



Waterfront Plan Working Group

Meeting: April 13, 2016

Seawall Seismic Study Meeting Notes

Members Present: Grant Ballard, Kirk Bennett, Reid Boggiano (State Lands), Chris Christensen, Jane Connors, Carolyn Horgan, Aaron Hyland, Earl James, Ellen Johnck, Ken Kelton, Janice Li, Ron Miguel, Stewart Morton, Jacquelyn Omotalade, Alice Rogers, Jasper Rubin, Cristina Rubke, John Tobias, Dilip Trivedi, Anne Turner, Maggie Wegner (BCDC), Corinne Woods

Absent: Mike Buhler, Kevin Carroll, Jeffrey Congdon, Jon Golinger, Stephanie Greenberg, Michael Hamman, Rudy Nothenberg, Karen Pierce, Tom Radulovich, Frank Rescino, Linda Fadeke Richardson, Peter Summerville, Dee Dee Workman

1. Welcome & Acceptance of March 23 Working Group Meeting Notes (6:00-6:10)

- Welcomed attendees, briefly described the evening's program
- Working Group accepted March 23, 2016 Working Group Meeting meeting notes
- Announcement about updated meeting date schedule which has been posted on the website; Co-Chair Li asked Working Group members to fill in survey to determine date for meeting to address Transportation
- Link to Working Group meeting documents: <http://sfport.com/waterfront-plan-archives>
- Link to SFGov TV meeting video: http://sanfrancisco.granicus.com/viewpublisher.php?view_id=183

2. San Francisco Seismic Study and Preparedness Planning (6:15-7:15)

Seawall Seismic Study: Steven Reel, Port Project Manager, Port Engineering Division

- Link to presentation: <http://sfport.com/sites/default/files/Presentation%20Earthquake%20Vulnerability%20Study%20of%20the%20Northern%20Waterfront%20Seawall%20WLUP%202016-4-13.pdf>

Summary points of presentation

(also see Port Commission staff report:

<http://sfport.com/sites/default/files/Executive/Docs/Commission/Commission%20Meeting%20Staff%20Reports/2016%20Commission%20Meeting%20Items/APR.12.2016%20Meeting%20Items/Item%2011A%20Seismic%20Study.pdf>)

- Seawall and bulkhead wharves were built in sections over 30 years; not all sections are the same

- 1906 earthquake was a major earthquake centered near San Francisco that caused lateral spread along Embarcadero, including roadway cracks at Lombard Street. It predates the current bulkheads and finger piers; the Ferry Building survived the earthquake, but with major damage to the clock tower.
- Loma Prieta was a moderate earthquake, centered 60 miles away, with 10 seconds of ground shaking. Some facilities experienced localized damage that required repair and modest Seawall movement in some locations. The 1906 Earthquake released 16 times as much energy, shook for one minute, and would pose more danger and damage today.
- There is a 72% probability of a strong earthquake in the Bay Area within 30 years. The Northern Waterfront Earthquake Vulnerability Study evaluates geotechnical conditions and earthquake vulnerability affecting the Northern Waterfront Seawall and associated impacts to The Embarcadero, utilities and upland areas, and mitigation strategies.
- The Study indicates greater than expected risk to the Seawall, which sits atop weak soils and is subject to lateral spreading during an earthquake. The created land adjacent to and upland from the Seawall is liquefiable.
- The Study identifies a menu of mitigation options that may be employed alone or in combination, depending on site-specific geotechnical and structural conditions. They include landside and waterside construction methods. Preliminary cost estimates vary but Seawall repairs are very expensive and construction would be disruptive. The cost to repair the entire seawall is estimated at \$2-3 billion, and could reach \$5 billion to also address sea level rise.
- Port recommends developing a program to implement Seawall repairs within 8-10 years, with suggested focus in key areas needed for disaster recovery efforts, to improve life safety, and combined Seawall strengthening and flood protection in low elevation area south of the Ferry Building to also protect Muni and BART subway portal. More studies are needed to develop any site-specific construction plans.
- Report to be finalized in June 2016, with continued work to coordinate with City Resilience planning efforts, outreach with Port tenant partners, and participation in Mayor's Sea Level Rise Committee and Action Plan.

