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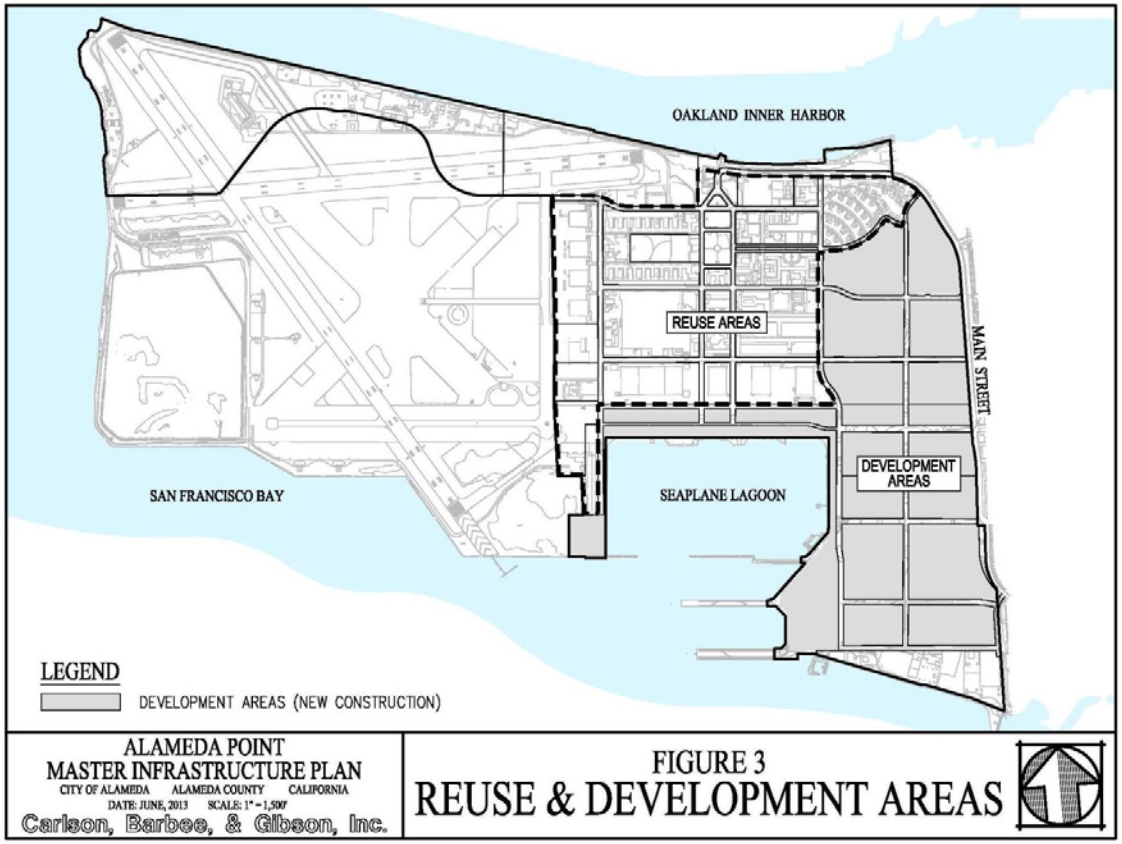
Addressing Sea-Level Rise at Alameda Point

City Council
November 19, 2013

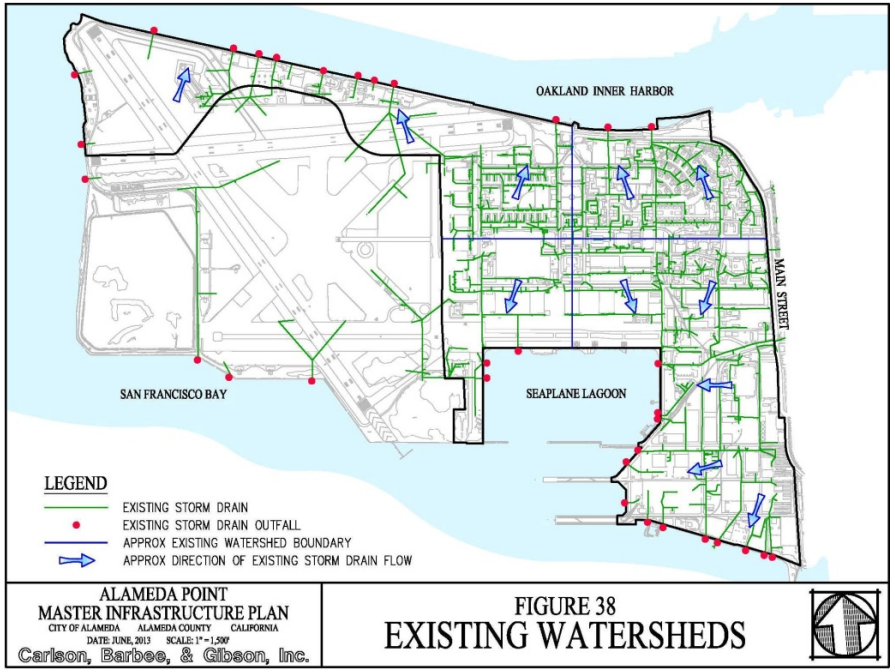
Approach to Flood Protection Infrastructure



- Distinct approach to infrastructure and sea-level rise protection in Development, Reuse and Northwest Territories Areas

