Subarea Profile

Piers 94 and 96

Subarea 4-4

SHORELINE TYPE:	SEISMIC RISK[1]:	FLOOD RISK[2]:	
Engineered: Filled land retained by concrete wall and pile supported concrete wharf	**Shoreline Instability:** Not Assessed - likely Moderate to High	**Tipping Point Elevation:**	19" above high tide
	Liquefaction Risk: Not Assessed - likely High	**Coastal Flood Events**	**Timing**
	Shoreline Structure Vulnerability: Not Assessed - potentially Moderate to high due to age of bulkhead wharf structures	100-yr Flood	Today
Subsurface Profile: Not Assessed - likely non-engineered fill with known liquefaction hazard, on top of deep bay mud.	**Unique Conditions:** Large landfill piers, liquefaction during 1989 earthquake	High tide + 36" SLR	2049 - 2067

SUBAREA DESCRIPTION

The Piers 94 and 96 subarea represents a cargo terminal and industrial area built on bay fill. Infrastructure includes bulk cargo terminals and equipment, deep water berths, and the San Francisco Bay Railyard that provides maritime, industrial, and emergency response services and the Pier 94 Wetlands. Both piers are identified by FEMA as staging areas for goods and debris removal in the event of a disaster. The Recology Recycling Central facility on Pier 96 accounts for 70 percent of San Francisco's recycling and landfill diversion.

The shoreline within this subarea is primarily engineered (structures on piles) that transitions to an embankment at the boundary with Subarea 4-5.

[1] Evaluation of seismic risk in areas outside of the Embarcadero Seawall Program are based on engineering judgement and will be updated once the Southern Waterfront Seismic Vulnerability Assessment is complete in Spring 2021.

[2] The timing of coastal flood events that will cause significant flooding in this subarea is provided as a range of dates based on the sea level rise projection scenarios provided by the California Ocean Protection Council (OPC) per the Likely and 1-in-200 chance of occurrence projections.

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The primary pathways of flooding are from overtopping of the southern edge of Pier 96 adjacent to Lash Lighter Basin, and eventually overtopping of the shoreline at Pier 94 adjacent to the Pier 94 Wetlands. Eventually inundation of this subarea connects with all adjacent subareas (Subareas 4-2, 4-3, and 4-5).

COMMUNITY IDENTIFIED PRIORITIES:	
Places • Recology • Pier 94 Wetlands • Bayview Hilltop Park	Since 2017, the Port has connected with tens of thousands of community members through the Waterfront Resilience Program. Public feedback collected about Piers 94 and 96 underscores the importance of maintaining and increasing the number and diversity of jobs and small business opportunities, increasing the availability of affordable housing in the neighborhood and maintaining the waterfront bike trail. Further feedback highlights additional community priorities, including opportunities to restore wetlands and increase connectivity.

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FIRST FLOODING OF ASSETS

The chart below describes the vulnerability of specific assets within the Pier 94-96 subarea to flooding. These assets will be exposed to coastal flooding when the water level in the Bay reaches a certain height above the current high tide. The heights at which each asset is exposed to flooding is indicated with the shaded cells in the table. Over time and due to sea level rise these water levels can occur due to large storm events such as a 100 year flood of daily high tides. For example, the Recology Recycling Center is exposed to flooding when the water rises 36 inches above current high tide, which could occur due to a 100 year flood with 3 ft. of sea level rise or as during daily high tide with 5.5 ft. of sea level rise.

● High Tide ○ 100 Year Flood ▭ Shaded cells indicate the water levels at which assets are exposed to flood

		WATER LEVEL ABOVE CURRENT HIGH TIDE										
SEA LEVEL RISE		0”	12”	24”	36”	48”	52”	66”	77”	84”	96”	108”
Today		●				○						
1 ft. SLR			●				○					
3 ft. SLR					●				○			
5.5 ft. SLR								●				○
Disaster Response												
	Pier 94 FEMA Staging Area					▭	▭	▭	▭	▭	▭	▭
	Pier 96 Debris Removal Staging Area					▭	▭	▭	▭	▭	▭	▭
	Pier 96 Dept. of Bldg. Inspection Trailer				▭	▭	▭	▭	▭	▭	▭	▭
	Pier 96 Med. Examiner Temp. Morgue							▭	▭	▭	▭	▭
	Pier 96 Mobile Hospital Trailers Staging Area				▭	▭	▭	▭	▭	▭	▭	▭
Open Space and Ecology												
	Bay Trail									▭	▭	▭
	-	-										
Maritime												
	Hansen Aggregates				▭	▭	▭	▭	▭	▭	▭	▭
	Intermodal Container Transfer											▭
	Pier 96		▭	▭	▭	▭	▭	▭	▭	▭	▭	▭
Transportation												
	SF Bay Railroad		▭	▭	▭	▭	▭	▭	▭	▭	▭	▭
	-	-										

Subarea Profile

Piers 94 and 96

Subarea 4-4

Critical Facilities												
	Recology Recycling Center											
	-	-										

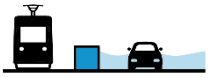
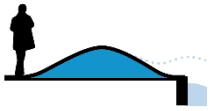
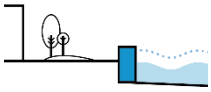
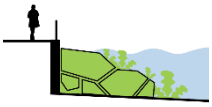
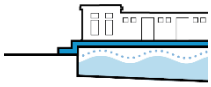
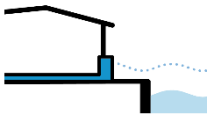
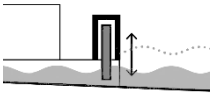
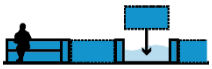
Subarea Profile

Piers 94 and 96

Subarea 4-4

FUTURE POTENTIAL MEASURES UNDER CONSIDERATION IN THIS SUBAREA:

FLOOD MEASURES:

Physical Infrastructure		Ecological Infrastructure	
 Floodwalls	 Levees	 Ecological Marine Structures	 Ecological Features
 Seawalls	 ~~Breakwaters~~	 Aquatic Habitat	 Ecological Shorelines
 Raised Marine Structures	 Building Adaptations		
 ~~Tide Gates~~	 Deployables		

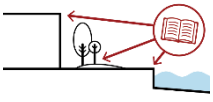
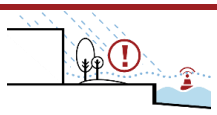
SEISMIC MEASURES:

Southern Waterfront Seismic Vulnerability Assessment

Further information about the potential seismic hazards and vulnerability of Piers 94 and 96 will be included in the Southern Waterfront Seismic Vulnerability Assessment. This assessment will not be at the same level as the recently completed Multi-Hazard Risk Assessment (MHRA) under the Embarcadero Seawall Program. It will be used as part of the Port's work to better understand the waterfront risks of the entire 7.5 miles in its jurisdiction.

FLOOD AND SEISMIC MEASURES:

Policy and Emergency Preparedness

 Policies and Zoning	 Emergency Preparedness		