2001-2021

EARTHQUAKE PREPAREDNESS

An Overview of Major Earthquake Preparedness Actions Undertaken in the City of Seattle Since the 2001 Nisqually Earthquake

Seattle
Office of Emergency Management

FACILITIES AND INFRASTRUCTURE UPGRADES

MAJOR INFRASTRUCTURE PROJECTS

Seismic Retrofit and Replacement of Fire Stations

The 2003 Fire Facilities and Emergency Response Levy funded the replacement, retrofitting, or renovation of 32 Seattle fire stations, in addition to a new Emergency Operations Center.

Project Cost: $ 303 million Completion Date: 2018

Key Facility Replacements

The City of Seattle has replaced outdated and seismically unsafe public buildings with new ones built to modern codes and new "green" design standards. The new City Hall ($73 million) was completed in 2003 and the Seattle Justice Center ($92 million) in 2002.

Project Cost: $165 million Completetion Date: 2003

Alaskan Way Viaduct Replacement

The two mile long SR 99 tunnel replaced the Alaskan Way Viaduct. Because of the viaduct's age and vulnerability to earthquakes, replacing it was critical to public safety.

Project Cost: $3.3 billion Completion Date: 2019 (tunnel opened)

Elliot Bay Seawall Project

The new Elliot Bay seawall, completed in 2017, has been built to meet current seismic standards, protecting public safety and acting as the foundation for Seattle's new waterfront.

Project Cost: $410 million Completetion Date: 2017

SEISMIC UPGRADES TO BRIDGES

The Seattle Department of Transportation (SDOT) has done significant work to make Seattle bridges safer since the 2001 Nisqually earthquake. The majority of bridge improvements have been made with funding from two voter approved levies passed in 2005 (Bridging the Gap) and 2015 (Move Seattle). Additional bridge improvements have been funded through

Bridging the Gap Levy (2005)

- Airport Way (over Argo Railyard)
- Albro Pl (over Airport Way)
- Ballard Bridge (N and S approaches)
- Fauntleroy Expressway
- East Duwamish Waterway Bridge
- E. Marginal Way @ Horton
- King St Bridges
- Fairview Ave N
- NE 45th St Viaduct (west approach)
- Yesler Bridge

Workers complete seismic upgrades to the N Queen Anne Dr Bridge

Move Seattle Levy (2015)

- Cowen Park Bridge
- Howe St. Bridge
- SW Andover Pedestrian Bridge (Design Completed)
- 8th Ave NW/NW133rd St (Design Completed

Other Funding Sources

- N Queen Anne Dr Bridge (FEMA Mitigation Grant)
- NE 45th St Viaduct (Federal Highways Grant)

View an interactive map with more details on bridge improvements

OTHER FACILITY & INFRASTRUCTURE PROJECTS

Seismic Upgrades to Parks and Recreation Facilities

Several City owned community spaces have had seismic upgrades that will make them safer spaces during an earthquake, reducing the risk of collapse or damage and improving life safety.

- Jefferson Community Center (2013)
- Langston Hughes Performing Arts Center (2012)
- Hiawatha Community Center (In design, construction expected 2021/22)
- Madison Pool (2019)
- Magnolia Community Center (In design, construction expected 2021/22)
- Magnuson Park Bldg 11 (2018)
- SLU Armory (MOHAI)
- Queen Anne Community Center (2009)

Jefferson Community Center, seismic retrofit completed in 2013

Emergency Generator Installation

Parks and Recreation facilities are a critical part of the City's sheltering plan. Ensuring that these facilities remain safe and functional after an earthquake will allow us to provide post-disaster sheltering services. Since 2003, eight potential shelter locations have had emergency generators installed which will allow them to maintain service despite potential utility outages.

- Bitter Lake Community Center
- Delridge Community Center
- Garfield Community Center
- Jefferson Community Center
- Meadowbrook Community Center
- Queen Anne Community Center
- Rainier Beach Community Center
- Southwest Teen Life Center

Emergency Gas Shut Off Valves

To reduce the chance of earthquake-related fires, automatic natural gas shut off valves were installed at thirty-five city facilities. These valves will automatically turn off natural gas during a moderate to severe earthquake. This protects not only the buildings themselves – including fire and police stations, key operations facilities, and community centers – but also the employees and residents who use them on a daily basis.

