MEMORANDUM

December 10, 2021

TO: MEMBERS, PORT COMMISSION
Hon. Kimberly Brandon, President
Hon. Willie Adams, Vice President
Hon. John Burton
Hon. Gail Gilman
Hon. Doreen Woo Ho

FROM: Elaine Forbes
Executive Director

SUBJECT: Informational presentation regarding the Waterfront Resilience Program early projects to address life safety and disaster response

DIRECTOR'S RECOMMENDATION: Information Only – No Action Required

EXECUTIVE SUMMARY

In 2018, the San Francisco Board of Supervisors proposed Proposition A Seawall Earthquake Safety Bonds. San Francisco voters approved this bond with a margin of 83-17% at the November 6, 2018 election. At the time, the Port and the City acknowledged that Proposition A was a vital downpayment to address much more costly seismic and flood risks along the waterfront.

Since the passage of Proposition A, the Port has engaged in in-depth study and analysis of the waterfront earthquake risks to life safety and emergency response. The Port has also developed a greater understanding of the engineering challenges and risks of rising sea levels through its work with the U.S. Army Corps of Engineers ("USACE") on the San Francisco Coastal Flood Study ("Flood Study").

Based on this work, the Port has recognized the need for a programmatic approach to improving the resilience of the waterfront to earthquake and flood risks. A programmatic approach is needed to plan for and implement improvements that advance geographic strategies and to bring together a range of funding sources needed to satisfy a multibillion-dollar price tag over the coming decades.

At the November 10, 2020 Port Commission Meeting, Port's Waterfront Resilience Program ("Program") team presented the Port's strategy for developing adaptation strategies and a

proposed decision framework[1], including a Program goal statement, principles, draft evaluation criteria, draft flood and seismic standards, and draft Proposition A funding guidelines to guide future Port Commission decisions related to the Program, including expenditure of Proposition A Seawall Earthquake Safety Bonds. Port Commission President Kimberly Brandon guided the Commission through a series of questions posed by Program staff. The Commission made changes to the Program principles, a copy of which is included in Exhibit A.

As described at the November 9, 2021 Port Commission Meeting[2], over the past year, the Program team and Port staff have developed adaptation strategies for geographic areas along the entire northern waterfront (South Beach, Ferry Building Area, Northeast Waterfront, and Fisherman's Wharf), including options for future coastal flood defenses that can be advanced through the USACE Flood Study. Through this geographic-focused work, the Program team has developed a list of 23 early projects that will:

- reduce life safety risks identified during the Embarcadero Seawall Multi-Hazard Risk Assessment,
- reduce disaster response risks identified through the Port-San Francisco Department of Emergency Management sponsored disaster response task conducted in August, 2021, and
- Address existing high-consequence flood risks identified through the Flood Study ("Embarcadero Early Projects").

Having completed risk assessment, initial planning and identification of Embarcadero Early Projects, we are at the next pivotal stage in Program development where we need to undertake advanced planning with City Departments and USACE to develop adaptation strategies that will yield a preferred plan for future coastal flood defenses and defend multiple, interdependent critical infrastructure systems from earthquakes and flooding. We have identified more Embarcadero Early Projects than can be funded with Proposition A alone. By using Proposition A to fund a portion of this advanced planning and for project definition and predesign of projects, the Port can position the Program to leverage other public and private sources of funding that can further reduce risks and provide benefits along the waterfront.

We are not seeking a Port Commission decision at this time regarding which projects will be constructed with Proposition A funding – those decisions will come to the Commission over the next 1-3 years (depending on project complexity). Instead, staff is seeking the Commission's concurrence that we advance planning for the entire waterfront, with a more detailed focus on the zone between Piers 19-41, and complete needs assessment and alternatives analysis of a suite of Embarcadero Early Projects, at an estimated cost of $26 million over the next 2 years. Proposition A project decisions, including funding for design and construction, will be advanced during this period for Port Commission consideration as described in more detail below.

STRATEGIC OBJECTIVES

The Port's Waterfront Resilience Program supports the goals of the Port's Strategic Plan as follows:

[1] November 10, 2020 Staff Report:
https://sfport.com/meetings/san-francisco-port-commission-november-10-2020

[2] November 9, 2021 Staff Report:
https://sfport.com/meetings/san-francisco-port-commission-november-9-2021

Engagement
By leading an inclusive stakeholder process to develop a shared vision, principles and goals for the Waterfront Resilience Program and Flood Study.

Livability
By increasing the proportion of funds spent by the Port on contract services performed by LBE firms.

Resiliency
By leading the City's efforts to address threats from earthquakes and flood risk through research and infrastructure improvements to the Embarcadero Seawall and adjoining buildings and other infrastructure, and to the 7½ miles of Port shoreline property.

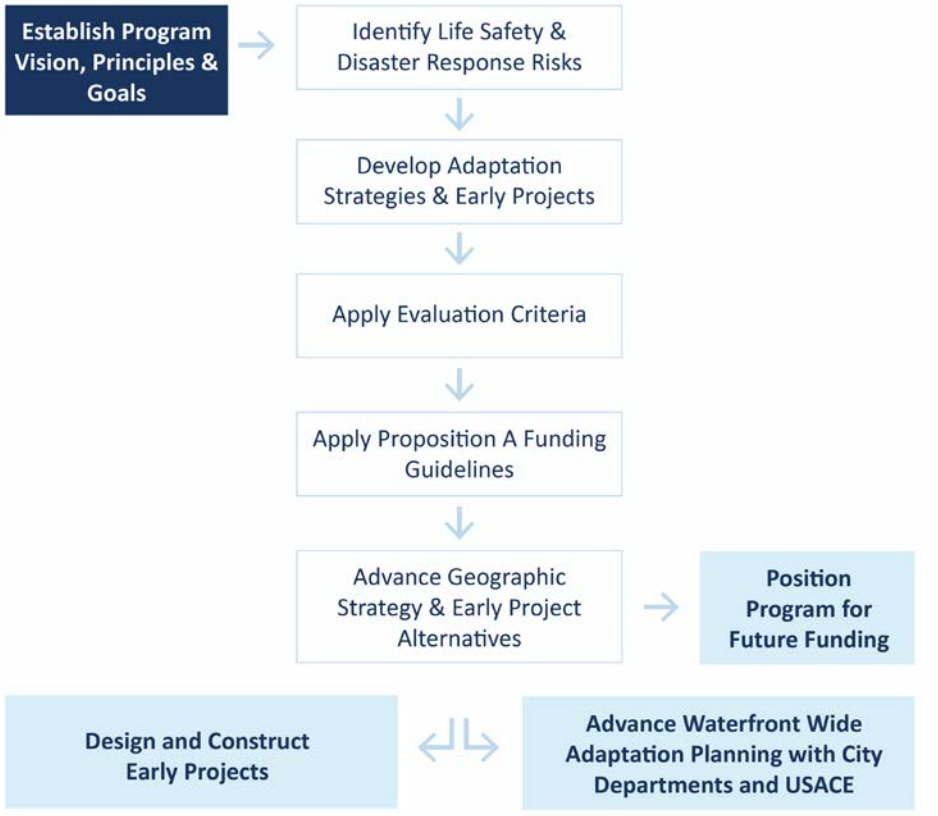
Sustainability
By enhancing the quality of the Bay water and habitat with the improvements, by limiting construction impacts and waste, and by sustainable design and construction best management practices.

