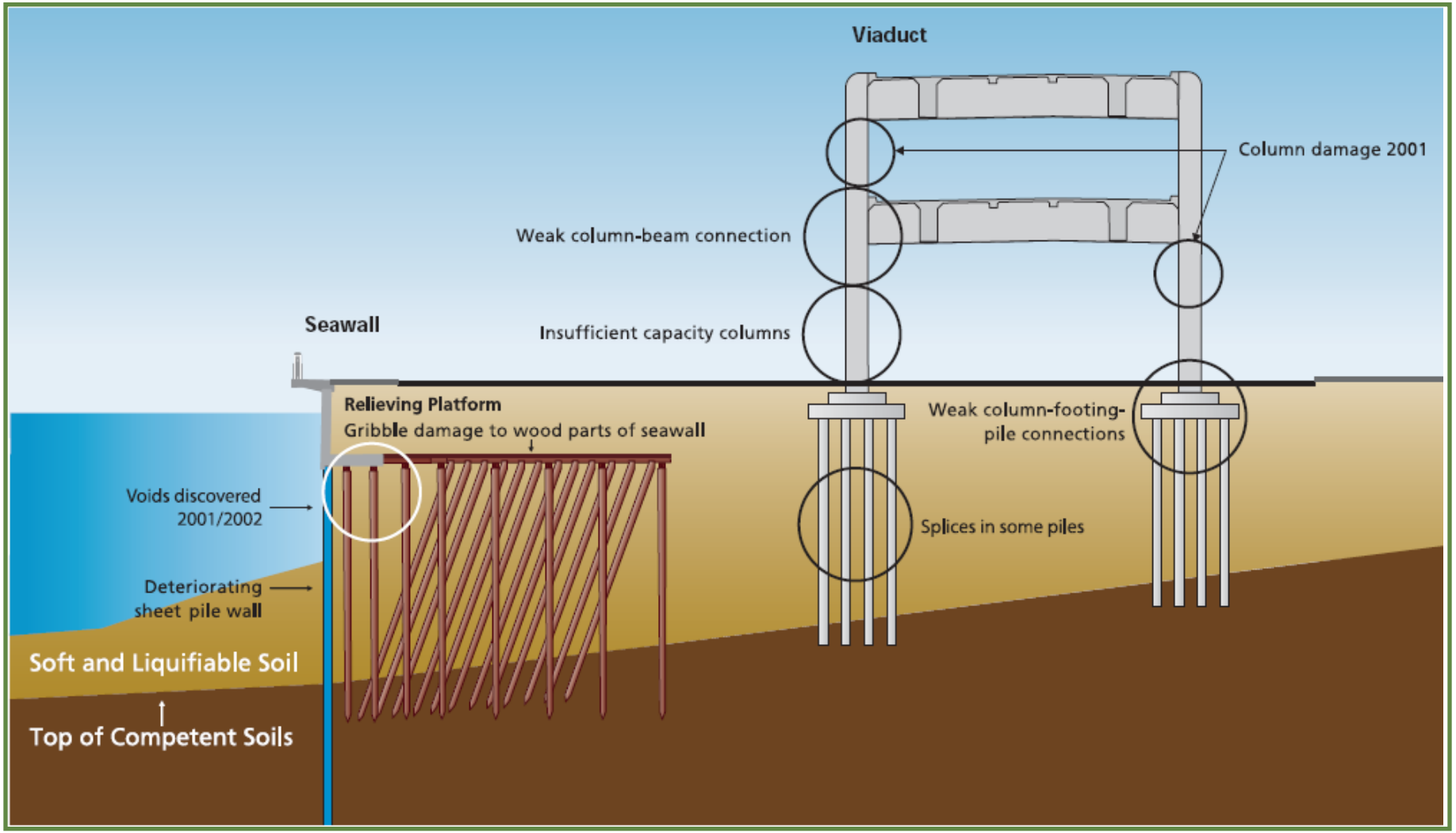
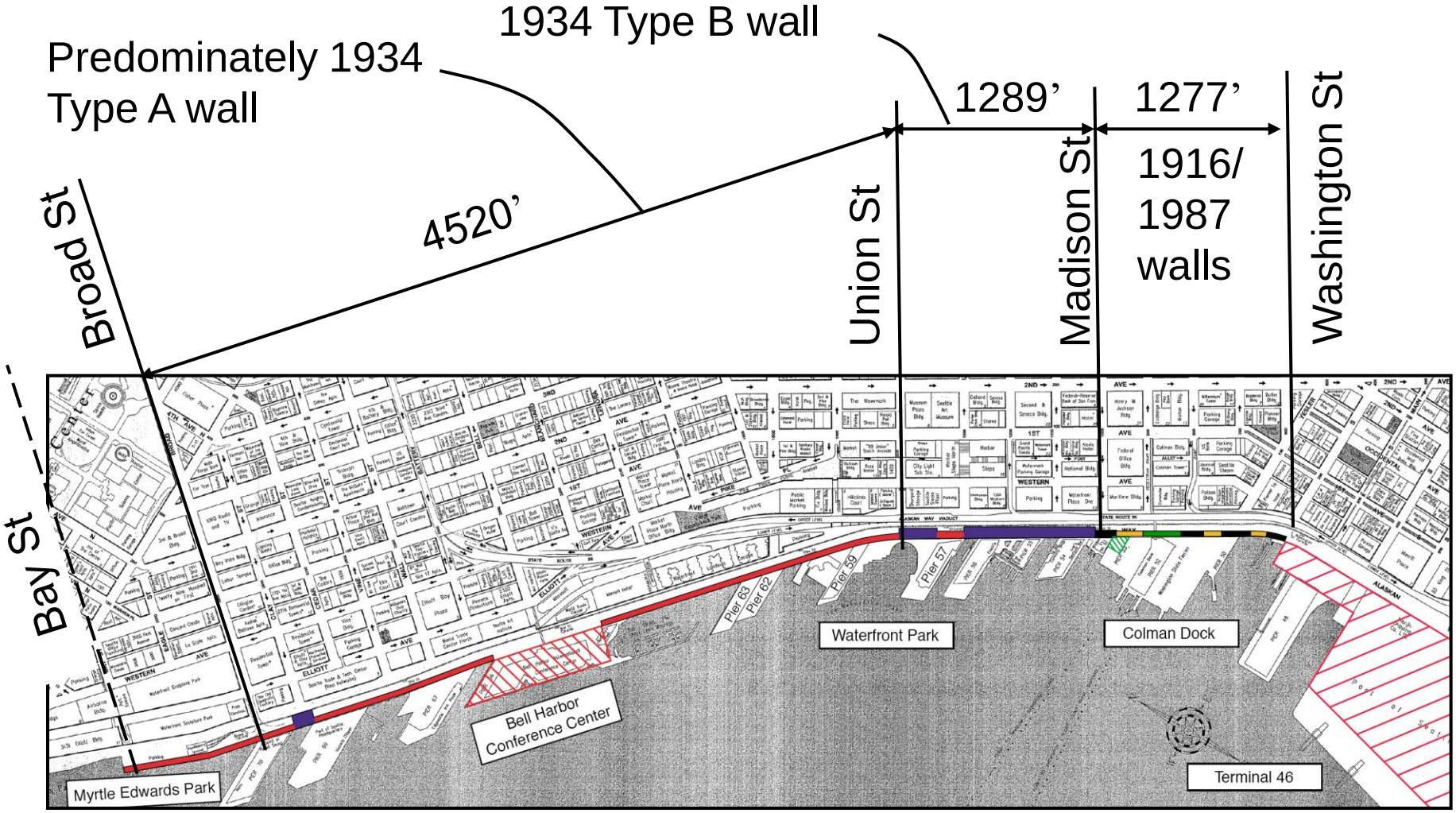
# Viaduct and Seawall Vulnerabilities