OTHER FACILITY & INFRASTRUCTURE PROJECTS

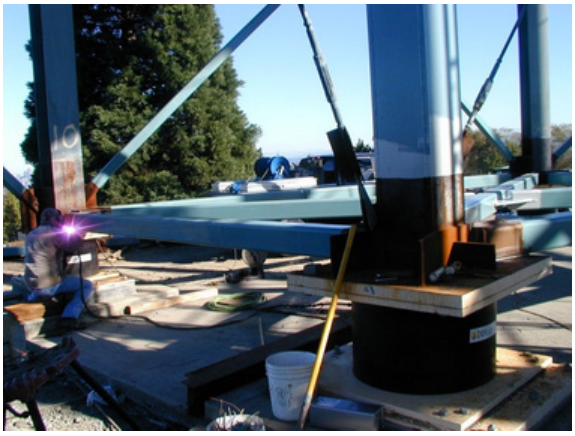
Shelter Supplies

The 2003 Fire Levy funded the purchase of emergency shelter supplies and established four caches of supplies throughout the city. These caches are able to provide assistance for 3,500 displaced people who may seek shelter in an earthquake or widespread disaster. Contents include cots, blankets, shelter kits, nurse kits and emergency radios. The supplies are strategically located in Magnolia, North Seattle, Central/Southeast Seattle and West Seattle.

Protecting the Water System

SPU has spent more than $100 million on seismic upgrades to transmission pipelines, pump stations, storage tanks, and other projects. Several reservoirs have been seismically upgraded with the goal of minimizing water losses after an earthquake.

Earthquake resistant pipe installation in Pioneer Square



Seismic upgrades being made to the Myrtle Reservoir water tank

Areaways Mitigation

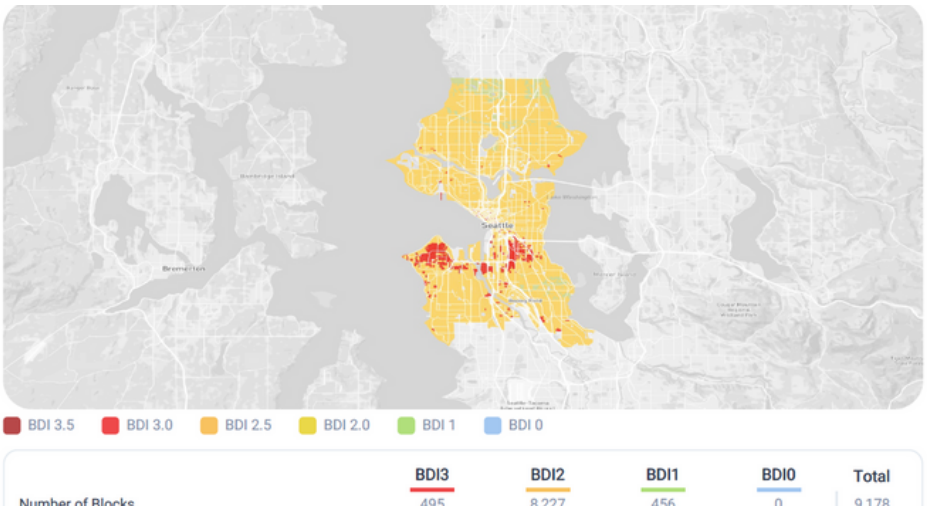
Columbia St areaway with shoring being added during the retrofit

Many of downtown Seattle's surface streets and sidewalks are built on areaways: open areas underground that once were the city's "ground level" before the street levels were raised following the Great Seattle fire in 1889. The 100 year-old brick walls that form these areaways are known to be vulnerable to earthquake damage. As part of its on-going Areaways Program, the Seattle Department of Transportation (SDOT) implements mitigation projects for areaways that reduce risks to City facilities and the general public. FEMA Hazard Mitigation grants helped fund the retrofit of areaways at Columbia St and Post Alley.