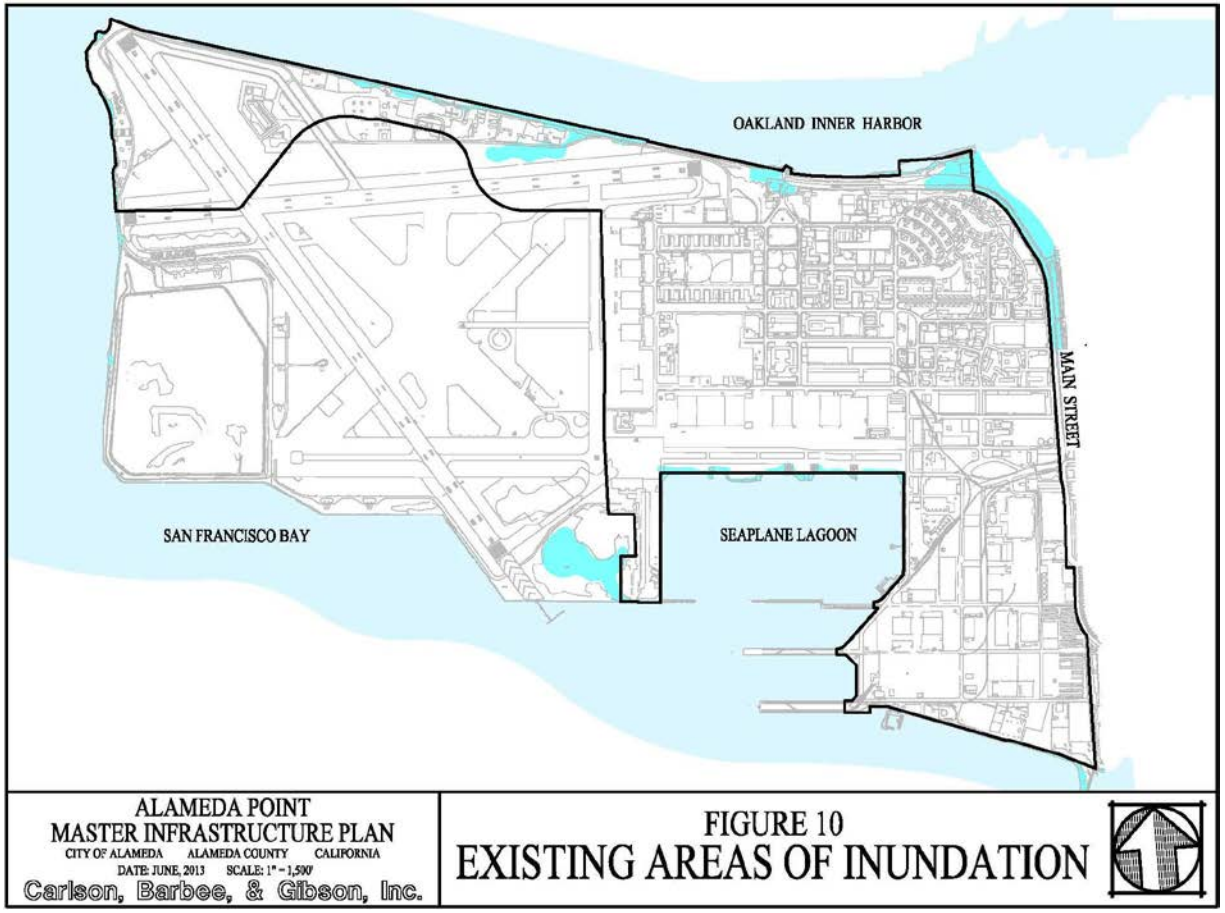
Existing Storm Drain Conditions

- Drainage pattern depends on site topography
- Existing storm drain system in need of repair



Existing and Projected Flooding

- Existing site currently floods during extreme tidal events and storms
- 100-year flood projected to flood significantly
- 18-inches of sea-level rise results in greater flooding



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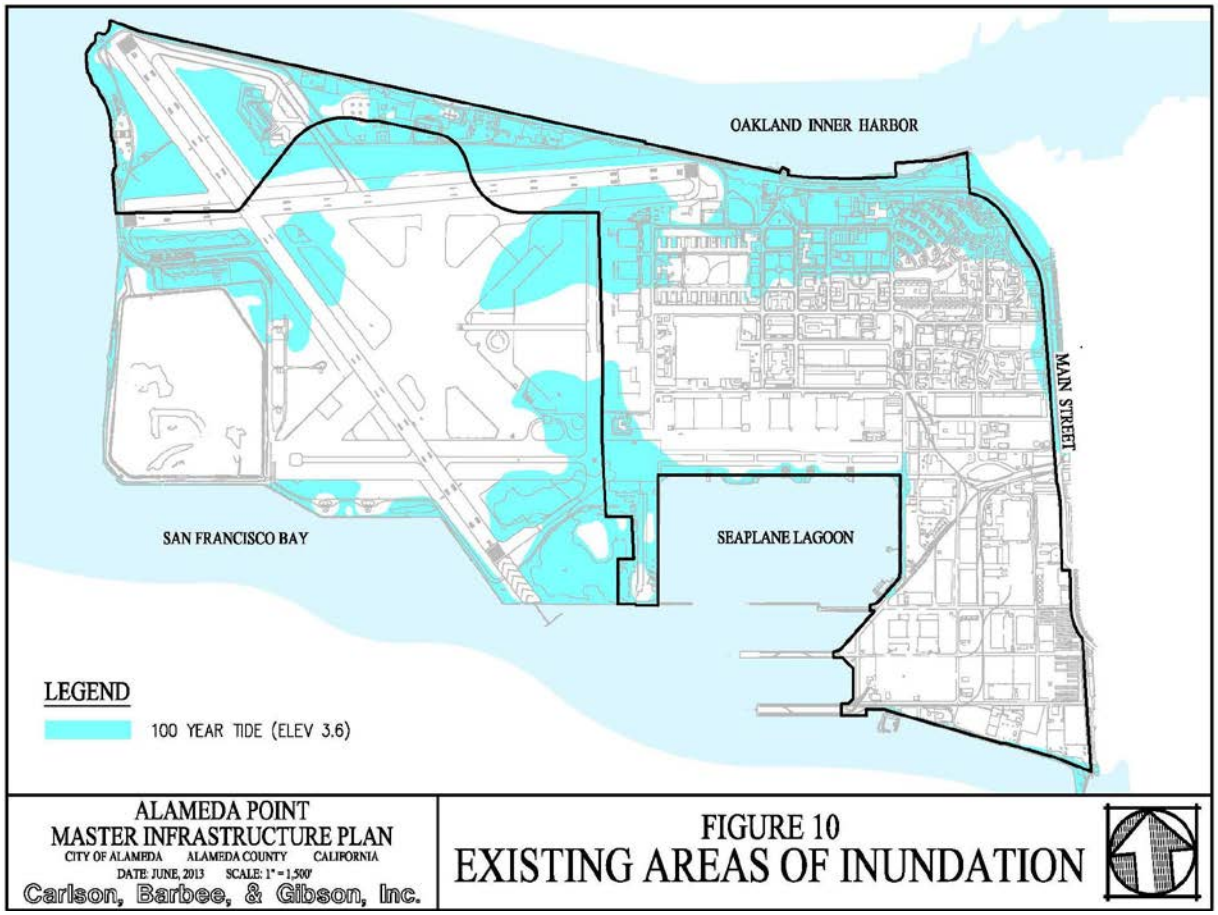