# Plan of Alaskan Way Seawall



# 2002 Inspection of Existing Seawall

**3 – Good Condition**

**6 Test Pits**

**3 – Poor Condition**

# Deteriorated Cap Beams and Deck Boards

## Timber Cap Beams

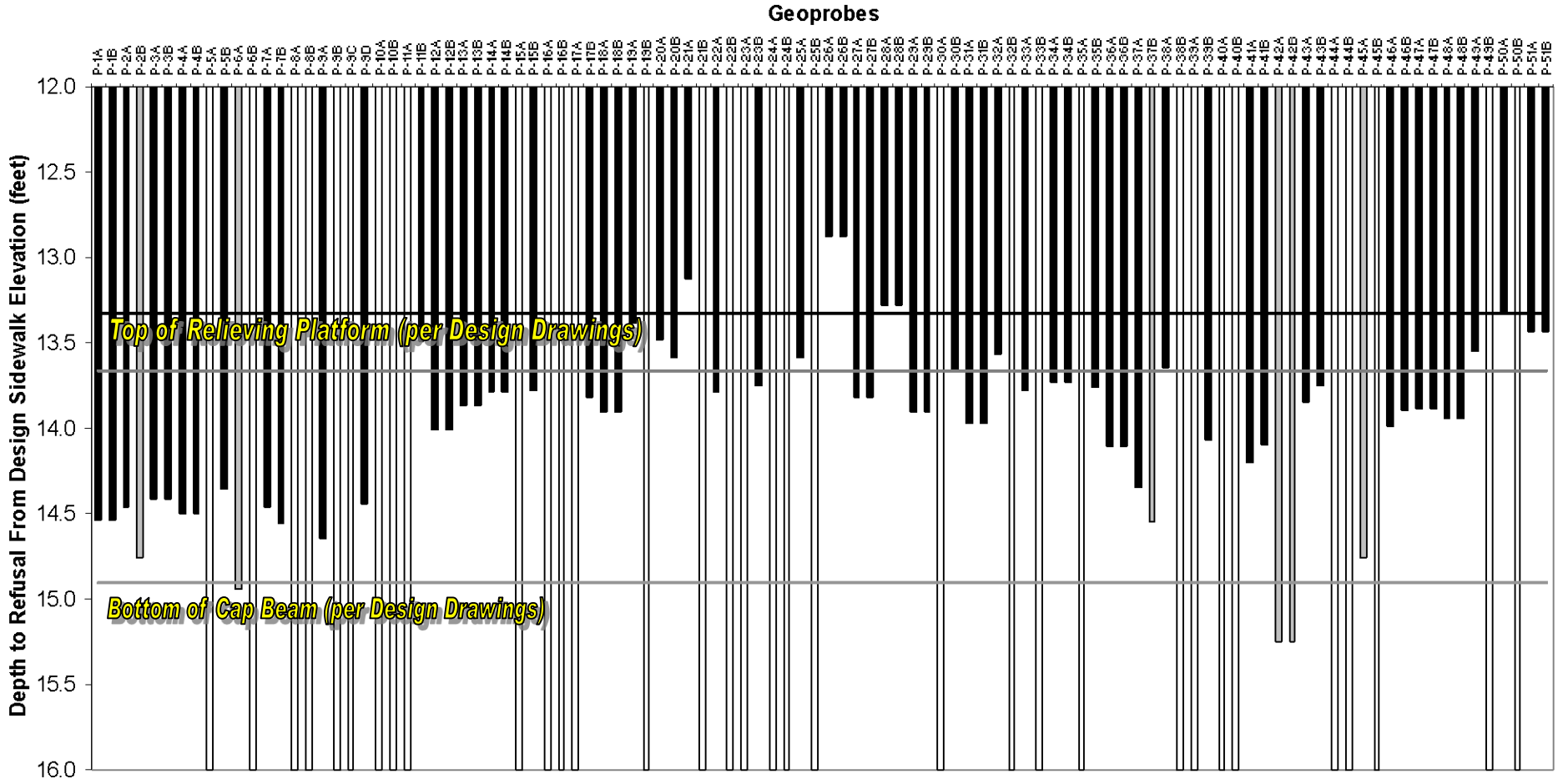
## Timber Deck Boards

# Marine Borer Damage

**Live Gribbles**

***L. lignoram***
("gribble")

