5. Many drivers respond with caution by slowing down to increase separation from vehicles ahead and behind. Increased vehicle spacing reduces vehicle throughput and contributes to freeway congestion. In addition, the lack of safe areas for incident response, disabled vehicle pullout, and driver recovery also impairs the ability to manage highway operations and recover from events that interrupt traffic flow.
5. Bicycle and pedestrian facilities for crossing the Columbia River in the I-5	The width of the bicycle/pedestrian facility on the I-5 bridge is substandard (6 to 8 feet) and located extremely close to traffic. Oregon Department of

bridge influence area are not designed to promote non-motorized access and connectivity across the river. .	Transportation standards call for a multi-use path to be at least 10 feet wide. Bicycle and pedestrian connections between North Marine Drive, Hayden Island, and Vancouver require out-of-direction travel. No connection exists for pedestrians or bicyclists wanting to stay on the west side of the bridge between Hayden Island and North Marine Drive. Pedestrians and bicyclists are required to cross underneath eight lanes of traffic to access a connection on the east side of the highway.
6. The I-5 bridges across the Columbia River do not meet current seismic standards, leaving them vulnerable to failure in an earthquake.	Previous studies concluded that the existing structures could not be upgraded to fully meet seismic design standards without full bridge reconstruction.
Future Problems	Details/Background
7. As the Portland/Vancouver region grows, mobility and accessibility for automobile, transit and freight will decline unless added capacity is provided in the I-5 influence area. An increasing disparity between demand and capacity will lead to longer delays, increased accident rates, and diminished quality of life and economic opportunity.	Regional Growth Consistent with regionally adopted comprehensive plans, the region's growth forecasts indicate that population, employment, and commercial trade will continue to grow, increasing regional travel demand. By 2020: • Vancouver-Portland regional population will likely increase by nearly 40 percent, from 1.8 million to 2.5 million. • Regional trade is expected to increase by 50 percent, from nearly 300 million tons to nearly 450 million tons. A substantial portion of freight will be moved by truck. Increased Travel Demand Daily traffic demand over the I-5 bridge is expected to increase by more than 40 percent, from 125,000 vehicles in 2000 to 180,000 vehicles in 2020... The projected increase in use of the bridge is constrained by the lack of capacity to accommodate more vehicles so will cause the peak period to expand to accommodate the projected traffic increase. There is also a potentially large and underserved transit market for trips to and from key regional locations with connections that include the bridge influence area. Deteriorating Traffic Conditions

	Unless improvements are made, traffic conditions in the I-5 bridge influence area are predicted to worsen over the next 20 years: • Congestion and delay will increase, with stop-and-go conditions in both directions for 10 to 12 hours on weekdays and increased delays on weekends. • The current off-peak periods used by freight carriers will blend into adjacent peak period congestion, increasing freight delay throughout much of the day. • Vehicle-hours of delay during the evening peak period will increase nearly 80 percent, from 18,000 hours to 32,000 hours each day. Vehicle-hours of delay on truck routes will increase by more than 90 percent, from 13,400 hours to 25,800 hours each day. • Travel times for buses traveling in general purpose lanes on I-5 between downtown Vancouver and downtown Portland are expected to almost double, from 27 minutes in 2000 to 55 minutes in 2020. These travel time increases will continue to erode mass transportation services as a viable mode choice and increase transit operation costs. • Safety will continue to deteriorate as a result of increased congestion. Diminished Mobility and Accessibility • Slower highway speeds will reduce access to jobs, shopping, and recreation. • Increasing delays between I-5 and freight centers will adversely affect freight distribution and access to ports/terminals, thereby shrinking market areas served by the Vancouver-Portland region. The current Metro Regional Transportation Plan and the Regional Transportation Council Metropolitan Transportation Plan recognize the need for additional capacity to improve the flow of people and freight in the I-5 bridge influence area. Both plans include the I-5 Transportation and Trade Partnership Strategic Plan recommendations to increase mobility and accessibility in the I-5 crossing area.
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