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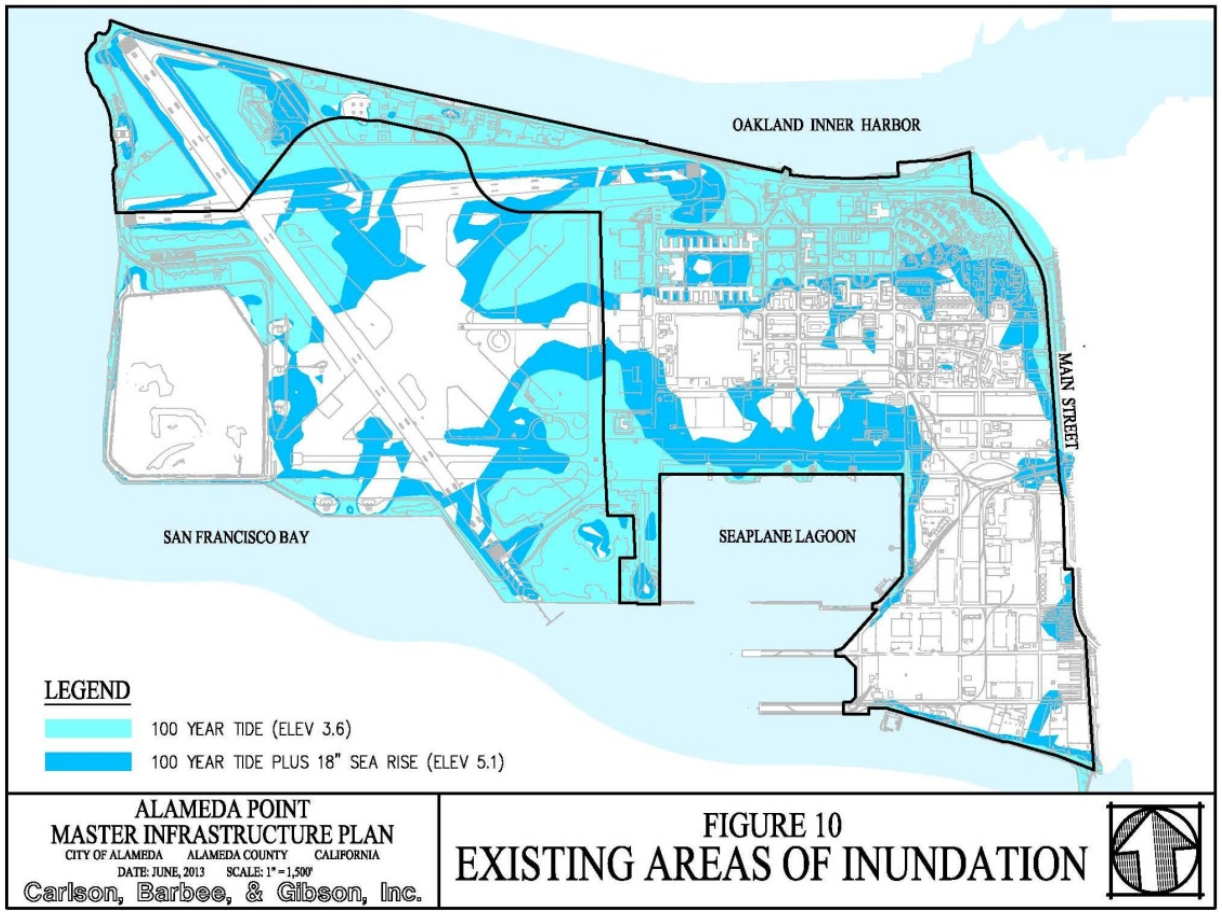

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Projected Flooding at Mean High Tide

- BCDC projections benchmark from mean high tide
- 55’ projections from mean high tide comparable to City’s 18-inch plus 100-year tidal event projected flooding

Sea-Level Rise Projections and Policies

- State California Climate Action Team (CO-CAT) issued updated guidance document in March 2013:
  - 1.5-12 inches by 2030
  - 5-24 inches by 2050
  - 17-66 inches by 2100
- CO-CAT will continue updating sea-level rise projections
- Intergovernmental Panel on Climate Change (IPCC) recently issued their fifth assessment on climate change, which predicts global sea-level rise will range:
  - 11-38 inches by 2100