# Geoprobe Results



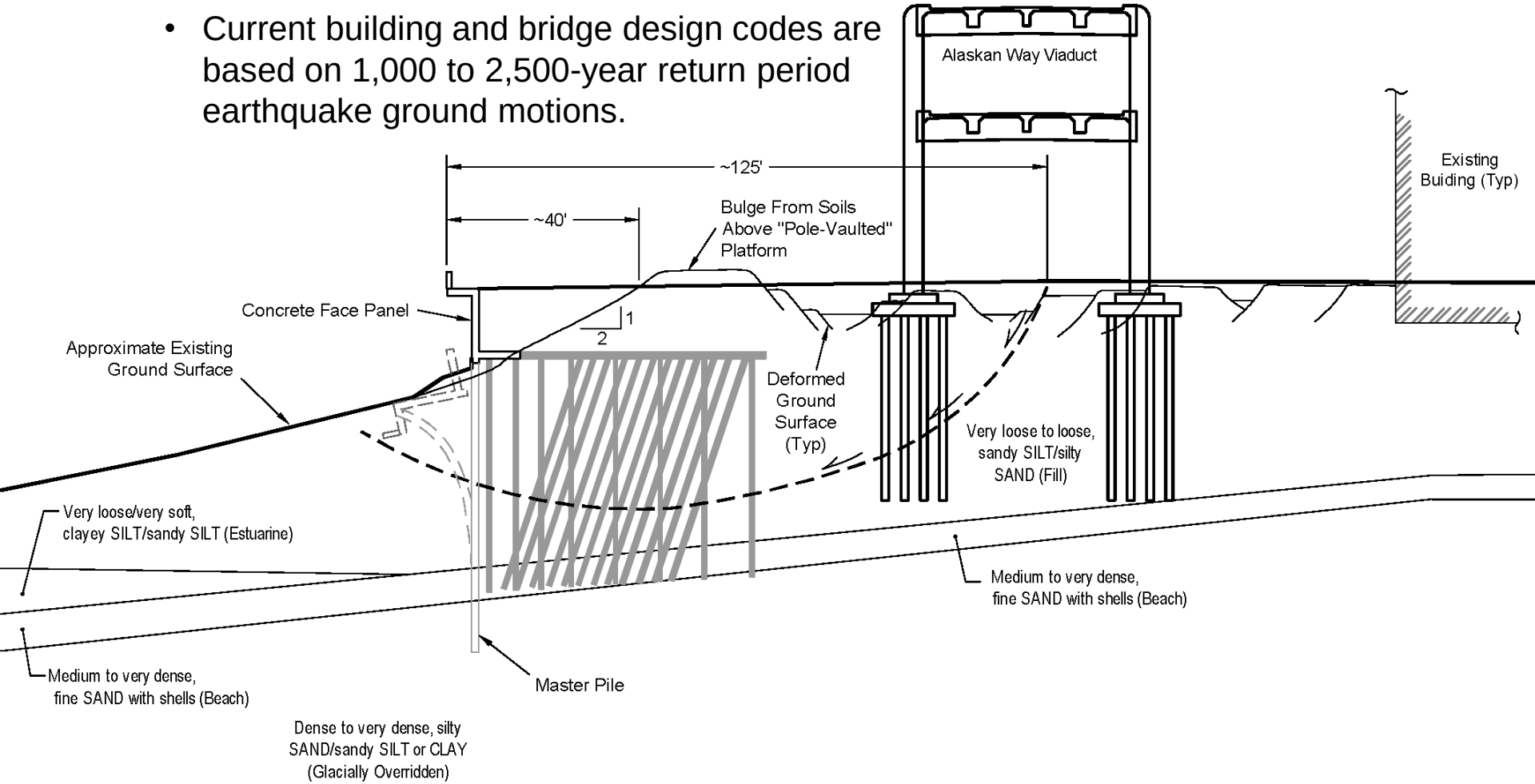

**LEGEND**

- Probe Refusal
- Probe Refusal Likely Below Deck
- No Probe Refusal

- **Approximately 50% of the relieving platform has significant damage**

# Seawall Earthquake Vulnerability

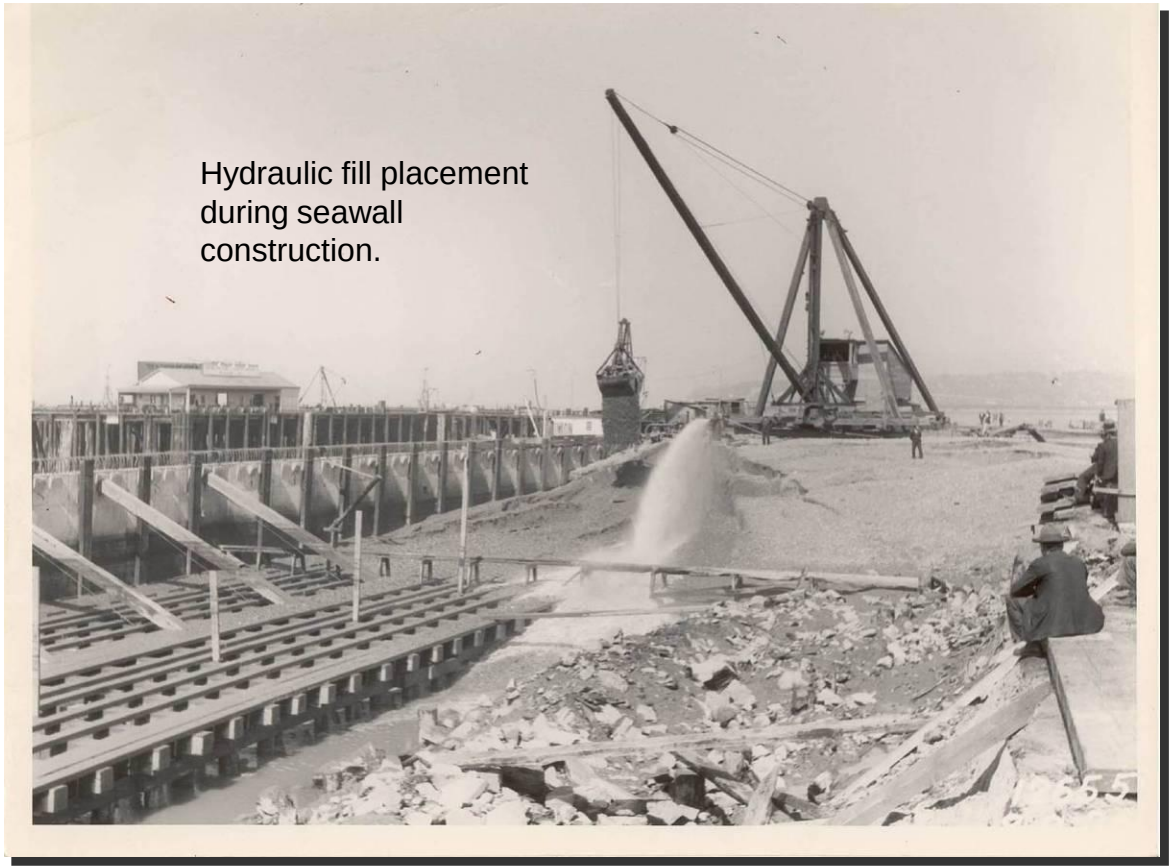
- Failure will occur for Expected Earthquake ground motions
  - Expected Earthquake - Ground motions with a 1 in 10 chance in 10 years.
  - Current building and bridge design codes are based on 1,000 to 2,500-year return period earthquake ground motions.



# Soil Liquefaction Causes Wall Failure

Sand boils across railroad tracks between E. Marginal Way S. and Alaskan Way S., 2001 Nisqually Earthquake.

