Why the Enhanced Seismic Retrofit Alternative is not the Preferred Alternative

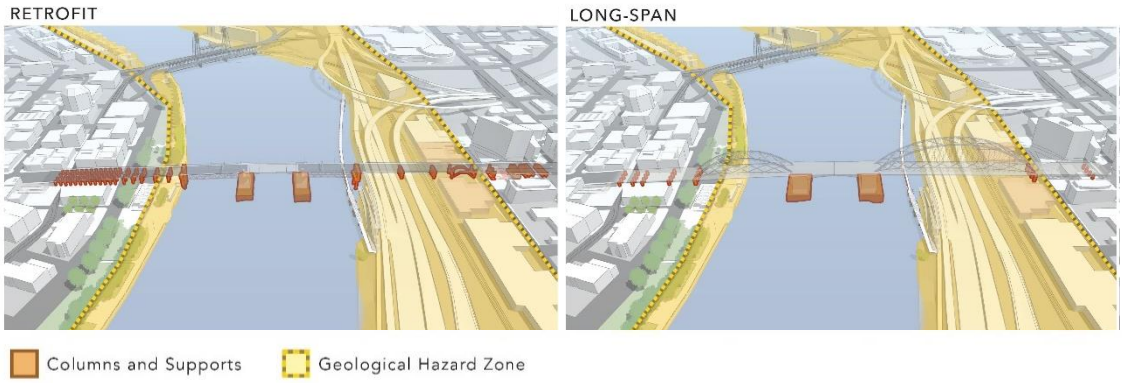
The existing Burnside Bridge was built in 1926 before information about earthquakes was more readily available and understood. At that time, the Burnside Bridge was built with lightly reinforced rebar and supported on shallow timber piles embedded into quicksand-like soils. Given the age, location and materials of the Burnside Bridge, seismically retrofitting the bridge to withstand the size and magnitude of a major Cascadia Subduction Zone earthquake, and be immediately usable following such an event, makes this alternative more challenging than the replacement alternatives and greatly compromises the historic nature of the existing bridge.

However, several stakeholders have expressed support for a Retrofit Alternative because it is the only build alternative that would preserve elements of the existing historic Burnside Bridge. The following summarizes the key reasons that the Enhanced Seismic Retrofit was not recommended as the Preferred Alternative.

Seismic resiliency is technically feasible for the Retrofit Alternative, but very challenging, and the Retrofit relies on more bridge bents (supports) in the geologic hazard zones (unstable soils) than any of the replacement alternatives.

The graphic below shows that the Enhanced Seismic Retrofit Alternative has seven bents located in the geologic hazard zones near the river, compared to the Replacement Long Span Alternative which has just one. In a Cascadia Subduction Zone earthquake, soils up to 120 feet deep in these zones are expected to liquefy and slide horizontally 20+ feet toward the river. This places such large lateral loads on the bridge foundations located in these areas that they become unstable without very expensive subsurface soil improvements to prevent these movements.

