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Creating Higher Ground at Sea Level

Time is critical to maximizing survival in a disaster, but after an earthquake, there may only be a few minutes after the shaking stops before tsunami waves crash ashore. In **Washington** state, depending on the time of year, 50-200,000 people could be in a tsunami zone who may not have time to reach high ground before the waves arrive.



Recognizing this significant hazard, communities in Washington state are digging deep (literally) to build **Tsunami Vertical Evacuation Structures**. The structures themselves vary but are designed with steel and concrete and are high enough for people to stand on for 24 hours above tsunami waves, with pilings that reach deep enough into the ground to remain secure even in sandy beach areas.

Due to the geographical risks in Washington state, the state estimates that more than 50 of these structures will eventually be needed to maximize the potential for lives saved in the event of a Cascadia earthquake and following tsunami, and some of the areas at risk lie on tribal land. **The Shoalwater Bay tribe took steps to mitigate this risk and was the first tribe in the nation to secure funding to build a vertical evacuation structure.**

As a complex infrastructure project, **partnerships at all levels were essential to its success.** Washington Military Department's Emergency Management Division provided support to the tribe during the process by providing technical assistance and convening appropriate subject matter experts to support the development of an effective FEMA Pre-Disaster Mitigation (PDM) program application. The state also supported the extensive structural development process which included site-specific tsunami modeling and physics-based scenario modeling for determining the required size and strength of the structure, developing an accurate benefit-cost analysis, and long-term project management.

Final decisions made around building the structure, including its location, were made by the Shoalwater Bay tribe following years of local community input. The tribe determined it had 80-100 members who would be in danger in the event of a tsunami, but that its neighboring community, Tokeland, had approximately 300 people who would not make it to high ground without access to a tower. The Shoalwater Bay tribe chose to locate the tower on the corner of their land to accommodate their neighboring community's need.

Knowing that undertaking the process to build a vertical evacuation structure is intensive, Washington EMD also developed a manual and supporting documents for communities to utilize before and during the public process, including cost estimates for similar structures. Complex infrastructure projects like these are time- and cost-intensive, and in Washington state have been primarily funded under the previous PDM grant program. Washington is now moving to adapt to the new funding stream through the Building Resilient Infrastructure and Communities (BRIC) program.

"We are excited and thankful for all the hard work and great collaboration that went into making this successful! This will be the second tsunami vertical evacuation structure in our state, which will save hundreds of lives when a tsunami hits our coast. This is just a start though. We need many more of these structures in Washington and we will continue to work hard to get them built." - Maximilian Dixon, Hazards and Outreach Program Supervisor, Washington EMD

Whether it is a tsunami, or whether it is a hurricane, whether it's an earthquake - when we see these great fatal and natural acts, men and women of every ethnic persuasion come together and they just want to help.

-Martin Luther King III

If you would like more information or have a state practice you'd like to highlight as part of this ongoing series, please contact Lauren Goodwillie.

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