

Roadway Operations: I-5 Express Lanes

Introduction

How were the operations of the I-5 express lanes addressed in the preferred alternative?

This document addresses the transit/HOV direct access ramp connection between SR 520 and the I-5 interchange included in the SR 520 I-5 to Medina preferred alternative. A direct access ramp will connect from the westbound SR 520 transit/HOV lane to the southbound I-5 express lanes during the morning periods of express lane operations. During the evening period of express lane operations, the direct access ramp will connect northbound I-5 express lanes to the eastbound SR 520 transit/HOV lane. The addition of a direct access on/off-ramp just south of the SR 520 interchange is necessary for this configuration, and would require design modifications to the express lanes. The preferred alternative will reduce the express lanes by one lane width just north of the I-5/SR 520 interchange to provide space for the single new transit/HOV direct access ramp to/from SR 520.

What comments were received?

The express ramp connection was included as part of all options evaluated in the SDEIS and was included as an element in the preferred alternative. The project team received comments on the SDEIS that requested additional information on the operations of the I-5 express lanes with the project, in part to determine if the value added by the express ramp connection is enough to warrant construction. Comments on the SDEIS also included a desire to provide for additional on/off access to the express lanes north of 520 and to modify I-5 to ensure safe merging from SR 520 to the I-5 Mercer Street exit.

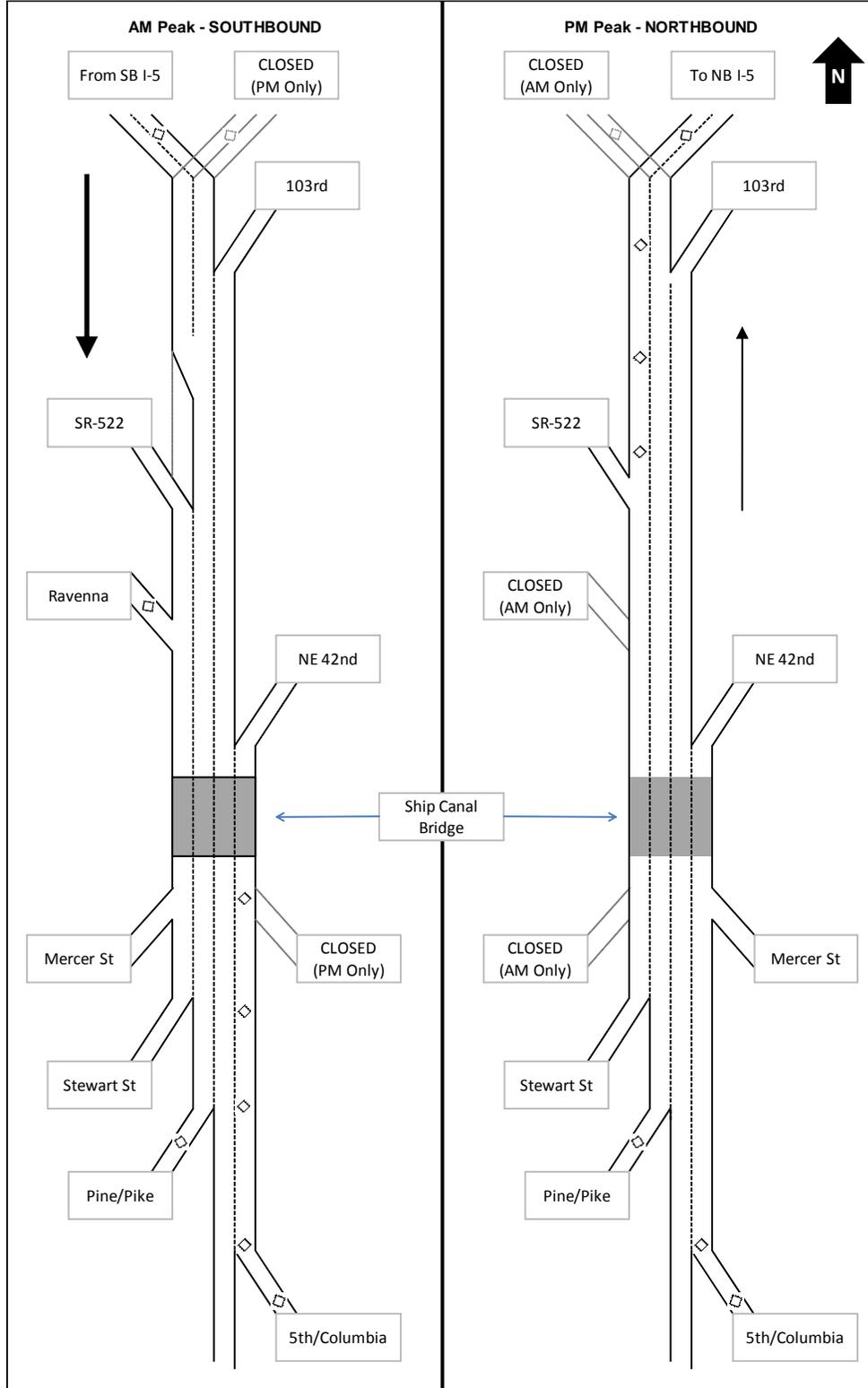
What issues are we trying to resolve?