- **Liquefaction – Quicksand-like condition in loose, wet soils when shaken**
- **Hydraulic fills liquefy readily**



Hydraulic fill placement during seawall construction.

# Liquefaction Causes Seawall Damage

1995 Kobe Japan Earthquake

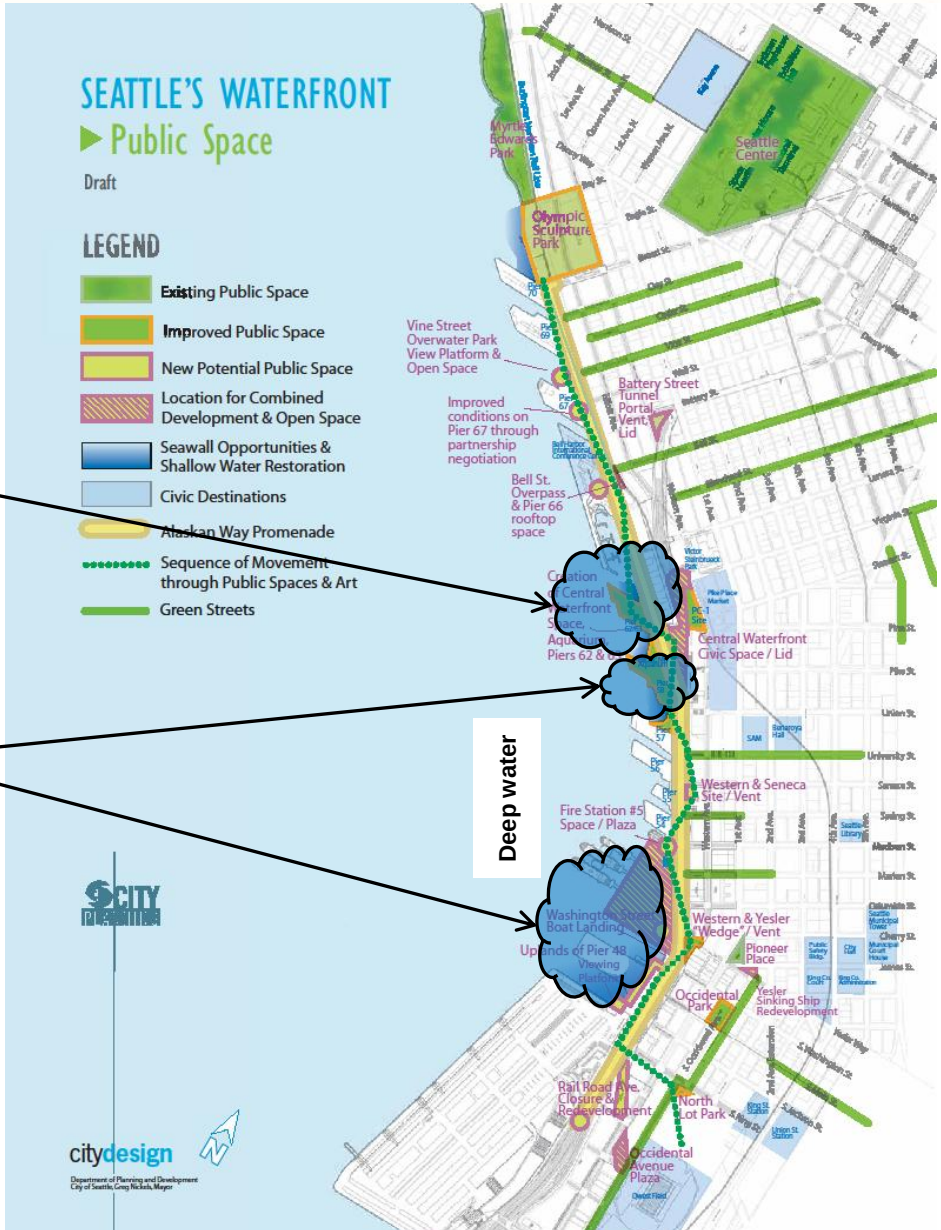
# Seawall Options

**Aquarium, Pier 63/63 Development**

**Shallow Water Restoration Opportunities (Waterfront Park, Pier 48)**

Considerations:

