

MSI Building at Hatfield: Quick Reference

- The Hatfield site has developed on a sandbar that was mapped as part of the Bay in 1930. A ferry dock and causeway called Ferry Slip Road were added prior to the construction of the Yaquina Bay Bridge in 1934.
- Filling in of the area between land and the ferry slip continues to present. Roughly 2 m (6') of fill have been added in recent years to raise and level the site.
- Earthquake/Tsunami issues were not considered in the original development of the site by OSU and federal and state agencies. Some structures were there prior to recognition of plate tectonics.
- Borings obtained during geotechnical analysis prior to recent development by NOAA indicate that the site is underlain by 21-38 m (70-124') of liquefiable sand/silt with several unconsolidated liquefiable intervals.
- The DOGAMI Cascadia study group investigated possible earthquake sources, and the resultant tsunami hazards 2008-2013. This was a comprehensive, coast-wide study that included earthquake sources, tectonic deformation, hydrodynamics and tsunami inundation. This work is being emulated in California and Washington. 1000's of model runs investigated a wide range of variation in source parameters.
- Earthquake/Tsunami "sizes" were binned by frequency based on onshore and offshore paleoseismology and named after "T-shirt sizes." HMSC flow depths above the parking lot are as follows for the DOGAMI preferred models. Each flow depth is associated with a range of earthquake magnitudes because several factors affect tsunami height in Newport. (Hatfield parking lot NAVD 88 ht = +3.6 m (11.7') (NAVD 88 roughly = Mean Low Water).

Medium = flow depth of ~4.1 m (13.5'), magnitude M 8.5-9.0

Lg = flow depth of ~6.8 m (22.3'), magnitude M 8.6-9.1

XL = flow depth of ~8.6 m (28.2'), magnitude M 8.8-9.2

XXL = flow depth of ~9.5 m (31.2'), magnitude M 9.2-9.3

- Estimated flow depth for the XXL event is 9.5m (+/- tidal variation). This includes tectonic subsidence of ~1m, but does not include expected liquefaction or lateral spreading. Similar earthquakes in similar environments in Japan produced 0.5-0.8 m liquefaction subsidence.
- USGS estimates of aggregated Peak Ground Acceleration at the site for a 2500 year event are 0.86 g. In Japan, 2011, measured accelerations at coastal sites were 0.8-1.3 g.
- Recurrence time for earthquakes in Cascadia is inferred from paleoseismic studies in coastal bays, inlets, offshore turbidites and inland lakes. Estimates of the recurrence interval for an M~8 or greater earthquake for the central Oregon coast ranges from 320-500 years. These recurrence intervals imply a probability of 15-20% for an M≥8 earthquake in the next 50 years. The probability for a particular magnitude decreases as the magnitude increases; however it is not possible to forecast either the time or magnitude of the next event.
- Horizontal evacuation plans for the HMSC direct people to Safe Haven Hill, located 1.6 km (1 mile) away. The time between the earthquake and the arrival of flooding depends on the location of the earthquake source, and can range from 20-40 minutes. This time will not be known a priori, so the minimum time should be assumed for planning.
- Factors to consider when planning for evacuation also include the likelihood of liquefaction, local flooding due to subsidence during the earthquake, downed powerlines and rough ground due to shaking and lateral spreading.
- Evacuation must also consider the transport of disabled individuals to Safe Haven Hill. Recent case law and a 2004 Executive Order have effectively extended the ADA to include emergency services. Building egress for the disabled will be required in addition to transport time to Haven Hill. Note that power may be out after the earthquake.
- In countries with long experience of tsunami, high occupancy buildings are discouraged or prohibited in the tsunami flooding zone. In Japan, a new law designates areas with 4 meters or more of tsunami inundation as "Red" zones. This is nationwide. People are being asked to move out of these zones. No residences, hospitals, or schools are allowed in red zones. Factories are allowed as long as evacuation is simple, and they are only occupied during the day. Facilities may be constructed in red zones with difficult evacuations only if they are constructed to resist tsunami and have higher floors for evacuation.

<http://www.loc.gov/law/help/japan-earthquake/>

<http://www.nature.com/news/rebuilding-japan-after-the-deluge-1.10172>

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