Sea-Level Rise Projections and Policies

- BCDC's Bay Plan in 2009 recommended:
  - 16 inches by 2050
  - 55 inches by 2100
  - Timeframes beyond 2050 must consider adaptive capacity
  - Development planning must use "best science" available
- BCDC recognizes CO-CAT as best science on sea-level rise

Sea-Level Rise Protection Considerations

- **Long-Term Site Protection** - Affords long-term site protection consistent with latest science
- **Phasing and Implementation** - Allows initial phases to proceed without being contingent on expensive upfront perimeter solutions
- **Geotechnical** – Addresses geotechnical soil conditions in a feasible and cost-effective manner
- **Financial Feasibility** – Recognizes that flood protection improvements are expensive and must be phased and adaptable to balance financial feasibility and near-term development with sea-level rise protection

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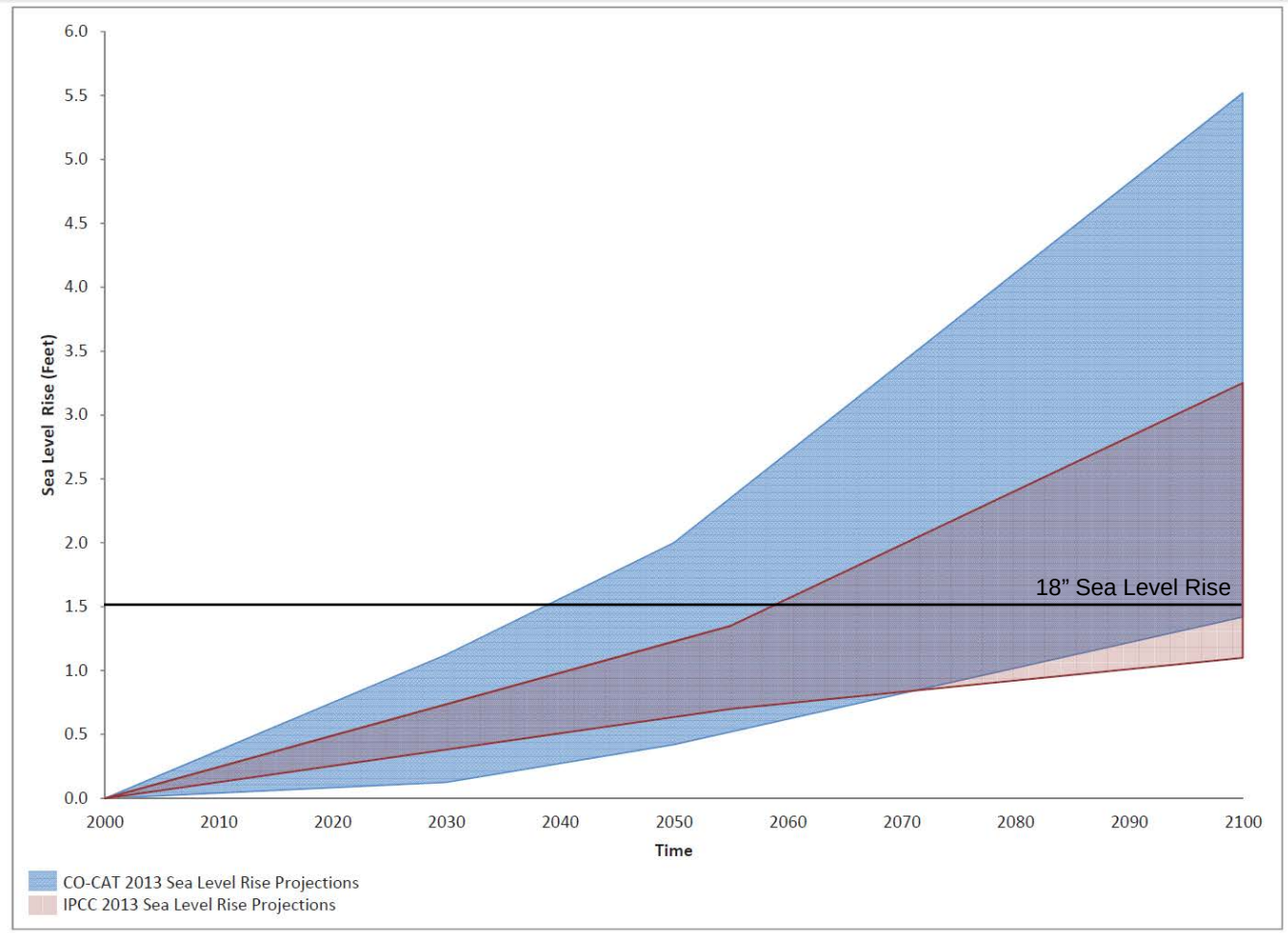
Proposed City Sea-Level Rise Protection Approach

- City's proposed approach consistent with international, State, and BCDC projections and policies:
  - 18 inches for initial flood protection
  - 55+ inches for adaptive flood protection
  - Ongoing monitoring of sea-level rise
  - Forgo protection in certain areas (Northwest Territories, western edge of Seaplane Lagoon)

