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## **Grays Harbor County School to Build first U.S. Vertical-Tsunami Refuge.**

A new scenario for a Cascadia megaquake and tsunami warns that more than 10,000 could be killed and 30,000 injured. But a school district near Westport, Grays Harbor County, is doing everything it can to keep its students safe.

A new [scenario](#) for a megaquake and tsunami off the Washington coast warns that the death toll could top 10,000 — but Paula Akerlund is doing everything she can to keep her kids safe. All 700 of them.

The Grays Harbor County school district Akerlund oversees on the Washington coast is preparing to build the nation's first tsunami refuge.

Residents of Westport, Grayland and other communities in the [Ocosta School District](#) approved a \$13.8 million bond issue earlier this year to replace a flimsy elementary-school building with a complex that includes a gym strong enough to withstand tsunami surges, tall enough to stay dry and big enough to shelter more than 1,000 people on its roof.

"We're probably less than a mile from the Pacific Ocean, and we have no hills to run up or other natural high ground," Akerlund said. "Our only alternative is to get as high as we can, as fast as we can."

In the wake of a magnitude-9 quake on the Cascadia Subduction Zone — a 700-mile-long offshore fault — the resulting tsunami is expected to slam into Westport and other parts of Washington's outer coast within 20 to 30 minutes.

Ocosta Elementary and Ocosta Junior/Senior High School sit side by side on a highly vulnerable peninsula, connected to the mainland by a bridge that is likely to be damaged in the quake.

During Thursday's statewide earthquake drill, the Great Washington ShakeOut, the children will follow their current evacuation plan, which calls for gathering on the second floor of the high school. But that building isn't very tall — and was constructed before the risk of megaquakes and tsunamis was known, Akerlund said.

The new gym will be built on a small hill, and its roof will sit about 55 feet above sea level. That's well above the tallest surges tsunami modelers predict for the school site, said Chuck Wallace, deputy director of emergency management for Grays Harbor County. "We're pretty much using our worst-case scenario for height."

Two previous bond measures to upgrade aging school buildings had failed when Wallace, Akerlund and other local officials decided to fold the tsunami refuge into their plans. "We just thought it made a lot of sense, since we needed to rebuild anyway," Akerlund said.

Even though Grays Harbor County has one of the state's highest unemployment rates, the measure

passed overwhelmingly.

“The community really stepped forward to say: We’re going to do this for our children,” Akerlund said.

The gym will also provide a refuge for nearby residents.

Several other coastal communities in Washington and Oregon have considered so-called vertical-evacuation towers, berms or other structures, but Ocosta’s is the only one with a guaranteed source of funding. Akerlund said construction is expected to start next summer.

“It’s really exciting that the first tsunami vertical-evacuation refuge in the United States is going to be built here in Washington,” said John Schelling, earthquake and tsunami program manager for the Washington Emergency Management Division. “My hope is that this really serves as a catalyst up and down the coast.”

Making the gym sturdy enough to survive a tsunami will add about 20 percent to the cost, said Cale Ash of Degenkolb Engineers, which is helping design the project. The building must be constructed on deep pilings, in case the tsunami scours out the foundation, he explained.

The gym will be bolstered by reinforced concrete cores at each corner with staircases leading to the roof. Even if the walls are ripped away, the cores should remain intact through both the quake and the tsunami, Ash said.

The school district and county have applied for a \$2.25 million Federal Emergency Management Agency (FEMA) grant to help defray the extra cost and allow for a larger building capable of sheltering up to 1,500 people.

“We are committed to doing this, but it would sure help us to have some additional funds,” Akerlund said.

The new megaquake scenario, released Monday by CREW — the [Cascadia Region Earthquake Workgroup](#) — underscores the need for better preparedness across Washington, Oregon, British Columbia and Northern California.

The last Cascadia megaquake and tsunami struck in 1700. The average interval between the most powerful quakes is about 500 years, but geologic records show that some were separated by as little as 200 years.

The report estimates more than 30,000 people will be injured in the region’s next magnitude-9 quake and tsunami. Damage in Washington and Oregon alone is likely to exceed \$80 billion.

Though the tsunami itself isn’t expected to do much damage inside Puget Sound, the intense ground shaking — which can go on for five minutes — could unleash landslides and undermine ports, ferry terminals and fuel terminals. It could also do serious damage to tall buildings, which are particularly vulnerable in the biggest quakes, the report says.

In areas like Renton and the Kent Valley, loose soils will liquefy, causing buried water and sewer lines to rupture — and the damage could take several years to repair, Schelling said.

Roads and bridges are also vulnerable, but the experience from Chile’s 2010, magnitude-8.8 quake proves the value of being prepared, Schelling added. Though the country’s Route 5 — the equivalent of Interstate 5 — was badly damaged, an alternate route was opened within 24 hours, complete with

portable refueling and comfort stations.

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