Financial Stability
Through wise investment of Proposition A Seawall Earthquake Safety Bonds.

WRP Decision Framework

Figure 1 depicts the proposed decision framework for advancing the Program:

Figure 1: Waterfront Resilience Program Decision Framework



As described in the November 2020 staff report, the Proposition A Seawall Earthquake Safety Bond Report included the following objectives for Proposition A:

- Act quickly to improve disaster preparedness
- Reduce earthquake damage and disruption
- Improve flood resilience
- Enhance the City and the bay
- Preserve historic resources
- Engage the community

At the November 10, 2020, Port Commission meeting, the Commission heard and provided feedback regarding the Program vision and principles which build on the Proposition A Bond Report to guide the Program. Exhibit A includes the Program vision statement and revised principles with additions that responded to Commission direction.

This report describes how the Program team evaluated Embarcadero Early Projects and subsequently applied Proposition A funding guidelines to develop a recommended subset of Embarcadero Early Projects to advance through the preliminary project development and predesign steps. The Program team presented these guidelines to the Commission at its August 10, 2021 Port Commission Meeting.

ADAPTATION STRATEGIES & EMBARCADERO EARLY PROJECTS

As described in the November 9, 2021 Commission presentation, the Program team has used the information developed over the past 3 years to advance development of adaptation strategies for the entire northern waterfront (South Beach, Ferry Building Area, Northeast Waterfront, and Fisherman's Wharf) to facilitate identification of Embarcadero Early Projects. The Program team is now embarking on a similar process in the Port's Southern Waterfront. These adaptation strategies will be vetted with City departments, regulatory agencies, the public and the Port Commission and City policymakers.

Core components of these adaptation strategies will include:

- the timing of major interventions;
- Early Projects – near-term investments such as seismic retrofits, improvements to disaster response facilities, shoreline stability and near-term flood risk reduction projects;
- a line of defense and adaptation zone (the extent of landward or Bayward adaptation) for future flood defenses;
- the earthquake risk reduction strategy for shoreline, transportation and utility infrastructure; and
- policies to improve seismic and flood safety.

Through this process, Port staff identified a list of 23 Embarcadero Early Projects in the Seawall zone to address the most urgent earthquake safety, disaster response, and coastal flood risks. Project cost estimates exceed Proposition A funds. Projects can be delivered with Proposition A funding, federal and state grants, leverage investments by long-term tenants, through public-private partnerships, City agencies capital programs, and the Port through its limited Capital Improvement Program.

Analysis of Geographic Areas

We are planning for both early interventions (Embarcadero Early Projects) and longer term adaptation strategies to defend the City against coastal flood and shoreline earthquake risk. Aging infrastructure, soil conditions – including Bay Mud, liquefiable soils, and the depth to bedrock – along with the current elevation and exposure of the shoreline to coastal waves inform how these risk reduction efforts have been developed and can be sequenced over time.

Staff presents the following analysis of the distinct geographic areas that enabled the Program team to develop Embarcadero Early Projects and initial investment recommendations for Commission consideration. A more detailed analysis of each of these areas (South Beach, Ferry Building Area, Northeast Waterfront, and Fisherman's Wharf) is included in Exhibit B.

South Beach - Mission Creek to Pier 24 / Bay Bridge

Table 1 summarizes risks and opportunities in the South Beach area:

Table 1: South Beach Earthquake and Flood Risks and Opportunities	
Occupancy	Except for the ballpark – which was built to modern earthquake standards – occupancy in this area is generally lower than other areas of the Embarcadero waterfront.
Earthquake Risks	
Groundshaking	Tall bulkhead walls are vulnerable to tilting and cracking, and connected wharves are vulnerable to collapse from unseating at the bulkhead.
Liquefaction	Differential settlement of fills is predicted to damage MUNI tracks, Embarcadero pavement and local water and sewer lines.
Shoreline Stability	The shoreline is relatively stable, except for a segment of Seawall adjacent to Seal Plaza and the wharves at South Beach Harbor.
Flood Risks	The shoreline has average elevation of approximately 12.0' NAVD 88, wave activity is higher here and occasional shoreline overtopping is expected with 2 feet of sea level rise.
Disaster Response	The Emergency Firefighting Water System (formerly AWSS) Intake Tunnel for Pump Station #1 passes through the Seawall near Pier 38 is a vital source of post-disaster emergency firefighting water.
Opportunities	The Port has active negotiations with development partners in this area that may be leveraged to deliver important shoreline resilience improvements at Piers 38-40 and Piers 30-32.

South Beach Early Projects

Improvements to the Embarcadero and transit and utility systems in this zone require a planning effort amongst multiple City agencies and utility operators. Program staff is using the City department engagement strategy discussed at the November 9, 2021 meeting to determine if sister agencies see a need to prioritize pre-disaster earthquake risk reduction along the Embarcadero. The Program team will advance coastal storm and sea level rise adaptation strategies for this area through the USACE Flood Study.

The Program team identified the following Early Projects in this area:

- **Pier 24 to Pier 28½ Bulkhead Wall and Wharf Substructure Earthquake Safety Project**. This project will reduce life safety risk at the Promenade and bulkheads by retrofitting the vulnerable bulkhead wall and wharf substructure to reduce risk of unseating and collapse.

- **The Emergency Firefighting Water System, Intake Tunnel #1 Earthquake Reliability Project**. In coordination with SFPUC, this disaster response project will ensure reliable

post-earthquake operation of this critical water supply intake where it passes through the Seawall.

- **Giants Seals Plaza Seawall Earthquake Stabilization Project**. This project will stabilize the soils under the Seawall Rock Dike and reduce risk of shoreline failure at this unique spot. The Program team is discussing this project with the San Francisco Giants.

All of these projects can be pursued independently of longer term adaptation strategies the Port and the City may pursue through the USACE Flood Study or earthquake and flood improvements to this section of the Embarcadero.

The Port is fortunate to have development partners at Piers 30-32 and Piers 38-40 in this area. These projects can rebuild wharves that are beyond their useful life and elevate and strengthen the bulkhead wall, reducing both earthquake and flood risk through a significant portion of this area if these projects are approved and constructed. The Waterfront Resilience Program team has consulted with Pacific Waterfront Partners on several occasions to assist the development team with conceptual design of their project and is in early discussions with the Strada/TCC team about resilience components of their project.

Ferry Building Area / Former Yerba Buena Cove – Bay Bridge to Pier 17

Table 2 summarizes risks and opportunities in the Ferry Building area:

Table 2: Ferry Building Area Earthquake and Flood Risks and Opportunities	
Occupancy	There is significant occupancy along major stretches of this area from the Ferry Building extending to the Exploratorium at Pier 15, with regional ferry access at the Water Emergency Transportation Agency ("WETA") Downtown Ferry Terminal.
Earthquake Risks	
Groundshaking	Wharf substructures which have not been seismically retrofit (Agriculture Building, Pier 9) are vulnerable to groundshaking.
Liquefaction	Differential settlement of fills is predicted to damage MUNI tracks, Embarcadero pavement and local water and sewer lines.
Shoreline Stability	The shoreline is subject to significant lateral spreading risks, which could significantly damage wharves, the Ferry Building substructure and the northbound lanes of the Embarcadero and frustrating disaster response use of maritime facilities.
Flood Risks	The shoreline has low elevation of approximately 8.5' NAVD 88 at Pier 14, with current localized flooding during King Tides and more widespread flooding at the 100 year event. There is flood risk today to the Embarcadero MUNI Portal under a very rare 500 year flood event.
Disaster Response	Key disaster response priorities include the WETA Downtown Ferry Terminal and staging areas around the Ferry Building, functional Port headquarters and Department Operations Center at Pier 1 to lead post-earthquake response, universal access across the Embarcadero and emergency vehicle access north and south along the Embarcadero.
Opportunities	The Port has long-term tenants at Pier 1, the Ferry Building, and Piers 1½ through 5 who share the Port's interest in seismic and flood resiliency.

