Presentation to the Capital Planning Committee
March 5, 2018

SEAWALL EARTHQUAKE SAFETY & DISASTER PREVENTION PROGRAM

Photo | Michael Maco

Historic shoreline

Embarcadero Seawall

Port Jurisdiction
Per the 10-Year Capital Plan, the City and County of San Francisco is proposing a $350M General Obligation Bond for the November 2018 ballot to fund improvements to the Embarcadero Seawall that will reduce the significant life safety seismic risk, improve current flood protection and provide a stable foundation for future adaptation to sea level rise.
Nearly ¾ of voters say they would vote “yes” on a bond measure to fund improvements to the Seawall.

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<tr>
<th>Opinion</th>
<th>Support</th>
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<td>Probably yes</td>
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<td>Undecided, lean yes</td>
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<td>Probably no</td>
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<td>Undecided</td>
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**Total Yes**: 75%

**Total No**: 25%

**San Francisco Seawall and Waterfront Protection Measure**

To protect San Francisco’s waterfront, BART and Muni tunnels, buildings, historic piers, and roads from earthquakes, flooding and rising sea levels by:

- repairing and upgrading the City’s 100-year old Seawall,
- strengthening the Embarcadero, and
- protecting critical transit infrastructure and utilities that provide water and power to residents and businesses,

shall the City of San Francisco issue $350 / $500 million in bonds, subject to independent citizen oversight and regular audits, with no increase in tax rates?
City sea level rise modeling identifies near-term flood risk, and maps rising tide and storm surge scenarios for years 2050 and 2100.

**Sea Level Rise Inundation Analysis**

April 2014

**San Francisco establishes aggressive agenda for further sea level rise analysis, adaptation planning, and implementation.**

**Mayor’s Sea Level Rise Action Plan**

July 2016

**Army of Corps of Engineering issues federal interest determination under its flood hazard mitigation authority.**

**Federal Interest Determination**

November 2017

**Lifelines Council Interdependency Study**

Seawall identified as one of the City’s Top 5 most critical lifeline safety assets. Seismic and sea level rise vulnerabilities identified for further multi-hazard risk assessment to inform investment prioritization.

June 2012

**Seawall Earthquake Vulnerability Study**

Seawall is found vulnerable to seismic hazards, posing risk to the City’s critical emergency response and lifeline assets.

March 2016

**Port’s Seawall Planning, Engineering, and Construction Project Commences Planning**

November 2016

**Port launches Seawall Earthquake Safety and Disaster Prevention Program.**
SEAWALL EARTHQUAKE SAFETY & DISASTER PREVENTION PROGRAM GOALS

1. ACT QUICKLY TO IMPROVE DISASTER PREPAREDNESS
2. REDUCE EARTHQUAKE DAMAGE
3. IMPROVE FLOOD RESILIENCE
4. ENHANCE THE CITY & THE BAY
5. PRESERVE HISTORIC RESOURCES
6. ENGAGE THE COMMUNITY
THE SEAWALL CREATED 500+ ACRES OF NEW LAND
WHY PRIORITIZE THE EMBARCADERO SEAWALL NOW?

THE SEAWALL IS A CRITICAL PART OF THE CITY’S NETWORK OF EMERGENCY RESPONSE

In the event of a major earthquake, the waterfront must be available for emergency response access. Ensuring the seismic reliability of the Seawall will allow the City to respond to a major disaster.

THE SEAWALL SUPPORTS AND PROTECTS IMPORTANT UTILITY INFRASTRUCTURE

This includes major wastewater, water, auxiliary water system, and power utilities.

THE SEAWALL IS KEY TO REGIONAL TRANSPORTATION

440,000 people arrive daily by boat at the Ferry Building or through the Transbay Tube on BART.

In addition, the Muni Metro system registers over half a million daily boardings on routes that terminate downtown.

$24.6B OF TOTAL ECONOMIC ACTIVITY AND $102.1B OF PROPERTY VALUE IS AT RISK FROM FAILURE OF THE SEAWALL

The value of assets at risk is 10–40x greater than the investment needed to strengthen the Seawall.
### ELIGIBLE PROGRAM COSTS AND PROJECTS

Address the **most significant** seismic and near-term flood risks to the most critical assets.

#### Project Implementation
- Program Development, Planning & Pre-Design
- Design & Engineering
- Construction Management

#### Earthquake Improvements
- Ground Strengthening & Liquefaction Remediation
- Bulkhead wall & wharf retrofits
- Bulkhead wall & wharf replacements
- Critical facility retrofits & replacements
- Utility replacements, relocations & bypasses

#### Flood Protection Measures
- Flood walls and barriers
- Changes to surface grading
- Flood proofing
- Enhanced foundation for future adaptation

#### Mitigation & Enhancement
- Public access enhancements
- Transportation/mobility improvements
- Environmental benefits

**Estimated design/construction costs for seismic and near term flood control improvements = $575 million per mile**
### PHASE I DETAILED SCHEDULE

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<th>Activity</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
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<td>Program Development/Planning, $14m</td>
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CRITICAL RISK: EARTHQUAKE SAFETY

72% PROBABILITY for a quake of at least 6.7 or GREATER magnitude to occur between NOW and 2032
CRITICAL RISK: CURRENT AND FUTURE FLOODING

- Seawall supports the Embarcadero and provides flood protection
- Existing Embarcadero closures during king tide
- Muni and BART tunnels subject to flood risk
- CCSF sea level rise guidance:
  - 12”-24” by 2050
  - 36”-66” by 2100
SAMPLE EVALUATION CRITERIA

Life Safety

Emergency Response

Implementation Timeframe
Risk Avoided
Community and Social Benefits
Environmental Benefits

Minimize Disruption and Construction Impacts
EARTHQUAKE RETROFIT CONCEPTS

**OPTION 1** GROUND IMPROVEMENT

**STABILIZE LAND + SEAWALL**

**OPTION 2** GROUND IMPROVEMENT UNDER SEAWALL

**STABILIZE LAND UNDER SEAWALL + RETROFIT WHARF**

**OPTION 3** BULKHEAD REPLACEMENT

**RELOCATE HISTORIC BUILDING + REBUILD WHARF**

**OPTION 4** NEW BAYWARD SEAWALL

**INSTALL NEW SHEET PILES WITH STRENGTHEN FILL**
POTENTIAL SEA LEVEL RISE SOLUTIONS

RAISE/EXPAND LANDSCAPE EDGE
Desired Program Funding by Source

- City GO Bond Program (residential and commercial taxpayers)
- Federal (Water Resources, Transportation)
- State (Cap and Trade, State Share of Tax Increment)
- Private (waterfront development projects and businesses)
GENERAL TIMELINE

Capital Planning Committee (informational) – March 5, 2018
Port Commission – April 10, 2018
Capital Planning Committee (approval) – April 16, 2018
Board of Supervisors – May 2018
CCSF General Election – November 6, 2018

QUESTIONS?