San Francisco Earthquake Safety Implementation Program: Patrick Otellini, San Francisco Chief Resiliency Officer

- Link to presentation:
<http://sfport.com/sites/default/files/San%20Francisco%20Earthquake%20Safety%20Implementation%20Program%20WLUP%202016-4-13.pdf>

Summary points of presentation:

- The City has a well-established focus on Citywide earthquake preparedness and mitigation
- Since the 1989 Loma Prieta earthquake the City has focused efforts to improve earthquake safety of existing housing and facilities in the least disruptive way, that allows people to stay in their homes, and enable operations to resume as soon as possible after disaster
- Example is City program to retrofit soft-story buildings, approximately 5000 buildings and 150,000 residents citywide
- Efforts also support earthquake preparedness fairs to promote outreach, education, funding and resources to neighborhoods and community

- The City opened an “Epicenter”, a retail-style facility open to the community to provide earthquake preparedness information and technical resources.
- City’s Lifelines Council produced a 5 year action plan to taken a holistic approach to seismic safety planning. This effort has brought public and private utilities together to coordinate operations and response strategies, with also are being managed alongside Port Seawall seismic improvements.
- City Resilience Strategy report will be published soon to address full scope of resilience needs, including sea level rise, and connections between government and neighborhood.

3. Working Group & Public Discussion (7:15-8:00)

Comments and Questions [from the Working Group and members of the public] were invited throughout the presentation, briefly summarized below, as answered.

- **What is the fill composed of?** A variety of City construction debris and waste including rocks from tunnel projects, refuse, and animal corpses.
- **How is the rock dike movements calculated?** The measurements are displacement distance per inch.
- **Are there tsunami risks?** The Study team has determined that tsunami risk is not something to consider at the moment.
- **When does lateral displacement represent failure or displacement that we can live with?** It depends on site-specific conditions such as whether/how utilities and bulkhead wharves and buildings are affected.
- **Do the economic impacts of Seawall damage include impacts on The Embarcadero?** No, the Study recognizes Embarcadero and underground utilities but economic analysis has not included damage/loss of use of these facilities. Further studies need to be done.
- **Do Seawall repair interventions depend on specific type of mitigation strategies, as presented?** Generally yes, the cross-sections shown in each mitigation strategy slides are most representative. However, other combinations of treatments (e.g. jet grouting, soil stiffening, reinforcing bulkhead substructure) are possible.
- **Sea level rise and seismic improvements complicate discussion of policy recommendations to update the Waterfront Plan. How can Working Group policy discussions assist Port and City efforts to address seismic safety?** It would be helpful for Working Group help set high level goals and policy to provide support and guidance for Port Seawall improvements without dictating specific design outcomes. Sometimes that requires public discussions to get down into details to understand the requirements and tradeoffs in order to develop informed goal and policy statements (e.g: “Develop a seismically safe and resilient waterfront.”) that are helpful when the Port or City is seeking support from the U.S. Army Corps or other

governmental agencies. The public discussions in the WG meetings are important to develop shared understanding and consensus.

- The Seawall mitigation strategies presented are intended to educate the Working Group and public at a conceptual level about the scope of the seismic challenge and possible approaches, requirements and tradeoffs to address it without trying to develop specific solutions. The public discussions in the Working Group meetings are important to determine whether there is shared understanding and consensus, and any other considerations before proposed new policy language can be drafted for the Waterfront Plan. The Working Group policy discussions will continue in Part 2 of the Waterfront Plan public process.
- **Did the Study consider tidal marshes or green surfaces to advance regulatory requirements?**
This is a vulnerability study and mitigation strategies were limited to those pertinent to the Seawall and minimizing fill. The scope is not broad enough to address soft edge treatment options, but they should be considered and are possible in southern waterfront. The resilience design competition planned by the City should inform that discussion.
- **What is BCDC's work regionally for resilience?** It's good for Seawall seismic options to solve for multiple needs, including sea level rise. BCDC has worked with many regional partners which face similar challenges around the Bay because so much of the shoreline is on Bay fill. Oakland Airport is an example, where consideration of flood and seismic risks also go hand in hand.
- **How is Seattle financing \$400 million in seawall improvements?** A City General Obligation (G.O.) Bond is providing current funding, but does not cover the cost for complete rebuild of the Seattle Seawall; the city will need to identify additional resources. San Francisco is looking into how Seawall seismic repairs could fit into the City's GO bond schedule without raising taxes, and is being evaluated relative to other City needs. Public safety repairs and retrofit historically have fared well for city investment.
- Suggestion to have Port tenants should include Seawall information in their Building Occupancy Resumption Plan to facilitate City post-earthquake building condition review.
- Comment regarding 1906 earthquake photo in which the Ferry Building survived while the rest of the city was destroyed; this is symbolic of the need for City to invest to protect the Port for the benefit of the whole city.
- Comment regarding growth in development and population along or near the waterfront, dictating the importance for increased transportation service at Transbay Terminal.

4. Next Waterfront Working Group Public Meeting – Historic Resources and Pier Condition Wednesday, April 27, 2016, 6-8pm, Port of San Francisco Pier 1 Office