Adaptation Strategies & Early Projects

Improvements to the Embarcadero and transit and utility systems in this zone will be part of a larger effort that requires planning among multiple City agencies and utility operators. The Program team will advance the development of coastal storm and long-term sea level rise adaptation strategies for this area through the USACE Flood Study.

The Program team identified the following Early Projects in this area:

- **Ferry Building Seawall and Substructure Earthquake Reliability Project.** This project will improve earthquake safety and disaster response capacity by strengthening the seawall and substructure at the Ferry Building area. The strengthening is also intended to support interim flood protection and later sea level rise adaptation.

  The Ferry Building is the most iconic structure on the waterfront and the most important location for post-earthquake water transit critical for bringing in first responders and returning thousands of workers to their homes. Stakeholders consistently cited the Ferry Building as one of the most important structures to protect. Opened in 1898 and renovated in 2002, the building sits over the Bay on a massive concrete seawall and substructure supported by more than 5,000 timber piles driven into hundred-foot thick, soft Bay Mud. Initial analysis indicates that large earthquakes will shift the mud, seawall, and substructure Bayward causing damages in the piles and concrete supports that may compromise the seawall and limit use of the area for disaster response and recovery. The 245-foot tall clocktower, which sits on top of the seawall and was heavily damaged in the 1906 earthquake, is of concern.

  Preliminary project concepts include strengthening the unreinforced concrete bulkhead and substructure and adding new piles. Notably, the construction piece of this project is not intended to solve all Ferry Building vulnerabilities, which will require a much larger investment. Rather, the Program team, in consultation with Hudson Properties (the Port's long-term lessee for the Ferry Building), will develop a state-of-the-art engineering model to test both strengthening concepts and longer-range adaptation strategies which may include raising the building and installing a new seawall.

- **Pier 1 Bulkhead Wall and Wharf Substructure Earthquake Reliability Project.** This project will improve post-earthquake recovery capability by strengthening the vulnerable bulkhead and wharf at Pier 1 to limit earthquake damage and improve functionality of the Port's primary Department Operations Center and headquarters, from which the Port staff will lead disaster response.

  Pier 1 is an historic finger pier containing the Port's headquarters and the Department Operations Center which functions as the post-earthquake logistics center for coordinating inspections, emergency repairs, and functional recovery for all 7-1/2 miles of Port waterfront. Preliminary project concepts include a "super frame" consisting of large diameter piles and girders that replace existing piles, can flex with the mud during earthquakes, and are detailed to allow future elevation of the deck and building in place as part of broader waterfront adaptation to protect against higher water levels in future decades. The Program team will develop these concepts in consultation with AMB, the Port's long-term lessee of Pier 1.

- **Pier 5 to 22½ Near-Term Coastal Flood Risk Reduction Project.** This project includes coastal flood defense improvements to the most at-risk segment of The Embarcadero

Seawall using a combination of raised bulkheads, new railings, and deployable measures. As this project advances, it will be important to align with USACE that this interim measure will be included in the USACE Tentatively Selected Plan.

The Pier 5 to 22-1/2 stretch of the century old Embarcadero Seawall is the most at-risk segment for coastal flooding. It was constructed over the thickest Bay muds in former Yerba Buena Cove and portions have settled by as much as 3 feet. Today, King Tides overtop the bulkhead in several locations sending saltwater onto the Embarcadero and, should we experience an extreme storm during such a high tide, overtopping could reach openings in the adjacent Muni Metro and BART underground network. This project will increase coastal flood defenses for regional transit and adjacent neighborhoods from sea level rise coastal flooding while keeping the waterfront thriving as longer-range plans are developed.

- **Agriculture Building Bulkhead Wall and Wharf Substructure Earthquake Safety Project.** This project will improve earthquake safety by retrofitting the bulkhead and wharf structure supporting the Agriculture Building while a more permanent solution is developed.

- **Pier 9 Bulkhead Wall and Wharf Substructure Earthquake Safety Retrofit Project.** This project will improve earthquake safety of a high occupancy historic finger pier through retrofitting of the bulkhead and wharf substructure to better withstand lateral spreading of the shoreline.

- **Pier 15 Bulkhead Wall and Wharf Substructure Earthquake Safety Retrofit Project.** This project will improve earthquake safety of a high occupancy historic finger pier that is home to the Exploratorium science museum through limited retrofitting of the bulkhead and wharf substructure to better withstand lateral spreading of the shoreline.

All of these projects can be pursued independently of longer term adaptation strategies the Port and the City may pursue through the USACE Flood Study or earthquake and flood improvements to this section of the Embarcadero.

The Program team conducted a planning-level evaluation to develop an Early Project proposal for the Agriculture Building which is exposed to significant earthquake risk from both groundshaking and lateral spreading. The evaluation was not able to identify a simple, constructable retrofit option for the existing substructure, which is near the end of its useful life and ultimately needs replacement rather than repair. Given the difficult soil conditions in this area, replacing the wharf that supports the Agriculture Building – which would require deconstruction and subsequent reconstruction of the building itself – is tied to larger scale improvements in the area.

<u>Northeast Waterfront – Pier 19 to Pier 41</u>

Table 3 summarizes risks and opportunities in the Northeast Waterfront (Pier 19-41) area:

Table 3: Northeast Waterfront (Pier 19-41) Area Earthquake and Flood Risks and Opportunities	
Occupancy	This area has the densest collection of historic bulkheads and finger piers in the Embarcadero Historic District and significant occupancy along key stretches, including Pier 39 and Alcatraz Landing at Pier 31½.
Earthquake Risks	
Groundshaking	Structures which have not been seismically retrofit (Pier 39 and most other structures in this area, except for Pier 27) are vulnerable to groundshaking.
Liquefaction	Differential settlement of fills is predicted to damage MUNI tracks, Embarcadero pavement and local water and sewer lines.
Shoreline Stability	The shoreline is subject to significant lateral spreading risks, which could significantly damage wharves, the northbound lanes of the Embarcadero, and City combined sewer infrastructure.
Flood Risks	The shoreline has average elevation of approximately 12.5' NAVD 88, with localized low spots leading to occasional shoreline overtopping expected with 2 feet of sea level rise.
Disaster Response	Key disaster response priorities include access to the Port's primary northern waterfront deep water berth at Pier 27, secondary berths at Pier 35, and components of the Emergency Firefighting Water System including fireboat manifold at Pier 33-1/2.
Opportunities	The Port has long-term tenants at Pier 39 and Pier 31½ who share the Port's interest in seismic and flood safety. The Port Commission has identified a potential public-private partnership opportunity involving Piers 19, 23, 29 and potentially Pier 31 that could potentially contribute to important shoreline resilience improvements in this zone.

