

## Critical Buildings – Recommendations Summary

### Preliminary Report to OSSPAC

A summary of the recommendations for Oregon's critical and vulnerable structures is provided below. These recommendations are not intended to apply to one and two family dwellings, buildings in low seismic hazard areas, and other building code exempt structures.

#### Immediate Actions

**1. Establish a State Office of the Structural Engineer**

*Finding:* The State does not currently have a lead office to provide the resources and leadership necessary for coordinating and implementing a statewide seismic resilience plan.

*Recommended:* Establish and fund a State Office of the Structural Engineer to provide leadership, resources, advocacy, and expertise in implementing a statewide resilience plan.

**2. Education:**

*Finding:* There is a much greater need for education and awareness of the impact a Cascadia Subduction Zone (CSZ) event would have, and how to prepare for it so that we have a resilient State

*Recommended:* Programs should be encouraged and implemented to provide a broad range of education, public awareness, and public relations regarding the CSZ risks and State Resilience.

**3. Building Inventory:**

*Finding:* A complete statewide inventory of critical buildings does not exist, but is needed for future planning, assessment and upgrading of critical building structures.

*Recommended:* An inventory should be compiled within 5 years that includes an initial seismic screening of each building and updates to the existing inventory. More detailed evaluations should be completed for those buildings identified by the initial screening to be the most susceptible to damage from an earthquake.

**4. Emergency Response:**

*Finding:* Outside of government employed emergency responders, there are not uniform organization, procedures or protections for volunteer responders from the private sector to assist in the response following a CSZ event.

*Recommended:* Maintain a comprehensive database of ATC-20 certified post-earthquake inspectors, establish procedures for their engagement and response following an event, and strengthen Good Samaritan laws to protect them.

#### Sustained Actions

**5. Essential Facilities:**

*Finding:* The estimated current state of Hospitals, Emergency Operation Centers, Fire and Police Stations falls significantly short of the target state need for these facilities to be immediately available following the CSZ event.

*Recommended:* Hospitals should be upgraded within 15 years of completing an inventory and seismic evaluations. Emergency Operation Centers, Fire and Police Stations should be upgraded within 20 years if the building is a URM or non-ductile concrete structure, or 30 years if it is of other construction. Non-structural elements in these buildings should also be upgraded within the same timeframes, and ORS 455.400 should be strengthened and updated for consistency with these recommendations.

**6. K-12 Schools:**

*Finding:* The current average estimated state of recovery for K-12 school facilities in the Coast and Valley regions of Oregon falls significantly short of the recommended target state, despite an existing statute directing seismic retrofit before January 1, 2032.

*Recommended:* Increase state investment in seismic retrofit of schools; prioritize the replacement of structure types that present the greatest hazard to their occupants in a seismic event; promote ASCE-31 (or equivalent) engineering assessment of existing school facilities; and update the state's database of public school facilities on a regular basis.

**7. More Comprehensive Passive Trigger Seismic Strengthening Program:**

*Finding:* The existing building code includes triggers that require building upgrade for a change of occupancy or increase in structural loads, but do not go far enough, allowing major building upgrades to deficient structures without requiring seismic strengthening.

*Recommended:* Expand the triggers for seismic upgrade to include changes in the level of occupancy risk, major building renovations, and re-roof of URM and non-ductile concrete buildings. Give seismic upgrades the highest priority for non-conforming upgrades, and allow them to be phased over 10 years if needed.

**8. Vulnerable Buildings:**

*Finding:* Unreinforced Masonry (URM) and Non-ductile Concrete Buildings are generally the most dangerous types of buildings in an earthquake, and should not be allowed to remain in service indefinitely unless they are fully upgraded.

*Recommended:* Initially, the danger of URM and non-ductile concrete buildings should be disclosed at the time of building sale or lease. Through market pressures and upgrades triggered by other building repairs and changes, upgrades can be made to many of these structures. For those not upgraded by these means, deadlines for mandatory upgrade of roof-to-wall connections, diaphragms, parapets and appendages are recommended within 15 years, and a complete building upgrade within 30 years.

**9. Improved Plan Review and Construction Oversight**

*Finding:* Structural plan reviews are often being done by individuals who would otherwise not be qualified to provide the design being reviewed. Additionally, special inspections and structural observations are not currently required by code for certain structure types and elements important for resilience.

*Recommended:* Require a licensed Design Professional or Structural Engineer provide plan reviews, reciprocal with the licensing required to provide the design. Expand Special Inspections and Structural Observations to include most commercial structures, critical non-structural components, and wall connections in tilt-up and CMU buildings with light framed roofs and floors.

**10. Earthquake Performance Rating System:**

*Finding:* Public knowledge of the seismic safety of the buildings they own, live, and work in is often limited, or misinformed, especially when compared with other hazards.

*Recommended:* Encourage and promote a voluntary, standardized rating system for the expected

earthquake performance of buildings, similar to the LEAD rating used for green buildings. The system should be easily understood and readily available to anyone with an interest or stake in the building.

**11. Performance Based Design:**

*Finding:* Many new buildings will be built over the next 50 years, but current code is only intended to protect life-safety, not provide resilience.

*Recommended:* Incentives should be adopted to encourage owners to build to higher performance standards than the code minimum. Research should also be funded to provide better tools and consensus for performance based design.

**12. New and Existing Building Sites:**

*Finding:* Geologic hazards, including landslides, liquefaction, lateral spreading and tsunami inundation are a significant cause of building damage in earthquakes, but are often unknown or not properly mitigated.

*Recommended:* Current laws restricting certain essential and critical facilities on these sites should be expanded to include evaluation and mitigation for all new construction on building sites with geologic hazards. Hazards on existing sites should be disclosed at the time of sale, and the hazard information made readily accessible through a centralized website.