Alameda Approach within Range of Projections



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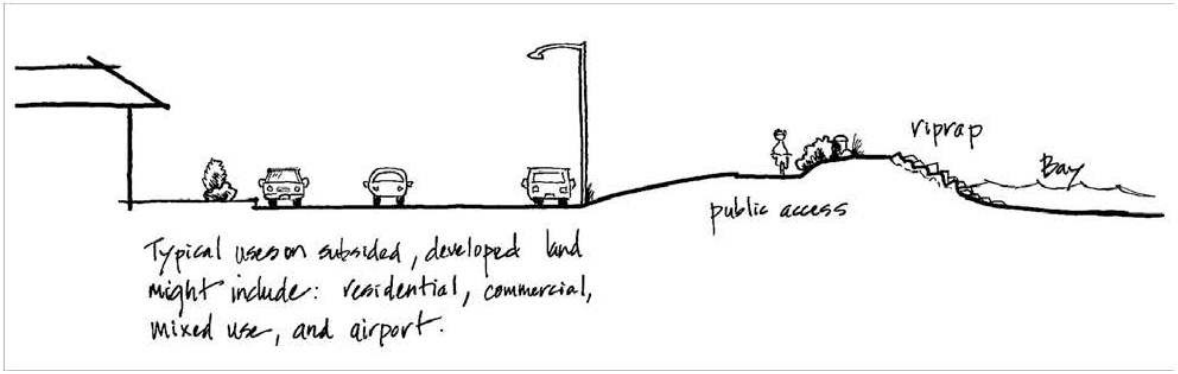
Sea-Level Rise Protection Strategies

- Elevate above expected and proposed areas
- Perimeter protection
- Set back from shoreline
- Adaptive measures

Source: BCDC



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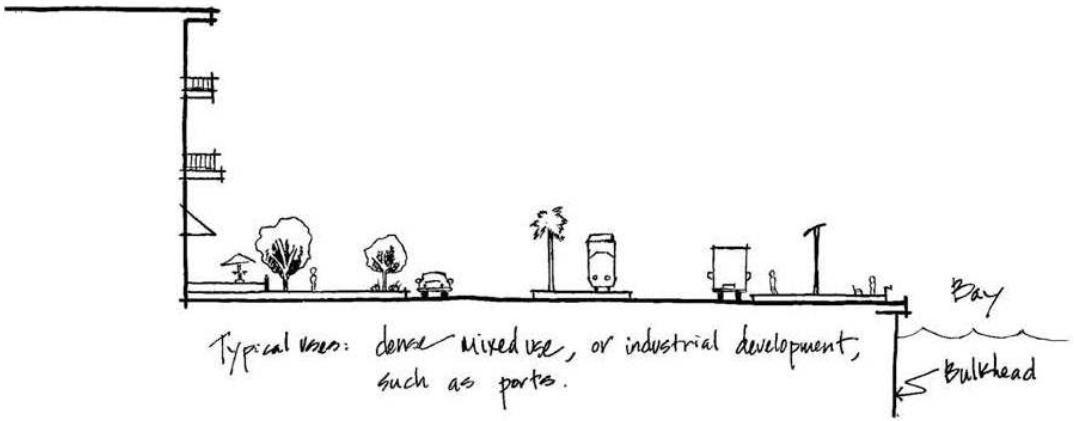
Examples of Protection Strategies

Source: BCDC



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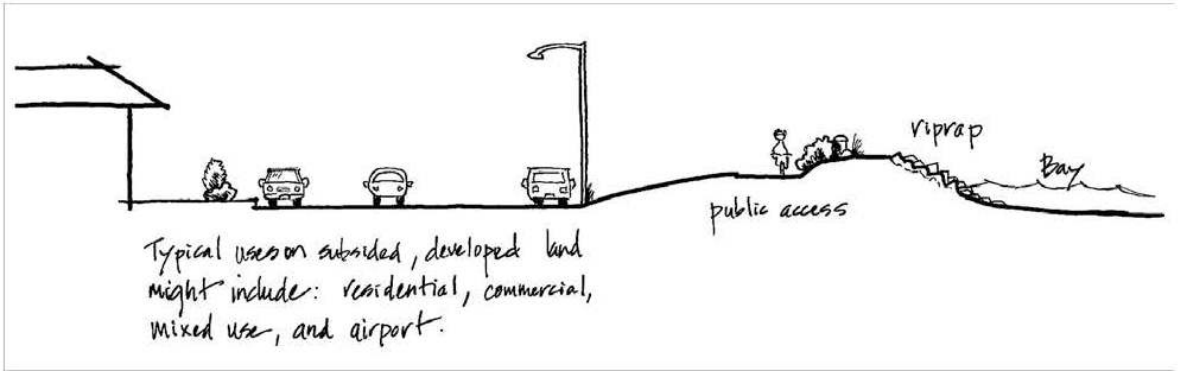