Adaptation Strategies & Early Projects

Improvements to the Embarcadero and transit and utility systems in this zone are part of a larger effort that would require a planning effort amongst multiple City agencies and utility operators. The Program team will advance development of coastal storm and sea level rise adaptation strategies for this area through the USACE Flood Study.

Given the high occupancy in this zone, vulnerable infrastructure and critical need for access to deep water berths, the Program team recommends prioritizing development of options for a geographic adaptation strategy in the Piers 19 to 41 zone. This adaptation strategy can address the following risks and opportunities:

- Reliable access to the James R. Herman International Cruise Terminal at Pier 27 will significantly improve regional, state and federal response in the aftermath of a major earthquake;

- Both the Embarcadero and critical City infrastructure in the roadway would significantly benefit from Seawall stability and ground improvements in the zone between Pier 35 and Pier 31;

- Occupancy is high in this zone, including Pier 39 and surrounding areas, creating high earthquake safety risk and need for resilient disaster response assets;

- A negotiated lease extension for Pier 39 may afford the opportunity to leverage private investment in shoreline improvements that would benefit both Pier 39 and the City;

- The Port Commission has prioritized a development offering for Piers 19-29 (and potentially Pier 31); the solicitation for a development partner will be informed by earthquake and flood resilience strategies developed through the Piers 19-41 geographic strategy; and

- Due to the shallower soils in this area, more options are available to improve earthquake stability of the shoreline and costs are expected to be much lower than the Ferry Building Area. Overall costs, however, are expected to far exceed available funding under Proposition A.

In consultation with the Real Estate and Development and Maritime Divisions, the Program team recommends pursuing a combination of public and private investment in this area which could yield substantial earthquake and flood risk reduction and disaster response improvements within the next decade. The Program team identified the following potential Early Projects in this area, **which we propose to examine through development of a coordinated geographic strategy for the area**:

- **Pier 27 Seawall and Wharf Substructure Earthquake Reliability Project:** This project will improve disaster response by creating reliable access across the Seawall between the Embarcadero roadway and the Pier 27 deep water berth and staging area.

- **Pier 31-1/2 Bulkhead Wall and Wharf Substructure Earthquake Safety Retrofit Project**: This project will improve earthquake safety of a high occupancy wharf through limited retrofitting of the bulkhead and wharf substructure to better withstand lateral spreading of the shoreline.

- **Piers 33-35 Seawall and Wharf Substructure Earthquake Reliability Project**: This project will improve earthquake access to Pier 35 deepwater berths and reduce earthquake damages to a high risk section of The Embarcadero that contains critical Citywide wastewater infrastructure.

- **Pier 39 to Pier 41 Seawall Earthquake Stabilization and Wharf Substructure Retrofit Project**: This project will improve earthquake safety in a high occupancy wharf and pier zone by stabilizing the Seawall and retrofitting the wharf substructure.

Until the Program team advances analysis of these projects, it is not clear whether they can be pursued independently of longer term adaptation strategies the Port and the City may pursue through the USACE Flood Study or earthquake and flood improvements to this section of the Embarcadero. More targeted fixes could be independent projects that could be advanced to design and construction with Proposition A funding. Examples of potentially independent projects include: seismic improvements to Pier 31½ (home to Alcatraz Landing) and a targeted area of the Embarcadero with vulnerable infrastructure or improvements to stabilize access to Pier 27, and Embarcadero seawall and utility resilience improvements in the vicinity of the Northpoint Treatment Plant.

Fisherman's Wharf (Pier 43-1/2 to Hyde Street Harbor)

Table 4 summarizes risks and opportunities in the Fisherman's Wharf area north of Pier 41:

Table 4: Fisherman's Wharf Earthquake and Flood Risks and Opportunities	
Occupancy	There is significant occupancy throughout Fisherman's Wharf.
Earthquake Risks	
Groundshaking	Structures which have not been seismically retrofit are vulnerable to groundshaking.
Liquefaction	Differential settlement of fills is predicted to damage roads and local water and sewer lines.
Shoreline Stability	The shoreline is subject to significant lateral spreading risks, which could significantly damage wharves and adjacent buildings.
Flood Risks	The shoreline has average elevation of approximately 11.5' NAVD 88, with occasional shoreline overtopping expected with 1.5 feet of sea level rise.
Disaster Response	The Joint Operations and Security Center is home to the San Francisco Police Department Marine Unit. Secondary disaster response priorities include access to ferry terminals in the wharf.
Opportunities	The Port has long-term tenants in Fisherman's Wharf who share the Port's interest in seismic and flood safety.

Adaptation Strategies & Early Projects

The Program team identified the following Early Projects in Fisherman's Wharf:

- **Pier 43-1/2 Seawall and Wharf Earthquake Safety Project.** This project will improve earthquake safety by improving the stability of the shoreline at Pier 43-1/2 which includes a restaurant and an excursion boat operation on the adjacent wharves.

- **Taylor Street Seawall Earthquake Stabliziation Project.** This project will improve earthquake safety by improving stability of the shoreline along Taylor Street between Jefferson and The Embarcadero.

- **Wharf J9 Replacement and Resilient Shoreline Project.** This project will create a new resilient section of shoreline by replacing the failing wharf and bulkhead along the Inner Lagoon between Jones and Leavenworth Streets.

- **Joint Operations Security Center and Fuel Dock Reliability Project.** This project will improve the post-earthquake functionality of the Marine Police Unit and the Marine Fuel Dock by relocating these facilities.

One significant challenge in Fisherman's Wharf is that shoreline stability projects in this area are not expected to provide desired levels of earthquake performance on their own; further improvements to buildings and wharves would be required to achieve seismic stability. Since tenants on long-term leases have responsibility for the maintenance of their facilities, the Program team recommends continuing discussions with these tenants regarding such potential partnerships. As discussed with the Port Commission at its March 26, 2019 meeting[3], Port staff believes these types of improvements would be best negotiated as part of a lease extension

[3] Staff Report:
https://sfport.com/meetings/san-francisco-port-commission-march-26-2019

with an interested tenant under mutually acceptable terms to encourage private investment to make these structures resilient.

EVALUATION CRITERIA

To support the evaluation and prioritization of the Embarcadero Early Projects, specific evaluation criteria were developed with community input. The evaluation criteria were developed to align with the Program Goals and capture the unique aspects of the Embarcadero Early Projects. The evaluation criteria include the following categories:

- Feasibility and Performance
- Society and Equity
- Economic and Financial
- Environmental
- Governance and Partnerships

Approximately 35 individual criteria were developed across these categories and specific criterion descriptions and guidance were established. For each criterion, a relative rating of 1 through 5 (with 5 being the most positive rating for that criterion) was assigned. Based on results from the MHRA and input from the Port team subject matter experts, the ratings were compiled for all Embarcadero Early Projects. The process of Early Projects evaluation involved several iterations as the Port team found some criteria to be redundance or were determined to be less valuable for distinguishing between projects.