Navigation, Ferry dock, Pier uses, contaminated soils



## Braced Secant Pile Wall Alternative

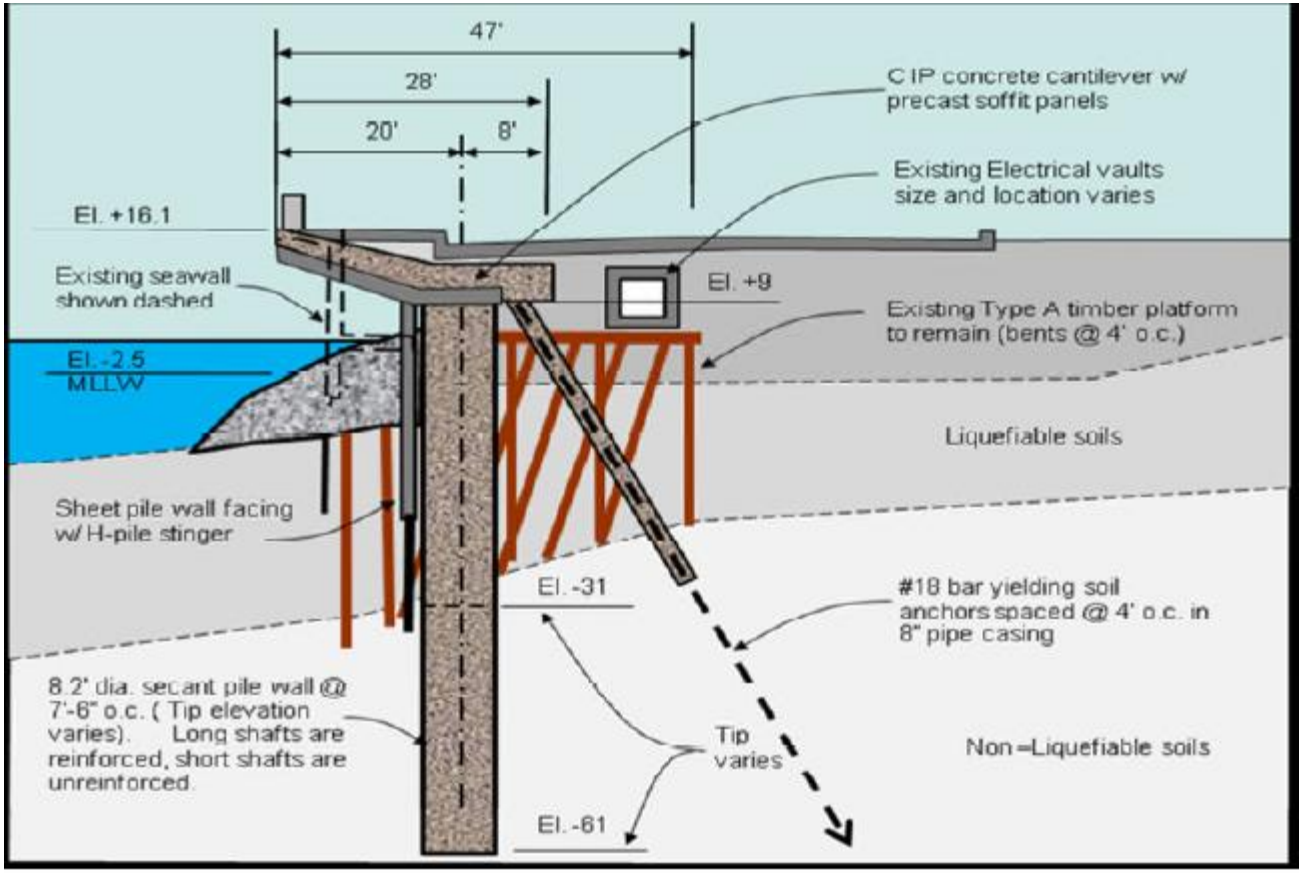