Bridge Supports located in Geologic Hazard Zones

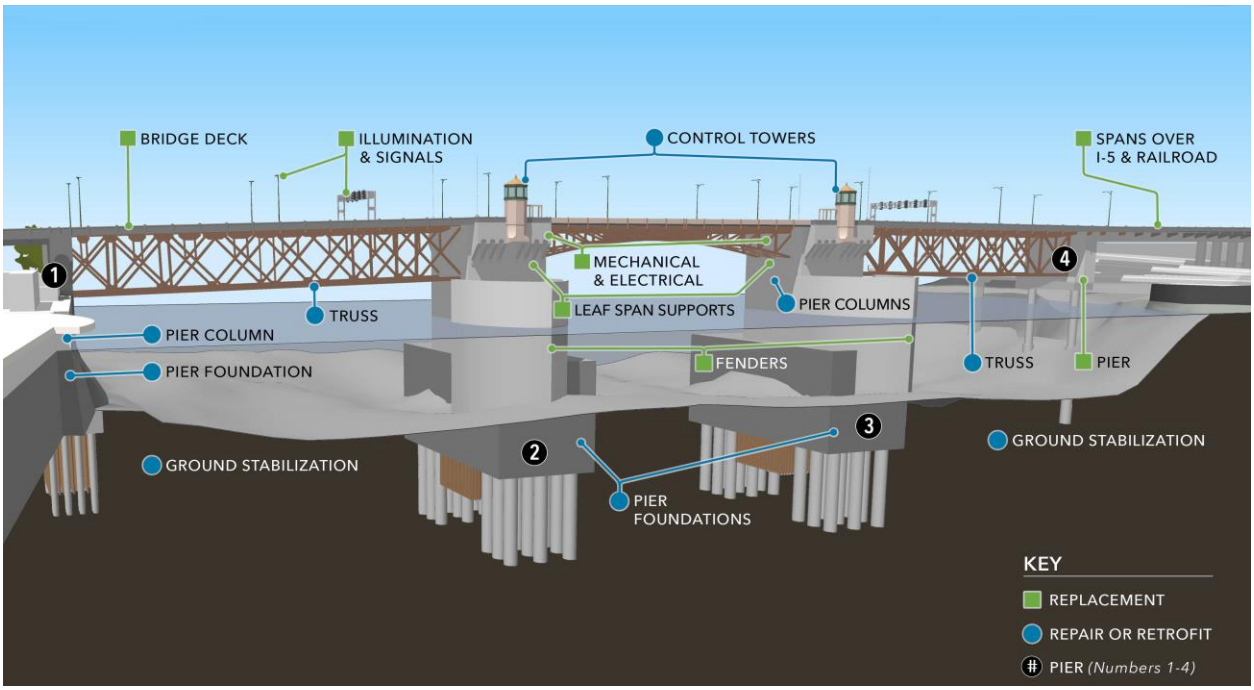


Extensive ground improvement actions are not only expensive, but they also increase the risk of damage (such as ground heaving or settlement) to adjacent facilities, buildings, I-5 bridges, and railroad tracks. These costs and risks would be significantly reduced with the Replacement Long Span Alternative.

The Enhanced Seismic Retrofit Alternative would not preserve the historic status of the Burnside Bridge, and would remove another historic resource eligible for listing on the National Register of Historic Places.

The Enhanced Seismic Retrofit Alternative studied in the Draft Environmental Impact Statement is the culmination of extensive seismic and design analysis intended to create a retrofit alternative that could maximize performance while still maintaining as much of the existing bridge as possible. Even so, this alternative requires replacing much of the eastern approach, the entire bridge deck and bridge railings, the movable span mechanical and electrical elements, the east in-water pier, the iconic masonry control towers, and possibly even the movable span leafs. In addition, major retrofitted elements include installing new foundations with large diameter concrete shafts, encasing the two major in-water bridge piers with thick concrete jackets, and conducting major retrofit of all the other piers and bents and other structural elements. Because of these changes, the bridge would no longer be listed on the National Register of Historic Places. In addition, the Enhanced Seismic Retrofit Alternative is the only alternative that would remove the Burnside Skatepark, a National Register eligible resource.

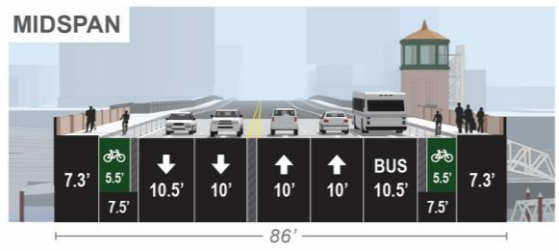
Detailed Work Needs (what can be repaired/retrofitted and what needs replacement)



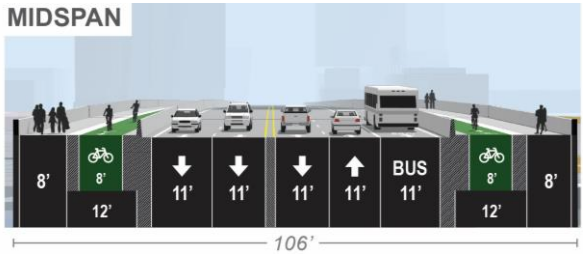
The Enhanced Seismic Retrofit Alternative would provide no meaningful improvements for bicyclists, pedestrians or people with disabilities.

All the Replacement Alternatives would widen the bridge over the river, thus allowing for substantial safety and convenience improvements for active transportation, including wider sidewalks, wider bike lanes, and a physical barrier separating these facilities from motor vehicle traffic. The Enhanced Seismic Retrofit, by maintaining the existing bridge width across the river, cannot provide these improvements. Widening the deck of the existing bridge is not practical and would further denigrate its historic features.

Bridge Deck Midspan Cross Section Comparison



Enhanced Seismic Retrofit Alternative



Replacement Long Span Alternative

The Retrofit Alternative would have the greatest long-term impact on Waterfront Park.

The Replacement Long Span Alternative would replace all the existing bridge supports located in Waterfront Park with a single support. It would also remove the visually obstructive portion of Pier 1 above the Harbor Wall. These changes would provide a better and safer public space, as well as improved views for park users. The Enhanced Seismic Retrofit Alternative, had it been selected, would have increased the size of the columns for all the Waterfront park supports. It also would have infilled the Pier 1 support, thereby further obstructing the views of the river. It would also impact the utilities connecting to the Ankeny Pump Station and its seawall.

The Enhanced Seismic Retrofit Alternative has the highest life cycle cost of all alternatives.

In general, seismically retrofitting rather than fully replacing a bridge can reduce construction costs. However, the extensive retrofitting required to achieve the project's seismic design criteria for the nearly 100-year old Burnside Bridge adds substantial costs to construction. This is largely because it was never designed for any amount of earthquake loadings when originally designed. In fact, the Enhanced Seismic Retrofit would result in the second highest construction cost of all the build alternatives, a higher cost than a new bridge in several cases. In addition, given the age of the bridge and the need to have a service life for another 100 years, the long term maintenance costs for the Enhanced Seismic Retrofit would far exceed those of the replacement alternatives, making the Enhanced Seismic Retrofit the highest life cycle cost alternative.