OTHER FACILITY & INFRASTRUCTURE PROJECTS

Seattle Information Technology Upgrades

Seattle IT has completed a new Western data center and Eastern data center located in diverse locations to provide redundancy for the City's IT services. In the event of a catastrophic earthquake within the Seattle Urban Area, basic information technology network, systems, and critical applications either fail over to or can be recovered using existing server capacity at the Tierpoint Eastern Data Center located in Liberty Lake, WA a suburb of Spokane WA. Seattle IT has also engaged cloud computing capabilities provided by multiple vendors that adds to the City's IT disaster recovery capabilities.



ALERT SEATTLE

EMERGENCY ALERTS AND NOTIFICATIONS

PLANNING, TRAINING, AND EXERCISE

PLANNING, STUDIES, AND ASSESSMENTS

Emergency Management Accreditation

In 2015 the City's emergency management program earned accreditation through an internationally recognized, independent accreditation process. The Emergency Management Accreditation Program (EMAP) assesses emergency management programs against 64 established standards through self-assessment, peer review and committee and commission review, and accredits qualifying state and local emergency management programs across the country. Seattle will be seeking reaccreditation in the fall of 2021.

Seattle Disaster Recovery Framework

On Nov. 14, 2016, the City Council formally adopted the Seattle Disaster Recovery Framework. The Framework was developed to address how the City would partner with the community and coordinate with County, State and Federal agencies in recovering from the effects of disaster, using a massive earthquake as the premise. Consultants and staff researched lessons and best practices from communities' recovery from Hurricanes Sandy, Irene, and Katrina as well as earthquakes in New Zealand, Chile, and Japan. The heart of the Framework is the Disaster Recovery Organization structure, which establishes a post-disaster governance and oversight structure, seeking to leverage and coordinate the resources, intelligence, and energy of our community, including public, private, and not-for-profit organizations.

Regional Catastrophic Planning

From 2012 to 2014, Seattle was a major partner in the creation of an eight-county Puget Sound Regional Catastrophic Plan that outlines how the region will coordinate and manage resources in several key areas such as transportation, health and medical services, firefighting, communications and mass fatality management during a catastrophic earthquake.

Enhanced Emergency Alerting Capability

Alert Seattle, the city's official alert and notification system was launched in 2015. Since then, over 55,000 people have signed up to receive emergency alerts directly via text message, email, and voice calls. In 2020, the Office of Emergency Management and other select City departments obtained authorization to issue Wireless Emergency Alerts. This capability will allow us to quickly and broadly alert the public during incidents that pose an immediate threat to life or property with alerts directly to mobile phones. Previously these types of alerts had to be issued via the State or County.

Water System Seismic Study (2018)

This study modeled impacts of a magnitude 7.0 Seattle Fault Zone earthquake and a magnitude 9.0 Cascadia Subduction Zone earthquake. The study identifies over $850 million of seismic investments over the next 50 years. Improvements include installing earthquake isolation valves on reservoirs and upgrading high-risk portions of the water system.

PLANNING, STUDIES, AND ASSESSMENTS

OneConcern

In 2019, The Office of Emergency Management entered into an agreement with One Concern to pilot the company's new earthquake loss estimation tool, Seismic Concern. The software allows the City to gain a better understanding of where major damage will occur in different earthquake scenarios. Several projects have been completed including one that demonstrated how earthquakes, like other disasters, affect low income and minority communities disproportionately. This work allows the City to target outreach and planning towards those who can most benefit. The software has also been used to estimate the benefits from retrofitting unreinforced masonry buildings, the number of people the City will need to shelter in various types of earthquakes, how to better support people with access and functional needs, and identifying the best locations for Community Points of Distribution (CPODs).

Cascadia Rising Exercise: 2016

In June of 2016 Seattle participated in the region's largest ever earthquake exercise, Cascadia Rising. Exercise participants included state, local, tribal and federal government agencies, and private sector and non-profit organizations from across Washington, Oregon, and Idaho. The exercise was designed to test the ability of EOCs at all levels of government to coordinate joint interagency disaster operations in response to a magnitude 9.0 catastrophic earthquake and coastal tsunami. It also incorporated practice of military support to civilian operations with National Guard and Department of Defense assets. Over 300 City department representatives, agency partners and nongovernmental stakeholders were in the Seattle EOC over the two-days of exercise play. The exercise players focused on: operational coordination, operational communications, situational awareness and mass care services. Several problem solving scenarios allowed the EOC to address fuel prioritization, sheltering of over 30,000 people, conducting holistic damage assessment and dealing with multiple location needs for incoming resources.

