



DATE: June 3, 2021
TO: Environmental Services Commission
FROM: Doug Lane, Utilities Department Senior Engineer
SUBJECT: Water System Seismic Resiliency Study Update

ACTION REQUIRED

No action required.

BACKGROUND / ANALYSIS

Bellevue's water distribution system and the regional water supplies were designed and constructed prior to a full understanding of local earthquake potential. As a result, this infrastructure is vulnerable to significant service disruption caused by severe earthquakes along the Cascadia Subduction Zone and the Seattle Fault. In late 2018, Seattle Public Utilities issued a report that in either of these events, regional water service may be completely unavailable for 3 weeks, followed by a long recovery period with only partial service for a period of months. SPU developed a 50-year plan to improve resiliency and recovery time, and Bellevue undertook a similar effort for our own system.

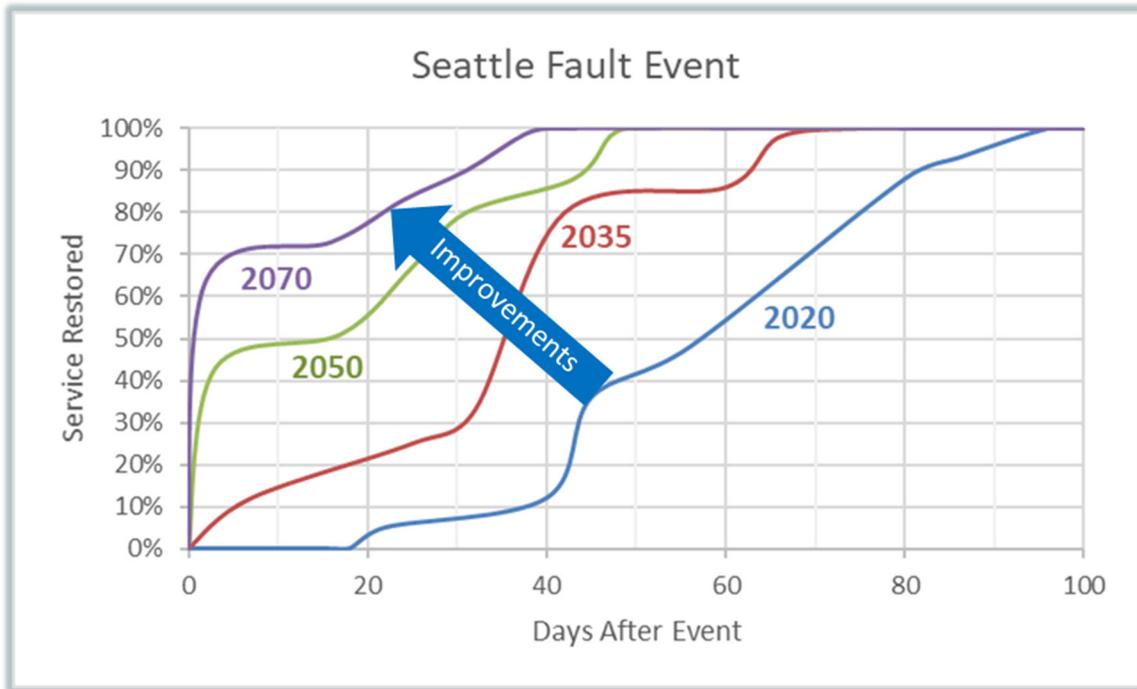
At the November 2020 ESC meeting, staff presented mitigation timetable options for how long the City could take to improve our water system seismic resiliency. Options ranged from "never", to "as soon as possible". A risk-based 50-year strategy, in line with industry benchmarks, was recommended. This includes prioritized improvements selected to mitigate the highest risks at a reasonable cost.

Also at the November 2020 meeting, proposed post-earthquake level of service (PE-LOS) goals were presented. Goals represent the amount of time it takes to restore service following either the Seattle Fault or Cascadia Subduction Zone event. Those proposed goals were used as targets for developing a set of mitigation recommendations to improve performance. Recovery time improves with each successive period of mitigation improvements (short-, medium-, and long-term).

On June 3, staff will present recommendations developed with our consultants to meet the proposed PE-LOS goals. There are three categories of recommended mitigation improvements:

- **Supply:** Add independent groundwater wells, while lobbying Seattle to prioritize local improvements to the regional system that benefit Bellevue.
- **Backbone:** Add a network of resilient pipelines to key points that can be relied on while the overall system is being repaired.
- **Distribution System:** Continue existing renewal and replacement (R&R) programs, which already provide significant current and future seismic resiliency improvements. Adjust prioritization within these existing programs to account for seismic risk reduction.

The figure below shows simulated recovery time with the existing system (2020), after short-term improvements (2035), after medium-term improvements (2050) and after long-term improvements (2070).



Staff will also present the methodology used to estimate the benefits (reduced risk of economic damage) versus the costs of mitigation projects. Predicted economic damage to Bellevue resulting from water service disruption is estimated at \$8.3B for a magnitude 6.6 Seattle Fault event, and \$2.4B for the magnitude 9.0 Cascadia Subduction Zone event. The implementation of recommended improvements over the next 50 years can reduce potential economic damage to less than \$1B for both events.

POLICY ISSUES

The recommendations for mitigation projects are intended to satisfy the proposed new PE-LOS goal policy in the upcoming Emergency Water Supply Master Plan. Draft PE-LOS goals and industry benchmarks were presented at previous ESC meetings, but the final proposed policy will be presented with the Draft master plan seeking adoption at a future ESC meeting.

FISCAL IMPACT

The results of the study will inform future mitigation project investment funding needs.

ATTACHMENTS & AVAILABLE DOCUMENTS

None