After applying the evaluation criteria, a tiered approach was used to organize and characterize the Embarcadero Early Projects. Tier 1 consists of Project Performance criteria and ratings for seismic risk reduction, flood risk reduction, life safety benefits, disaster response, and asset/life cycle were combined. Tier 2 include aggregate ratings for independence of projects, society and equity, environment, and governance and partnerships.

Based on the evaluation process, the Embarcadero Early Projects were sorted based on the Tier 1 – Project Performance set of criteria. While all of the projects are believed to be provide significant value in relation to waterfront resilience, the evaluation process identified those with higher performance. Table 5 summarizes the results of the evaluation process for the Embarcadero Early Projects:

Table 5: Embarcadero Early Projects Evaluation Summary					
Embarcadero Early Projects	**Performance**	**Independence**	**Society & Equity**	**Environment**	**Governance & Partnerships**
Pier 27 Seawall and Wharf Substructure Earthquake Reliability Project	H	L	H	M	M
Ferry Building Seawall and Substructure Earthquake Reliability Project	H	H	H	M	M
Pier 39 Seawall Earthquake Stabilization and Wharf Substructure Retrofit Project	H	L	H	M	M
Piers 33-35 Seawall and Wharf Substructure Earthquake Reliability Project	H	L	M	M	M
Pier 41 Seawall Earthquake Stabilization and Wharf Substructure Retrofit Project	H	L	H	M	M
Wharf J9 Replacement and Resilient Shoreline Project	H	L	H	M	M
Pier 43-1/2 Seawall and Wharf Earthquake Safety Project	H	M	M	M	L
Joint Operations Security Center and Fuel Dock Reliability Project	H	H	M	H	M
Pier 1 Bulkhead Wall and Wharf Substructure Earthquake Reliability Project	H	M	H	M	H
Pier 9 Earthquake Safety Retrofit Project (includes two projects: wharf and shed)	M	H	L	M	M
Taylor Street Seawall Earthquake Stabilization Project	M	L	L	M	L
Giants Seals Plaza Seawall Earthquake Stabilization Project	M	M	H	M	M
Pier Fire Suppression & Waterside Evacuation Improvement Projects	M	H	M	L	M
Emergency Firefighting Water System, Intake Tunnel #1 Earthquake Reliability Project	M	H	M	L	H
Pier 15 Bulkhead Wall and Wharf Substructure Earthquake Safety Retrofit Project	M	H	H	M	M
Agriculture Building Bulkhead Wall and Wharf Substructure Earthquake Safety Project	L	H	L	M	L
Emergency Firefighting Water System, Fireboat Manifold Earthquake Reliability Projects	L	H	M	L	H
Pier 31-1/2 Bulkhead Wall and Wharf Substructure Earthquake Safety Retrofit Project	L	H	M	M	L
Pier 5 to 22 ½ Near-Term Coastal Flood Risk Reduction Project	L	H	H	M	H
Pier 45 Apron Earthquake Safety Retrofit and Interim Flood Risk Reduction Project	L	H	M	M	M
Pier & Wharf Utility Connection Earthquake Retrofits at Seawall Project	L	H	M	L	M
Pier 24 to Pier 28-1/2 Bulkhead Wall and Wharf Substructure Earthquake Safety Retrofit Project	L	H	M	M	L

The Tier 2 criteria were used to further identify the recommended list of Embarcadero Early Projects and will continue to be used in the design process.

PROPOSITION A FUNDING GUIDELINES

Application of the evaluation criteria described above yielded the prioritized list shown in Table 5 above. Exhibit B contains the Proposition A funding guidelines which the Program team presented to the Port Commission at the November 10, 2020 Port Commission Meeting. These guidelines ask a series of questions in the following categories to guide Proposition A investment, including:

- Are we focusing investment on Life Safety and Disaster Response?
- Is more analysis or planning needed?
- Are projects planned by other City agencies that would allow delivery in partnership?
- Is investment prioritized for improvements that benefit the whole city?
- Are risks being addressed across the Embarcadero Seawall area in an equitable way?
- Is there another source – private equity or public financing – that can be leveraged to pay for required improvements?
- Is there an existing long-term lease and is the tenant interested in a lease extension?

After considering these questions, the Program team recommends the following strategy for advancing all of the Embarcadero Early Projects at a programmatic level. With the concurrence of the Port Commission, some projects will be advanced with Proposition A funding, while the Program team will continue consulting with long-term Port tenants and sister City agencies about their interest and capacity to invest in advancing the projects described in this report.

PROGRAM EARLY PROJECT RECOMMENDATIONS

Table 6 below shows the Port staff recommendations for advancing Embarcadero Early Projects. The Program team recommends four key strategies for advancing all Embarcadero Early Projects:

- by advancing projects through project predesign using Proposition A funding (needs assessment and alternatives analysis) where there is a clear City benefit consistent with the Proposition A General Obligation Bond Report;

- through a Piers 19-41 geographic strategy with the potential for multiple sources of funding to improve an area with high occupancy and critical City & Port infrastructure;

- by consulting with Port long-term tenants and sister agency partners to determine interest and capacity to invest in resilience improvements; and

- through the Port's 5 Year Capital Improvement Program (a very limited source given the Port's current financial position).

Where Embarcadero Early Projects implicate long-term tenancies where tenants have substructure maintenance responsibility under their leases, the Real Estate and Development and Maritime Divisions, in consultation with the Waterfront Resilience Program, recommend continued engagement with these tenants to 1) consult on project design and delivery methods, and 2) investigate the potential for a financial contribution to the project, potentially through a long-term lease extension.

In some key areas, the Program team recommends advancing Embarcadero Early Projects that implicate long-term leases with Proposition A funding due to the significance of these areas to the City and the Port, including the Exploratorium, Pier 1, the Ferry Building, Seal Plaza at Oracle Ballpark and in Fisherman's Wharf along Pier 45, Taylor Street and Wharf J9. The further understanding developed from these predesign activities will better inform any negotiations with these important Port tenants.

Figure 2 shows the geographic locations of the Embarcadero Early Projects.

Figure 2: Map of Embarcadero Early Projects

- Proposition A Predesign
- Advance through Geographic Strategy
- Coordination with Long-term Tenants, Capital Programs and City Agencies

1	Joint Operations Security Center and Fuel Dock Reliability Project
2	Wharf J9 Replacement and Resilient Shoreline Project
3	Taylor Street Seawall Earthquake Stabilization Project
4	Pier 45 Apron Earthquake Safety Retrofit and Flood Risk Reduction
5	Pier 43-1/2 Seawall and Wharf Earthquake Safety Project
6	Pier 41 Seawall Earthquake Stabilization and Wharf Retrofit
7	Pier 39 Seawall Earthquake Stabilization & Wharf Retrofit/Replacement
8	Pier 33 to 35 Seawall and Wharf Earthquake Reliability Project
9	Pier 31-1/2 Bulkhead Wall and Wharf Earthquake Safety Retrofit
10	Pier 27 Seawall and Wharf Earthquake Reliability Project
11	Pier 15 Bulkhead Wall and Wharf Earthquake Safety Retrofit
12	Pier 9 Bulkhead Wall and Wharf Earthquake Safety Retrofit
13	Pier 9 Historic Shed Building Earthquake Safety Retrofit Project
14	Pier 1 Bulkhead Wall and Wharf Earthquake Reliability Project
15	Ferry Building Seawall & Substructure Earthquake Reliability
16	Agriculture Building Bulkhead Wall and Wharf Earthquake Safety
17	Pier 5 to Pier 22-1/2 Near-Term Coastal Flood Risk Reduction Project
18	Pier 24 to Pier 28-1/2 Bulkhead Wall and Wharf Earthquake Safety
19	EFWS, Intake Tunnel #1 Earthquake Reliability Project
20	Giants Seals Plaza Seawall Earthquake Stabilization Project
21	Pier Fire Suppression & Waterside Evacuation Improvements
22	EFWS, Fireboat Manifold Earthquake Reliability Projects
23	Pier Utility Connection Earthquake Retrofits at Seawall