In addition the Cascadia Rising exercise in 2016, Seattle and the Puget Sound region have participated in additional large functional exercises since 2001 where each event provided lessons learned that then further influenced our earthquake planning and preparedness efforts. City of Seattle participated in: Sound Shake 2008, Sound Shake 2010 and the Evergreen Quake exercise in 2012.

Emergency Operations Center: Alternate Site Planning and Exercise

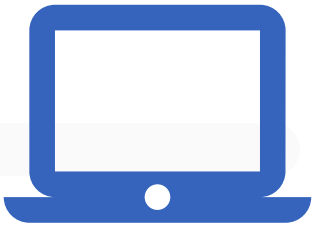
Seattle OEM has partnered with Seattle Colleges, the University of Washington and the Bill and Melinda Gates Foundation to secure spaces that could be used as alternate emergency operation center locations in the event that the City EOC is inaccessible or not functioning. OEM has worked closely with these institutions to identify appropriate spaces and to test on site systems to ensure that city personnel could quickly deploy to these locations and initiate citywide coordination activities during a disaster. OEM leads annual EOC relocation exercises during which department representatives report to alternate EOC sites and test equipment and processes needed to manage citywide coordination and communication.

PLANNING, STUDIES, AND ASSESSMENTS

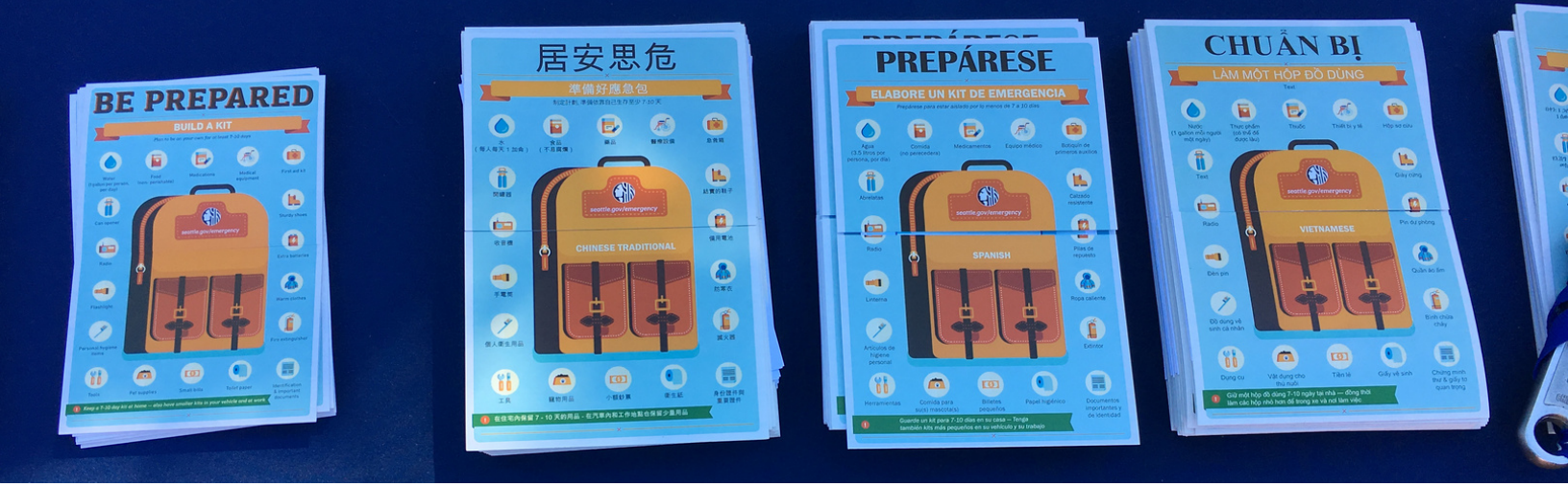
Unreinforced Masonry Buildings

Unreinforced masonry buildings (URMs) are old brick buildings typically built prior to 1945 that are more likely to experience damage or collapse during an earthquake. Seattle has over 1100 URMs. Since the 2001 Nisqually earthquake, the City of Seattle has spent significant energy analyzing the issue of unreinforced masonry buildings and developing possible policy options to reduce the risk of injury and loss of life caused by these buildings in the case of an earthquake. Learn more about the ongoing work around URMs at the SDCI website.