The following summarizes the operations of the I-5 express lanes today, and in the year 2030 with the No Build and 6-Lane alternative. The operations referenced in this document are from the SDEIS analysis. The data reported for the 6-Lane alternative is Option A with the Lake Washington Boulevard ramps open (Option A+ through the Legislative Workgroup). For the purposes of this white paper, this option is most similar through the I-5 interchange to the preferred alternative as it is currently defined. I-5 express lane analysis will be updated for the preferred alternative and will be included in the Transportation discipline report of the FEIS.

Existing conditions

The reversible express lanes on I-5 operate southbound in the morning and northbound in the afternoon. The limits of the express lanes are between the Northgate area and downtown Seattle. The existing express lane congestion points are at the exit points where the roadway narrows to one general purpose lane (northbound at Northgate and southbound through downtown) or where traffic from intersection signals at Mercer Street and Stewart Street back onto the express lane system. Congestion also occurs in both directions near the SR 522 ramp. Exhibit 1 depicts the existing channelization for the express lanes.

Exhibit 1. Existing channelization.



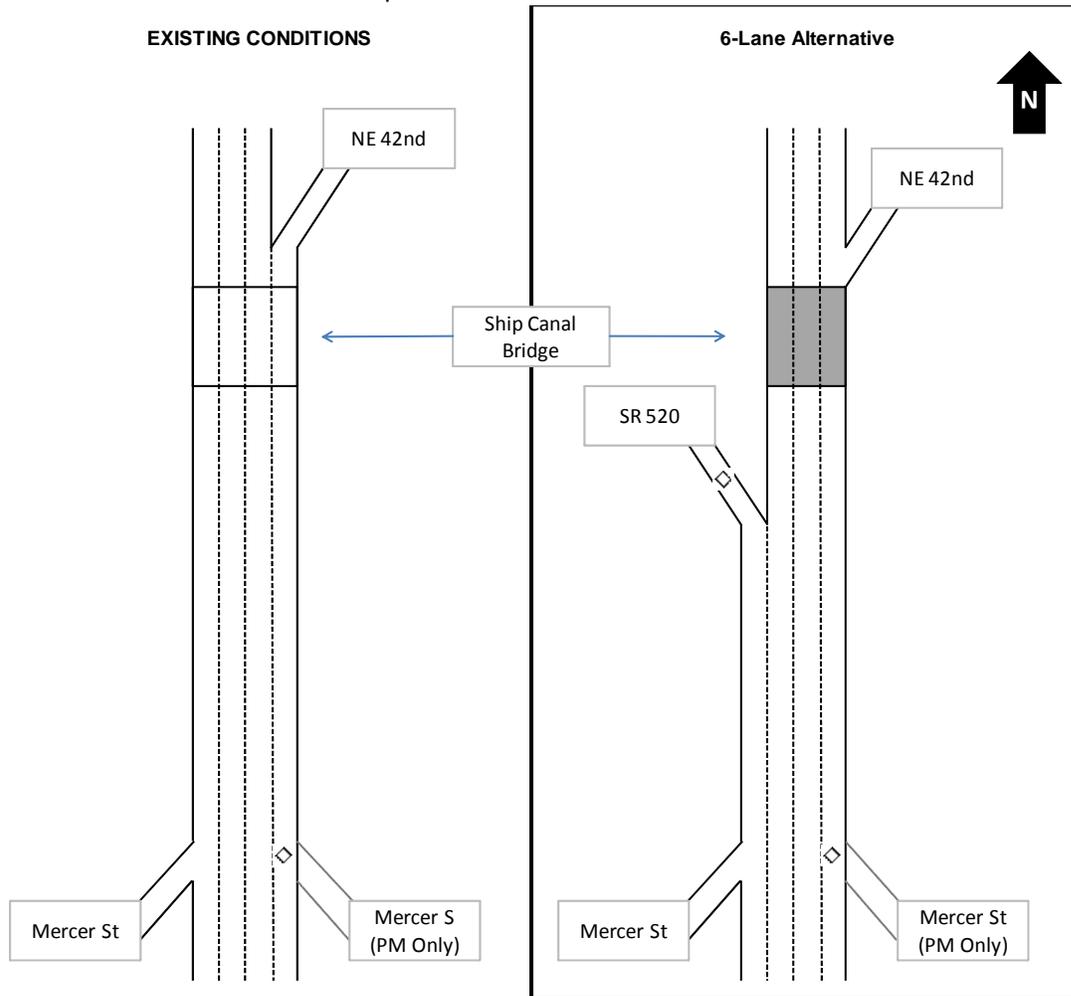
Year 2030 No Build alternative

By 2030, traffic volumes are expected to increase on the express lanes by about 10 percent in the morning and over 25 percent in the evening peak, resulting in increased congestion at the existing bottlenecks. This increase in traffic demand is expected due to projected increases in employment and population in the region by 2030, based on growth projections identified by the Puget Sound Regional Council.

Year 2030 with the project

The preferred alternative includes an HOV/transit ramp connection between SR 520 and the I-5 express lanes. The design would reduce the number of lanes from four to three in the express lanes across the Ship Canal Bridge to provide space for a single new HOV/transit ramp to/from SR 520. To accommodate the ramp, the 42nd Street NE ramp would be converted to a merge southbound or diverge northbound.

Exhibit 2. Channelization with the preferred alternative.



Southbound. In 2030, the 42nd Street NE ramp is expected to carry 260 vehicles per hour during the AM peak hour. This is a low volume for an interstate ramp and vehicles can reasonably merge to the express lanes if there is available capacity. Due to upstream congestion that would occur as described in the No Build, the maximum traffic volume approaching the three lane section of the Ship Canal Bridge is expected to be about 5,200 vehicles per hour. The three lane section of the Ship Canal can accommodate about 6,600 vehicles per hour, so this section of the express lanes could accommodate another 1,400 vehicles each hour before reaching capacity.