Table 6: Recommended Strategies to Advance Embarcadero Early Projects

		Proposition A Funding				
#	Embarcadero Early Projects	Piers 19-41 Geographic Strategy	Needs Assessment & Alternatives Analysis	Port 5 Year CIP*	SFPUC Coordination	Real Estate / Maritime Discussions
10	Pier 27 Seawall and Wharf Substructure Earthquake Reliability Project	✓				
15	Ferry Building Seawall and Substructure Earthquake Reliability Project		✓			
7	Pier 39 Seawall Earthquake Stabilization and Wharf Substructure Retrofit Project	✓				✓
8	Piers 33-35 Seawall and Wharf Substructure Earthquake Reliability Project	✓			✓	
6	Pier 41 Seawall Earthquake Stabilization and Wharf Substructure Retrofit Project	✓				✓
2	Wharf J9 Replacement and Resilient Shoreline Project		✓			✓
5	Pier 43-1/2 Seawall and Wharf Earthquake Safety Project					✓
1	Joint Operations Security Center and Fuel Dock Reliability Project					✓
14	Pier 1 Bulkhead Wall and Wharf Substructure Earthquake Reliability Project		✓			✓
13	Pier 9 Shed Earthquake Risk Reduction**			✓		✓
12	Pier 9 Bulkhead Wall and Wharf Substructure Earthquake Safety Retrofit Project**		✓			✓
3	Taylor Street Seawall Earthquake Stabilization Project		✓			✓
20	Giants Seals Plaza Seawall Earthquake Stabilization Project		✓			✓
21	Pier Fire Suppression & Waterside Evacuation Improvement Projects		✓			
19	Emergency Firefighting Water System, Intake Tunnel #1 Earthquake Reliability Project				✓	
11	Pier 15 Bulkhead Wall and Wharf Substructure Earthquake Safety Retrofit Project		✓			✓
16	Agriculture Building Bulkhead Wall and Wharf Substructure Earthquake Safety Project					✓
22	Emergency Firefighting Water System, Fireboat Manifold Earthquake Reliability Projects				✓	
9	Pier 31-1/2 Bulkhead Wall and Wharf Substructure Earthquake Safety Retrofit Project	✓				✓
17	Pier 5 to 22 ½ Near-Term Coastal Flood Risk Reduction Project		✓		✓	
4	Pier 45 Apron Earthquake Safety Retrofit and Interim Flood Risk Reduction Project		✓			✓
23	Pier & Wharf Utility Connection Earthquake Retrofits at Seawall Project			✓		
18	Pier 24 to Pier 28-1/2 Bulkhead Wall and Wharf Substructure Earthquake Safety Retrofit Project		✓			

Project numbering reflects the geographic numbering in Figure 2.
*The Port's 5 Year Capital Improvement Program.
**This Pier 9 project was split into two, with a recommendation to advance the Pier 9 wharf retrofit predesign with Proposition A funding and to advance the Pier 9 pier retrofit through the Port's 5 Year CIP.

As noted above, this is a group of projects with total costs that significantly exceeds Proposition A available funding for design and construction. This geographic strategy – including planning, pre-design and entitlement efforts – will enable the Program team to develop a scope, schedule and budget for this subset of projects.

Please note that the consultation with Port tenants and the SFPUC may not immediately yield other sources of funding to advance the Early Projects in Table 6. These are preliminary discussions intended to measure interest and financial capacity. Electing not to use Proposition A to advance any of the projects does not preclude a later decision by the Commission or the Port Director from a later decision to use Proposition A funding for a given project.

The list of Embarcadero Early Projects is a "live" list: as these projects advance through predesign, the Program team may recommend eliminating projects due to issues such as feasibility and cost. The list may also be augmented with other risk reduction projects as we learn more.

The Program team identified and evaluated a total of **23** Embarcadero Early Projects. The total rough order of magnitude estimate to deliver all projects ranges from **$650** million to **$3** billion. Of these, the Program team recommends:

- advancing **5** through development of an overall geographic strategy for the stretch between Piers 19 and 41,
- advancing **11** projects to pre-design through steps outlined in the August 10, 2021 presentation to the Port Commission[4], and
- advancing **7** through coordination with Port tenants, the Port's 5 Year CIP, and City agency coordination.

PROPOSED BUDGET & HIGH LEVEL SCHEDULE

As described in the staff report for the November 9, 2021 Port Commission meeting, the Program team has expended approximately $26.3 million in Proposition A funding to date.

[4] Staff Report:
https://sfport.com/files/2021-08/Item%209A%20Waterfront%20Resilience%20Program%20Project%20Delivery_final.pdf

Table 7: Waterfront Resilience Program Expenditures to Date
Proposition A Seawall Earthquake Safety Bond and Other Sources

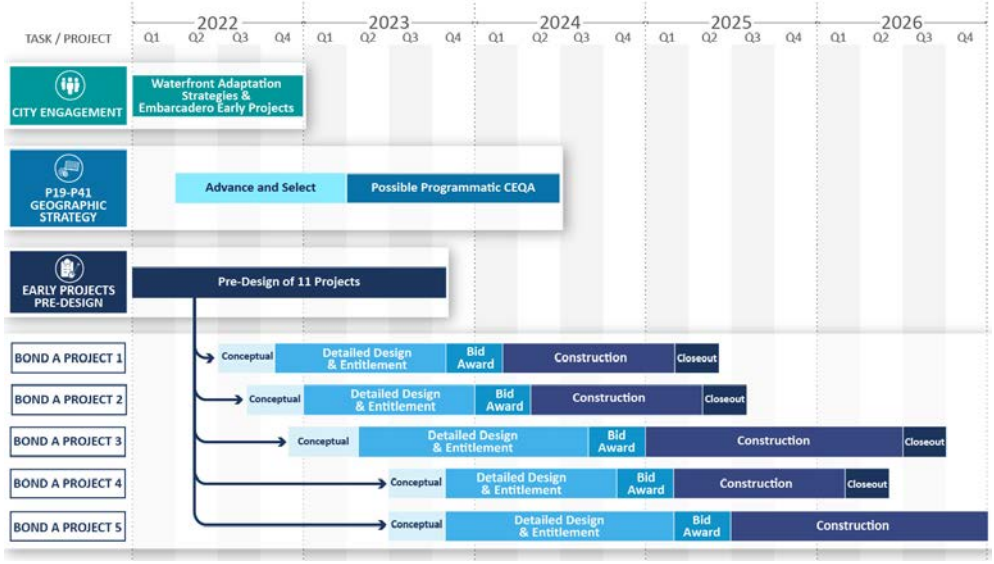
Category	Proposition A	Other Sources*	Total
Port Staffing	$3,774,967	$844,536	$4,619,503
Program Management	$7,063,755	-	$7,063,755
Existing Conditions, Multi-Hazard Risk Assessment, Seismic Peer Review Panel	$7,619,655	$3,219,119	$10,838,774
Stakeholder Engagement	$2,553,709	$1,502,707	$4,056,416
Workforce Development and LBE Support Services	$238,693	-	$238,693
Planning	$3,271,050	$5,782,457	$9,053,507
USACE Work-in-Kind	$1,725,230	-	$1,725,230
Other City Depts/Fees/etc.	$81,750	$665,544	$747,294
Subtotal Direct Expenditures	**$26,299,195**	**$12,014,363**	**$38,313,558**
Port Cash Contributions to USACE Flood Study	-	$990,000	$990,000
Total Expenditures	**$26,328,809**	**$13,004,363**	**$39,333,172**

*Other Sources are Port Harbor Funds and $5 Million State of California Grant.