View the Seattle Hazard Explorer to learn more about URMs and see where known URMs are located in Seattle



Learn more about the URM inventory and the recommended retrofit policy through this interactive presentation



COMMUNITY OUTREACH AND EDUCATION

COMMUNITY OUTREACH AND EDUCATION

The Seattle Office of Emergency Management (OEM) reaches on average 10,000 people per year with in-person emergency preparedness training. OEM regularly assess current programming and develops new programming to best meet the needs of the community, while prioritizing service to those likely to be most impacted by a disaster. Below are some highlights of this work.

Community Safety Ambassador Program

Seattle OEM launched the The Community Safety Ambassador (CSA) program in 2015 to reach Seattle communities that would be most impacted by a major disaster. The program enlists community members from those groups to provide outreach and training in multiple languages on disaster preparedness and emergency response skills. Since 2019 the CSA program has expanded to include partnerships with non-profits, including Villa Communitaria and the International Rescue Committee.

23,000+ BIPOC, immigrant, senior and low income individuals have participated in preparedness programs, such as workshops and community outreach activities since the CSA program laucnhed.

16 CSAs who speak 13 different languages: Amharic, Burmese, Cantonese, Khmer, Kiswahili, Lao, Mandarin, Oromo, Somali, Spanish, Thai, Tigrinya, Vietnamese

Community Emergency Hubs

The City supports the Community Emergency Hub program as a way for neighbors to help each other during a disaster. An Emergency Hub is a gathering place where neighbors come together to share information, resources and problem-solve after a major disaster. The City has consistently collaborated with Hubs on training, outreach. and exercises. The City has also directly supported the expansion of Hub locations by designating funding for equipment and supplies at Hub locations, and designating some community garden locations as Hubs. Since 2016, over $65,000 in City funds have been allocated to provide equipment and supplies to Emergency Hubs through the Hub-In-a-Box program. These funds have helped establish or increase the capability of 35 separate Hub locations throughout the city.

COMMUNITY OUTREACH AND EDUCATION

Home Retrofit Program

The City's Seismic Home Retrofit program has been a mainstay of OEM's training program since 1998, and provides free resident training throughout the year. During the two-hour class, homeowners are given instruction on what tools and techniques should be used to seismically retrofit their homes and how to benefit from existing plan sets and discounted permitting processes available through the Seattle Department of Construction and Inspections. Over 5,000 people have attended home retrofit training since the program began.

Stop the Bleed Program

OEM launched the Stop the Bleed program in 2018 and since then has trained over 500 community members and City of Seattle staff on how to treat life threatening bleeding. Stop the Bleed training empowers people to appropriately treat life threatening injuries before first responders arrive or when responders are overwhelmed. These skills are especially relevant to an earthquake response, when first responders will likely be overwhelmed and people's first source of help will be those immediately around them. The Stop the Bleed program also places public access bleeding control kits in community spaces. Since 2018 OEM has placed over 40 public access bleeding control kits in community spaces. Each kit has enough supplies to treat between 2-8 patients. The kits are purchased using Department of Homeland Security grant funds.

OEM delivers 12 public access bleeding control kits to be placed throughout the Seattle Center campus

Online Tools and Resources

Since 2014, OEM has focused on developing more online and multi-language materials to increase our reach to the community with preparedness information. Here are just a few of the tools and resources we have developed.

Be Prepared Infographic	Seattle Hazard Explorer	Hazard Ready Seattle-King County	OEM YouTube Channel
Easy to understand earthquake preparedness guidance available in 16 languages	Interactive map series to help people understand the risk from earthquake and other hazards	Online tool in multiple languages to help people understand risks for their location and steps they can take to prepare	Videos in multiple languages to help people learn important disaster preparedness and response skills