PROJECT NEED

The specific needs to be addressed by the proposed action include:

Seismic vulnerability increases risk of disrupted interstate travel

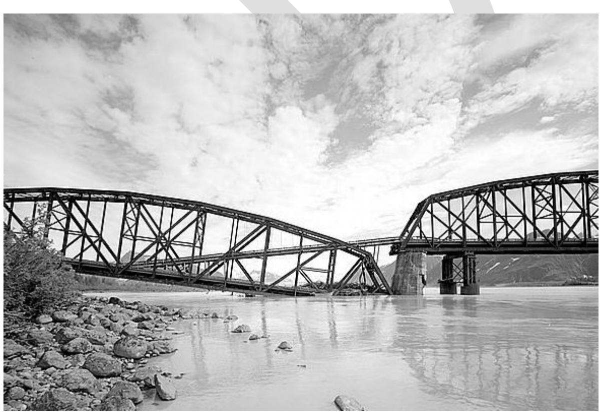
The Interstate Bridge consists of two spans, which were constructed in 1917 (northbound) and 1958 (southbound); both spans are seismically deficient. Scientific research over the past quarter century reveals Western Oregon and Washington are located in a region of high seismicity. Earthquakes from faults both near and far contribute to a level of seismic hazard that was not considered by designers of the Interstate Bridge.

As one of only two bridges across the Columbia River that connects the greater Portland area and Vancouver/Clark County, the Interstate Bridge provides a critical connection for people to access jobs and services, interstate commerce, and freight movement. The Interstate Bridge's vulnerability to failure in an earthquake presents a risk of severe disruption to the region, particularly to those who depend on the bridge as their primary route, including residents that would be isolated on Hayden Island, as well as in emergency response and region recovery. Replacing the structures with a resilient bridge will go far to support a healthy community, environment, and economy.

Seismic deficiencies of the Interstate Bridge

- The structures lack the ductility of similar, modern bridges. Ductility allows a structure to move back and forth without catastrophic failure and is an important defense against collapse. The trusses, towers, and piers of the Interstate Bridge are brittle elements, and simply do not have the ability to move without ripping apart.
- Both bridge spans are supported by hundreds of timber piles that sit within loose sand that will liquefy during a strong earthquake (CRC 2006). In such an event, sandy, saturated soils become fluid-like and unstable, causing the piles to sink and move horizontally.
- The combined effect—settlement and lateral movement—would prove devastating to the bridge spans, likely triggering their collapse even if the bridge managed to somehow survive the shaking mentioned above. *Exhibit 2* shows an example of such a collapse.

Exhibit 2. Soils liquified and caused the collapse of the Million Dollar Bridge, Copper River, Alaska, during the M9.2 1964 Good Friday Earthquake



Traffic congestion limits mobility and travel reliability while contributing to greenhouse gas emissions and inequity of transportation costs

The population of the Portland-Vancouver metro region is expected to grow from 2.5 million residents in 2018 to over 3 million in 2040 (23 percent) and over 3.5 million in 2060 (43 percent), further increasing travel demand and worsening existing congestion problems (Census Reporter 2018; Metro 2016). Daily traffic demand over the I-5 crossing has increased steadily over the last decade and is projected to increase in the future by more than <TBD> percent during the next 25 years, with congestion at the Interstate Bridge increasing from 10 hours daily in 2019 to approximately <TBD> hours daily in 2045.

> **Congestion** on a highway occurs when average speeds are below 35 mph.
>
> The duration of congestion on the Interstate Bridge has roughly doubled over the past 14 years. In 2005, there were 4 to 6 hours of congestion daily. By 2019 this had increased to approximately 10 hours.

Congestion in the program area limits mobility and travel reliability within the region and local communities, adversely affecting freight truck, bus, and personal vehicle travel. I-5 at the Interstate Bridge has been identified as one of the region's top recurring bottlenecks during the morning and evening commute periods <citation>.

Travel demand in 2019 exceeded capacity during peak periods on the Interstate Bridge on weekdays and weekends (IBR 202x). In 2019, the total number of vehicles using the bridge was 139,000 average weekday daily traffic (AWDT). Congestion has also steadily increased, with recurring congestion lasting approximately 10 hours each weekday approaching the Interstate Bridge (approximately 3 hours in the morning and 7 hours in the afternoon/evening). The peak periods have also spread into the mid-day period, impacting more bridge users. Other events causing congestion and decreasing travel reliability in the corridor include vehicle crashes, vehicle breakdowns, and bridge lifts (*Exhibit 3*). The cost of congestion on I-5 increased by 18 percent between 2015 and 2017 <to be verified>, increasing to nearly three quarters of a million dollars each day in 2017 (ODOT 2018).

> **Vehicle trips (2019)**
> Of the 305,000 vehicle trips that crossed the Columbia River daily in 2019, 139,000 vehicles utilized the Interstate Bridge while 166,000 used the I-205 Bridge. This total includes trips made in single-occupancy vehicles (SOV), high-occupancy vehicles (HOV), trucks, and transit vehicles (buses).

Exhibit 3. Crash on the Interstate Bridge (or Interstate Bridge Lift)

<insert photo>

The increased number of cars using the corridor and idling vehicles sitting in congestion conditions contribute to increasing greenhouse gas emissions. The Oregon Governor's executive order signed in March 2020 directs the state to take actions to reduce greenhouse gas emissions 45% below 1990 levels by 2035 and 80% below 1990 levels by 2050. The Washington RCW 70A.45.020 directs the state to take actions to reduce greenhouse gas emissions 45% below 1990 levels by 2030 and 95% below 1990 levels by 2050.

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