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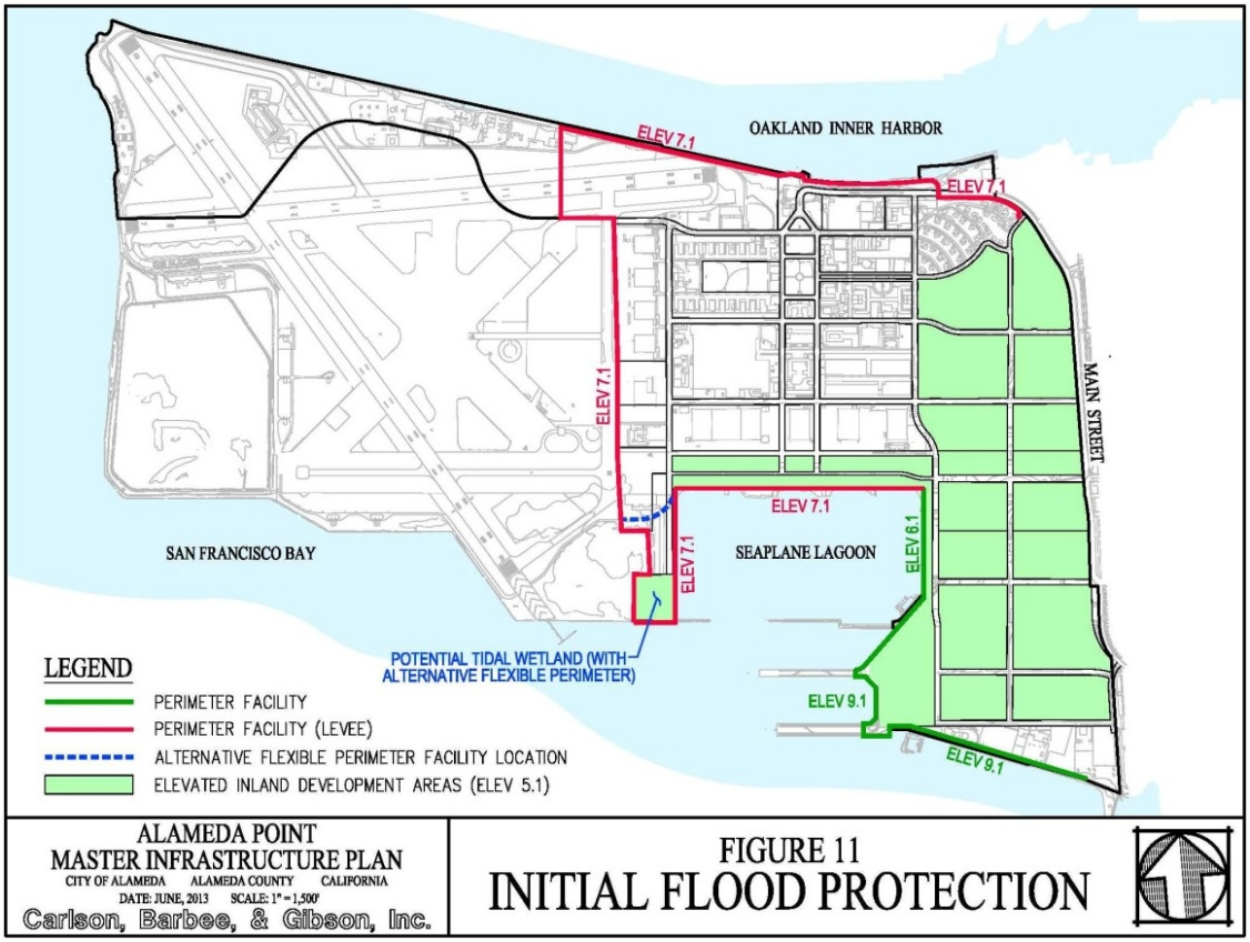
Proposed Initial Strategy (100-Year Plus 18” Sea-Level Rise)



- Elevate Development Areas with fill
- Improve and elevate perimeter measures
- Reserve land for adaptation
- Monitoring

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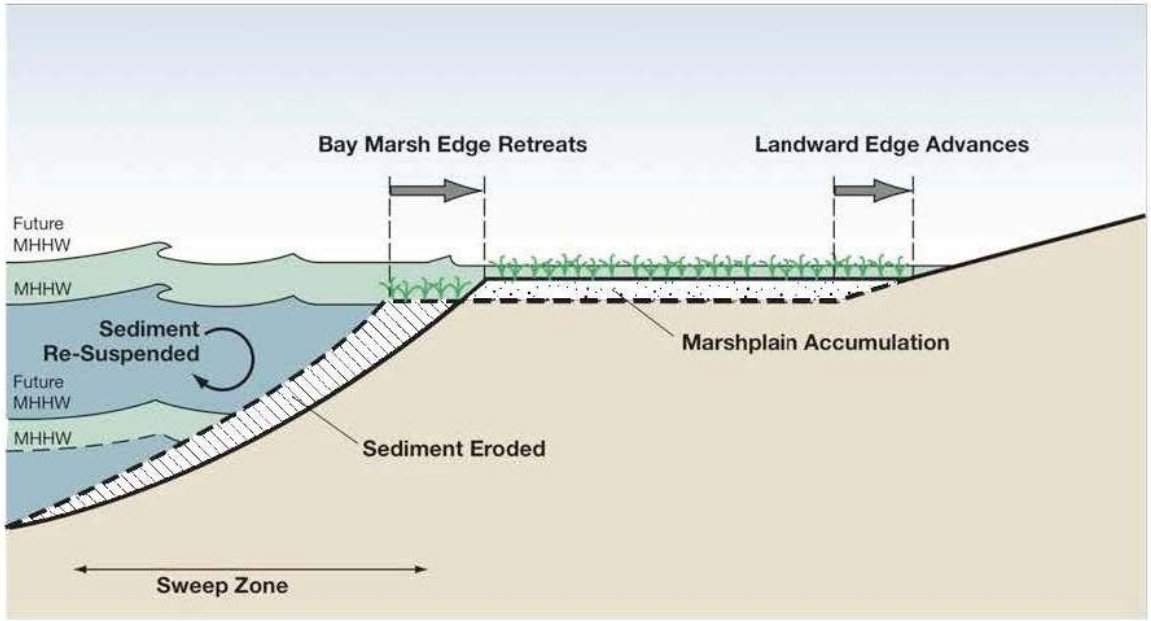
Proposed Adaptive Strategy

- Ongoing monitoring
- Implement adaptive measures if necessary
  - Raise perimeter
  - Flexible shoreline
  - Storm drain pump stations