The SR 520/I-5 direct access ramp included in the project would add between 200 to 400 buses and carpools per hour in the AM commute period. Since the operational issues for the I-5 express lanes are in the lane that terminates at the I-5 mainline and not in the lanes that serve HOV/transit traffic, the transit traffic exiting to downtown would benefit from the direct access ramp connection.

Some of the traffic entering the express lanes from SR 520 would be destined for the I-5 mainline south of downtown Seattle. This would increase traffic pressure to an already congested lane as vehicles exit the express lanes back onto I-5 mainline at the southern end. Congestion could last up to an hour longer compared to the No Build alternative and extend just north of the SR 520 interchange at the peak.

Northbound. In 2030, the 42nd Street NE ramp is expected to carry 660 vehicles per hour during the PM peak hour. The express lane volume across the Ship Canal Bridge is expected to peak in the afternoon at 5,600 vehicles per hour (compared to a capacity of 6,600 vehicles per hour).

Northbound operations with the preferred alternative are similar to No Build, because volume increases due to the project would only occur south of the Ship Canal Bridge. In the northbound express lanes, congestion occurs at the north end of the corridor. As a result, the preferred alternative would provide buses with a direct connection from the I-5 express lanes into the SR 520 center HOV/transit lane. This connection would avoid congestion on the I-5 mainline and would benefit transit travel time and reliability.

Addressing the problem

How will we identify possible solutions?

This white paper provides additional information about how the express lanes would operate with the new connection from SR 520. No problems have been identified for resolution.

Recommendations

What did we consider?

For the I-5 express lane connection to/from the south, we have considered the option that was developed and drafted in the DEIS and SDEIS process. We have ensured that the SR 520/I-5 interchange

design has not precluded future actions that might include the addition of a direct access ramp between the SR 520 corridor and the express lanes to the north.

Final TCT recommendation

The Technical Coordination Team (TCT) recommends implementing the SR 520/I-5 interchange design developed in the preferred alternative. A single-lane, reversible direct-access ramp will connect from the westbound SR 520 transit/HOV lane to the southbound I-5 express lanes during the morning period of express lane operations. During the evening period, the direct-access ramp will connect northbound I-5 express lanes to the eastbound SR 520 transit/HOV lane. The preferred alternative will reduce the I-5 express lanes by one lane width just north of the I-5/SR 520 interchange to provide space for the new reversible transit/HOV direct-access ramp.