The Program team is not seeking a Port Commission decision at this time regarding which projects will be constructed with Proposition A funding – those decisions will come to the Commission over the next 1-3 years (depending on project complexity). Instead, staff is seeking the Commission's concurrence that we advance planning for the entire waterfront, with a more detailed focus on the zone between Piers 19-41, and needs assessment and alternatives analysis of a suite of Embarcadero Early Projects selected through application of the evaluation criteria and Proposition A funding guidelines described above.

For context, we estimate that the cost of advancing this work will be $26 million over the next 2 years. Figure 3 below shows a conceptual schedule for this work, which is dependent on a number of variables, including City department engagement and the complexity of the projects.

Figure 3: Conceptual Schedule for Advancing Embarcadero Early Projects



After we complete alternatives analysis, the Program team will return to the Port Commission before we advance a smaller subset of Projects to conceptual engineering. This later conceptual engineering step will result in clear scope, schedule and budget for each project.

NEXT STEPS

At this stage, the Embarcadero Early Projects are defined at the planning level. The Program team intends to use Proposition A bond funding to advance pre-design of the Early Projects and the detailed geographic strategy for Pier 19 to Pier 41 as recommended here. The planning level estimate for the total cost of all of these projects ranges from **$650 million** to as much as **$3 billion**, and represents more projects than can be delivered solely with Proposition A bond funding.

Advancing more projects into pre-design will provide reliable information for determining which projects get funded first, create a pool of projects ready to advance, and position the Port for state and federal funding opportunities on the horizon. These funding opportunities are targeted to “shovel-worthy” projects, with at least a 35% level of design and entitlement.

As projects are advanced, the Program team will update the Commission as needed to update the Commission on progress and seek decisions to advance projects into final design and construction as soon as possible rather than waiting for all projects to finish pre-design.

Today staff seeks feedback from the Port Commission on the strategy described in this report. We are eager to advance these critical planning and project delivery steps to fulfill the promise of Proposition A and to meet the Commission’s goals under the Port’s Strategic Plan.

Prepared by: Steven Reel, Deputy Waterfront Resilience Program Manager – Engineering and Project Delivery

Brad Benson, Waterfront Resilience Director

Exhibit A: Waterfront Resilience Program Vision and Principles

Table 8 below includes the Waterfront Resilience Program Vision and Principles, with additions to respond to Port Commission direction in underline.

Table 8: Waterfront Resilience Program Vision and Principles	
Vision	Take actions to reduce seismic and climate change risks that support a safe, equitable, sustainable, and vibrant waterfront.
Principles	**Prioritize** life safety and emergency response **Advance** equity throughout the Waterfront Resilience Program, including through community and stakeholder engagement, planning, contracting, jobs and decision-making **Enhance** and sustain economic and ecological opportunities **Inspire** an adaptable waterfront that: • Improves the health of the Bay and neighboring communities • Ensures public access to the waterfront and historic places and an inviting waterfront for all • Protects and preserves historic and maritime resources • Provides opportunities for diverse families, businesses, and neighborhoods to thrive **Lead** a transparent, innovative, collaborative, and adaptive Resilience Program

Exhibit B: Earthquake and Flood Risk Analysis by Geographic Area along the Embarcadero Seawall

South Beach - Mission Creek to Pier 24 / Bay Bridge

Risks

The South Beach area is at lower overall risk because of better soils and higher elevation. Apart from a small section near Mission Creek, the rock dike seawall is projected to be generally stable in earthquakes and the risk of damaging lateral spreading is low. There are, however, earthquake risks associated with the bulkhead wall and wharf and emerging flood risk from sea level rise. This area has a collection of unique historic bulkhead buildings, Piers 30-32 and Oracle Ballpark. Except for the ballpark – which was built to modern earthquake standards – occupancy in this area is generally lower than other areas of the Embarcadero waterfront.

There are critical City infrastructure systems in this area, including:

- San Francisco Municipal Transportation Agency's ("SFMTA")
    - Municipal Railway (MUNI) E-Line with connections to the 3rd Street Light Rail along which a majority of the light rail vehicles travel to and from the MUNI Metro East storage and maintenance facility at the beginning and end of each day.

- San Francisco Public Utilities Commission ("SFPUC")
    - transport and storage boxes which convey combined sewer flows from downtown and surrounding neighborhoods to the SFPUC Southeast Treatment Plant and also manages local water and sewer service.
    - Auxiliary Water Supply System ("AWSS"), which is part of its Emergency Firefighting Water System, which is critical for the City's disaster response.

- Pacific Gas & Electric manages local gas service and electrical service in this area[5].

The MHRA identified that earthquake risk is lower in this area due to lower risk of shoreline failure. The exception to this finding is a localized area behind Oracle Park which is not expected to affect the earthquake performance of the ballpark or life safety. There is a collapse risk of wharves in South Beach which can be addressed with relatively affordable retrofits or more costly wharf replacements. The MHRA predicts differential settlement of fills in the Embarcadero which will damage light rail tracks (particularly in areas crossing the transport storage boxes), local water lines and sewer laterals in this zone. The MHRA also predicts damage to AWSS systems in the area.

The shoreline in South Beach has an average elevation of approximately 12.0' North American Vertical Datum (NAVD 88)[6], leaving somewhat more time to adapt to rising sea levels here as compared to other lower lying areas. This area does, however, see higher wave activity and occasional shoreline overtopping is expected with 2 feet of sea level rise.

[5] PG&E has a program to seismically strengthen its utility services, including along the Embarcadero.
[6] North American Vertical Datum 1988 is the standard measure of elevation in North America.

Ferry Building Area / Former Yerba Buena Cove – Bay Bridge to Pier 17

Risks

This stretch of shoreline is at higher overall risk from both earthquakes and coastal flooding, and is the most challenging engineering design and constructability condition because of very thick Bay Mud, deep bedrock, and the complexity of the Ferry Building, BART tunnel, and MUNI underground and surface infrastructure. The deepest areas of Yerba Buena Cove are between Rincon Park to approximately Pier 9 where bedrock is more than 200 feet down and Bay Mud exceeds 100 feet thick. This area has a collection of historic resources that define the Embarcadero Historic District, including the Ferry Building and Agriculture Building (both individually eligible for listing on the National Regiater of Historic Places) and historic bulkheads and finger piers. There is significant occupancy along major stretches of this area from the Ferry Building extending to the Exploratorium at Pier 15, with regional ferry access at the Water Emergency Transportation Agency ("WETA") Downtown Ferry Terminal.