SOURCE: Lowe and Williams, 2008



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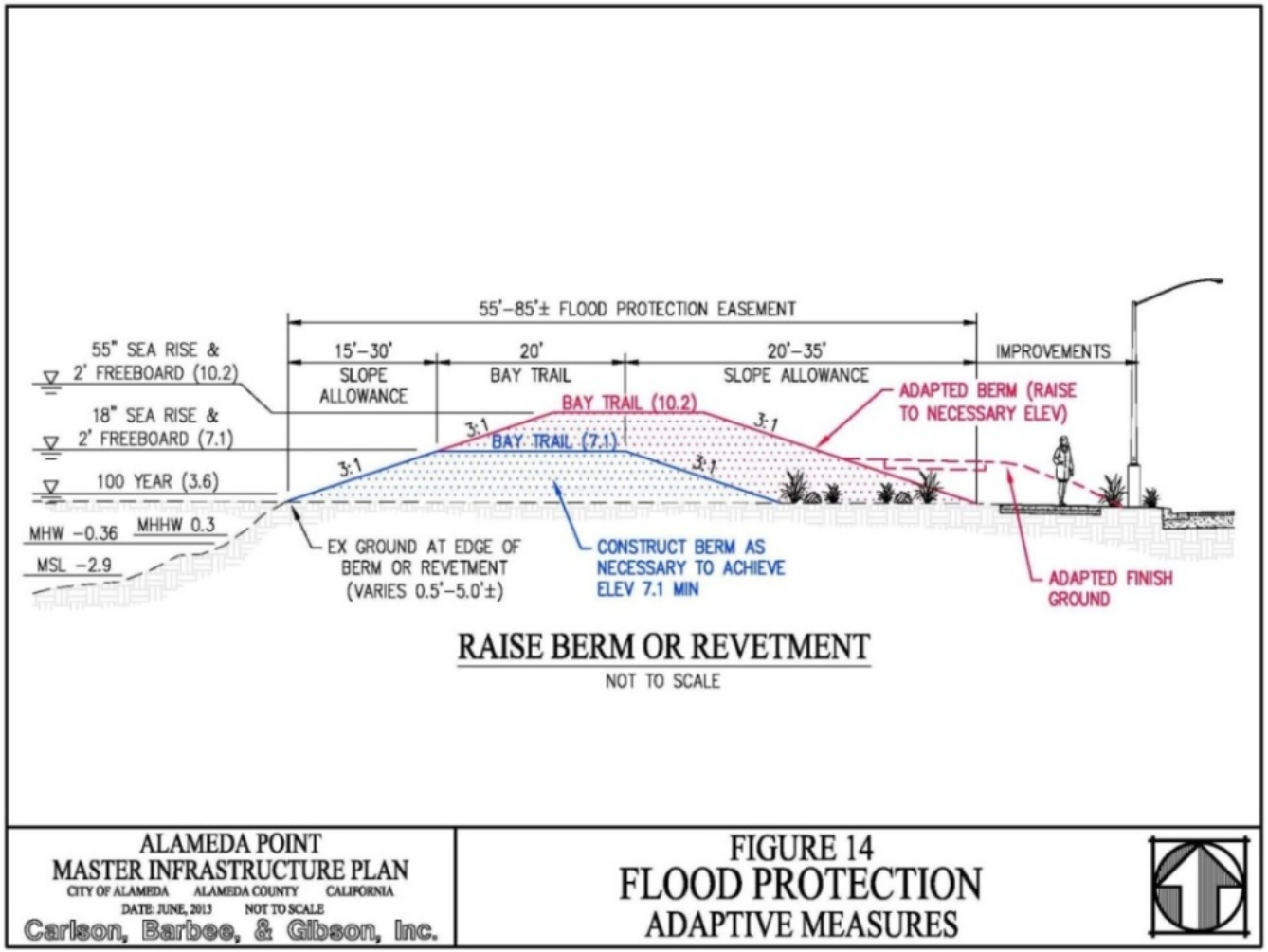
Example of Adaptive Strategy