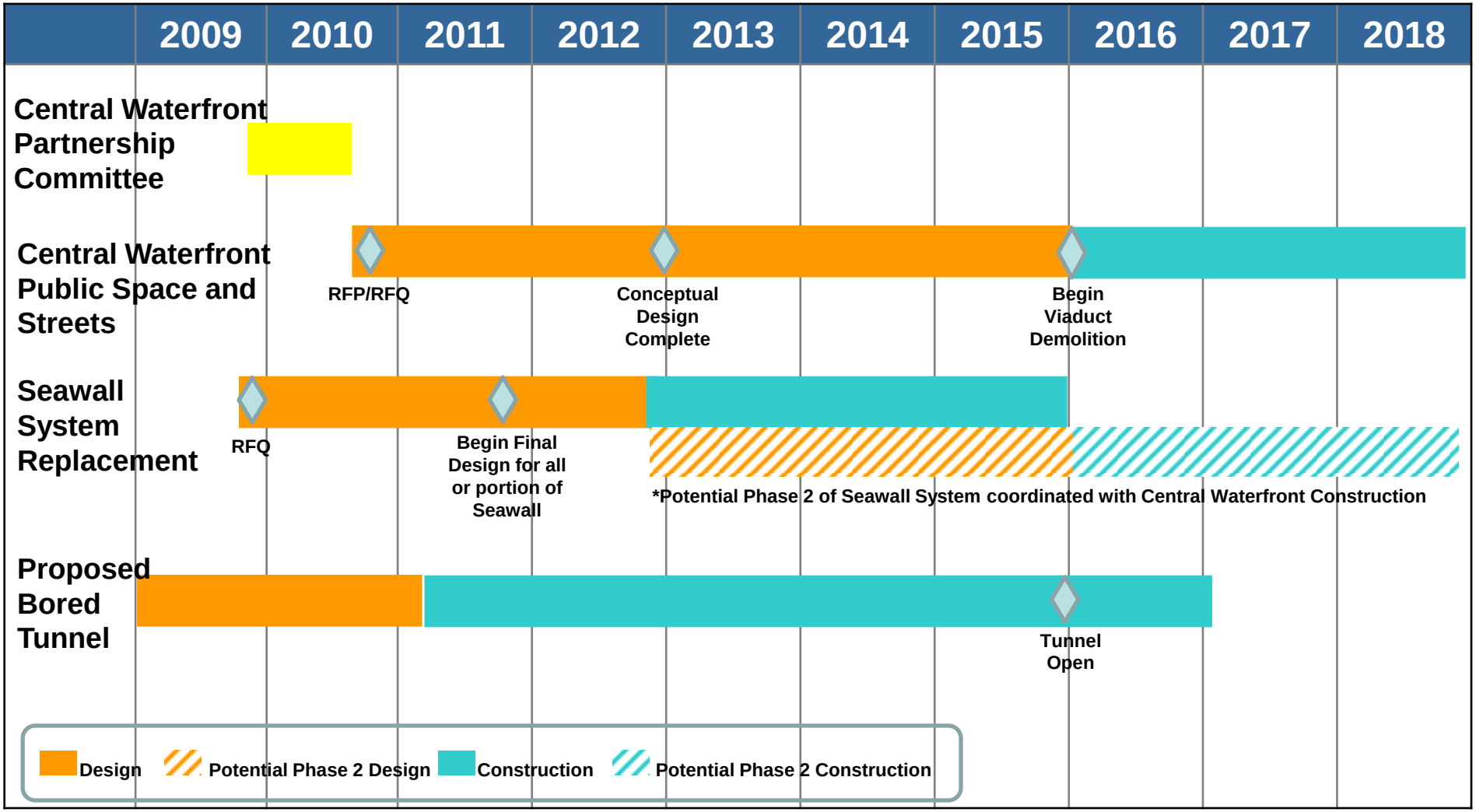



**Figure 14 – Proposed Type A Braced Secant Pile Wall**

# Central Waterfront Design / Construction Schedule