There are critical City infrastructure systems in this area, including:

- SFMTA
    - Embarcadero MUNI Portal, the E-Line and the F-Line, including the connections from Market Street to the Embarcadero and Fisherman's Wharf.

- SFPUC
    - two major wastewater transport storage boxes: the Jackson Transport and Storage (T/S) Box which connects to the Northeast Treatment Wet Weather Plant near Pier 35 and the North Channel T/S Box which conveys combined sewer flows from downtown and surrounding neighborhoods to the SFPUC Southeast Treatment. These facilities are connected by the North Shore Force Main which the SFPUC is currently upgrading.
    - local water and sewer service.

- Pacific Gas & Electric manages local gas service and electrical service in this area.

The MHRA identified that earthquake risk is high in this area due to high risk of shoreline failure and liquefaction of soils. The MHRA predicts shoreline failure in large earthquakes which is expected to increase damage to bulkhead wharves, including wharves which have been retrofit as part of prior development projects. Large ground movements could also damage the Ferry Building, which survived the 1906 earthquake and has since been seismically retrofit.

The MHRA predicts significant damage to the northbound lanes of the Embarcadero in the event of shoreline failure, damage to light rail tracks (particularly in areas crossing the transport storage boxes) and damage to local water and sewer service in this zone. The MHRA also predicts damage to AWSS system components including the Fireboat Manifold at Pier 22-1/2 and multiple suction hydrants for fire engines.

The shoreline in the Ferry Building area has the lowest elevation in the northern waterfront, with flood pathways near Pier 3 and the shoreline near Pier 14. Pier 14 has an elevation of approximately 8.5' NAVD 88 which leads to flooding of the northbound lanes of the Embarcadero today during King Tides and other storm-driven tide events. There is flood risk today to the Embarcadero MUNI Portal under a 500 year flood event (0.2 percent annual exceedance probability).

Northeast Waterfront – Pier 19 to Pier 41

Risks

The Northeast Waterfront area is at high earthquake risk from seawall instability, but has more favorable ground conditions than the former Yerba Buena Cove, making it somewhat less challenging to improve. This area has the densest collection of historic bulkheads and finger piers in the Embarcadero Historic District and significant occupancy along key stretches, including Pier 39 and Alcatraz Landing at Pier 31½, with the Port's primary cruise berth at the James R. Herman Internation Cruise Terminal at Pier 27.

There are critical City infrastructure systems in this area, including:

- SFMTA
    - F-Line, which provides connections to Market Street and Fisherman's Wharf.

- SFPUC
    - Northeast Treatment Plant near Pier 35 which treats wet weather flows and discharges to San Francisco Bay through outfalls affixed under Pier 35 and Pier 33.
    - Jackson Transport/Storage Box, North Shore Pump Station, and North Shore Force Main which conveys sewer service for over 350,000 people.
    - Local water and sewer service.

- Pacific Gas & Electric manages local gas service and electrical service in this area.

The MHRA identified that earthquake risk is high in this area due to high risk of shoreline failure and liquefaction of soils. The MHRA predicts shoreline failure in large earthquakes which are predicted to damage bulkhead wharves and buildings through this area. Large ground movements could significantly restrict access to the Cruise Terminal at Pier 27.

The MHRA predicts significant damage to the northbound lanes of the Embarcadero in the event of shoreline failure, damage to light rail tracks (particularly in areas crossing the transport storage boxes) and damage to local water and sewer service in this zone. The MHRA also predicts significant damage to the Embarcadero – including infrastructure that connects the Northeast Treatment Wet Weather Plant to its Bay outfalls – in the vicinity of Pier 35.

The shoreline in the Northeast Waterfront has an average elevation of approximately 12.5' NAVD 88. Localized low spots lead to occasional shoreline overtopping with 2 feet of sea level rise.

Fisherman's Wharf

Risks

The Fisherman's Wharf area is at high earthquake risk from shoreline instability and groundshaking vulnerabilities in many of the timber wharves and bulkheads. Most of the waterfront buildings were developed by private parties under long term ground leases with the Port and have a requirement to maintain substructures under their leases. There is significant occupancy throughout the wharf, which is home to Northern California's fishing fleet and fish processing businesses as well as to ferry and excursion service on the Bay.

Fisherman's Wharf does not have the same concentration of backbone infrastructure exposed to earthquake risks as the rest of the Embarcadero. The Seawall extends to Pier 45; shoreline conditions south and west of Pier 45 vary significantly. The SFMTA operates the F-Line providing connections to Market Street. The SFPUC in this area manages local water and sewer service. Pacific Gas & Electric manages local gas service and electrical service in this area.

The MHRA identified that earthquake risk is high in this area due to vulnerable wharves, shoreline failure, and liquefiable of soils. The MHRA predicts damage to wharves and buildings throughout this area, with the exception of newer structures (like Boudin's) that were constructed under modern seismic codes or structures that have been retrofit (such as Pier 45).

The shoreline has average elevation of approximately 11.5' NAVD 88, with occasional shoreline overtopping expected with 1.5 feet of sea level rise.

Exhibit C: Proposition A Funding Guidelines

Table 9: Proposition A Funding Guidelines	
1	**Life Safety and Disaster Response** ➢ Which areas have the highest lateral spreading risk and expected damage that could pose a risk to life safety? ➢ Where are the highest concentrations of people? ➢ Where are there critical disaster response assets that will support response? ➢ Are there relatively **low-cost improvements** in an area that can improve life safety?
2	**Sufficient Funding/More Analysis or Planning Needed** ➢ Do we have sufficient Proposition A funding available to fund required improvements? ➢ Is further planning, stakeholder alignment and/or analysis required to undertake improvements? ▪ If yes, seek other funding (grants, etc.) or dedicate a part of Proposition A funding to complete planning and studies to advance action in these areas?
3	**Partnership Opportunities** ➢ Are projects planned by other City agencies that would allow efficient delivery in partnership? ➢ Have we effectively identified regional, state and federal partners? Have we identified grant opportunities?
4	**Society & Equity** ➢ Is investment prioritized for improvements that benefit the whole city? ➢ Are risks being addressed across the Embarcadero Seawall area in an even manner? ➢ Are resilience alternatives informed by a broad range of stakeholders who reflect SF? ➢ Are the economic benefits (e.g. jobs, local businesses, community projects) putting equity first?
5	**Proposition A Schedule & Program** ➢ Can priority projects be delivered within the timescales identified in the Proposition A bond report? ➢ Does the program of first projects allow efficient delivery?
6	**Planned Rehabilitation** ➢ Is there planned development? ➢ Is there another source – private equity or infrastructure financing district/community facilities district proceeds – that can pay for required improvements? ▪ If yes, is additional subsidy needed to ensure financially-feasible historic rehabilitation?
7	**Lease Extension** ➢ Is there an existing long-term lease? Is the tenant interested in a lease extension? ➢ Is there another source – private equity or infrastructure financing district/community facilities district proceeds – that can pay for required improvements? ▪ If yes, is additional subsidy needed to ensure financially-feasible historic rehabilitation?