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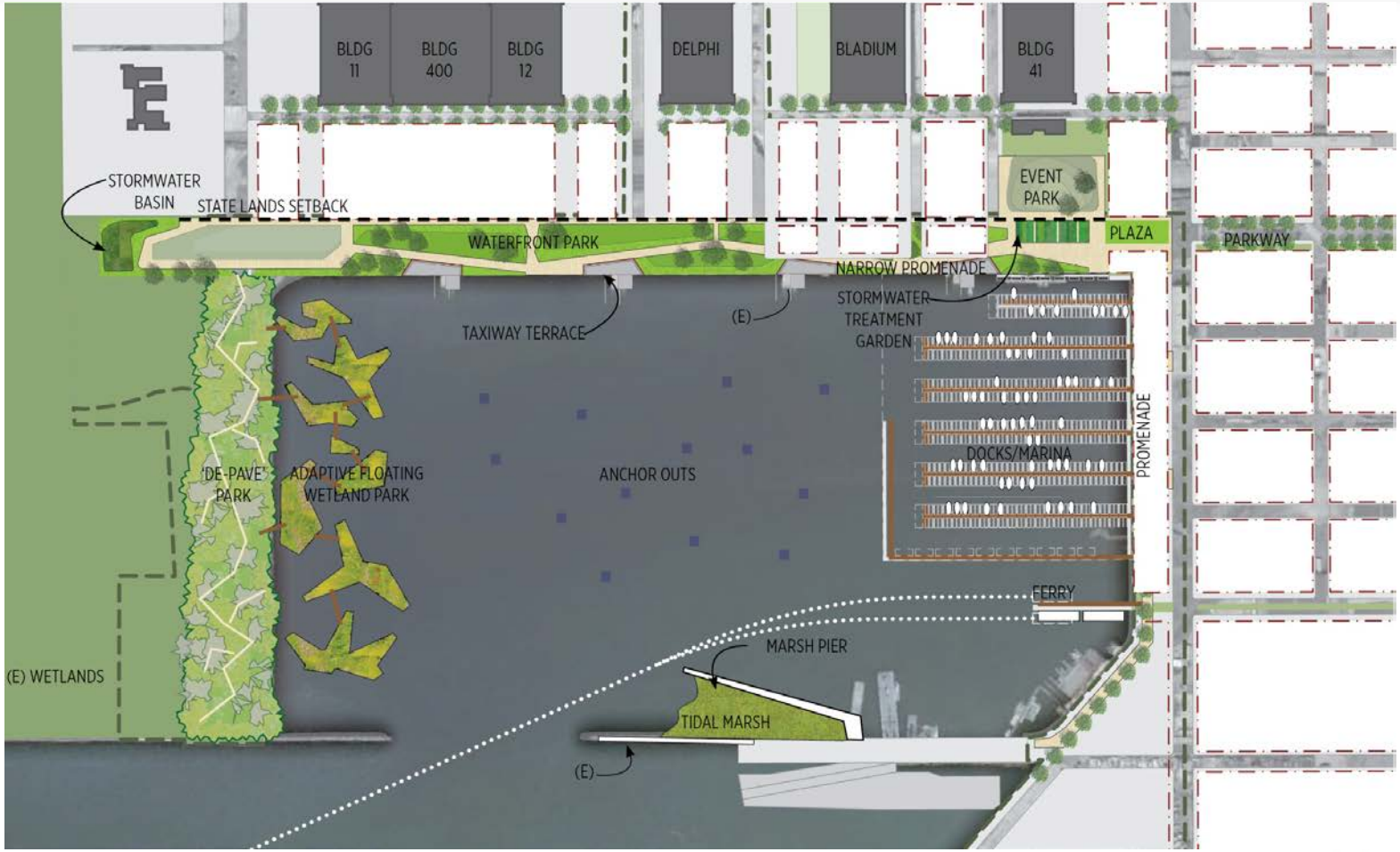
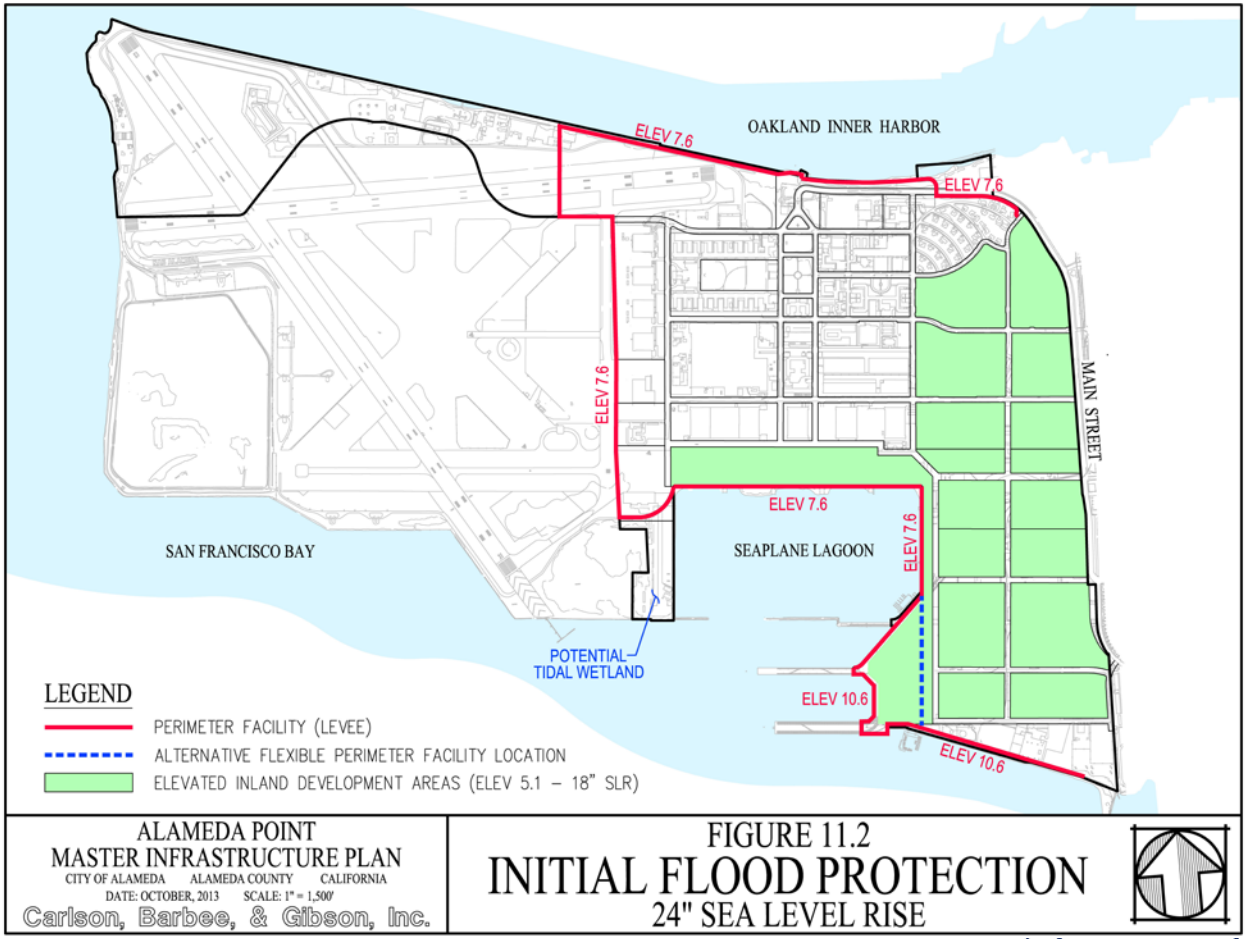


Planning Board Feedback

- 18-inch initial protection not sufficient
- Staff proposal: provide 24-inch perimeter protection; maintain 18-inch fill in Development Areas
- Add'l cost: $8M



Q & A

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Sea Level Rise Time Projections

18” of Sea Level Rise

Time Projections

	CO-CAT	IPCC	Average
High	2038	2058	2048
Upper Quartile	2047	2067	2056
Median	2056	2077	2066

24” of Sea Level Rise

Time Projections

	CO-CAT	IPCC	Average
High	2050	2070	2060
Upper Quartile	2057	2082	2069
Median	2068	2096	2081

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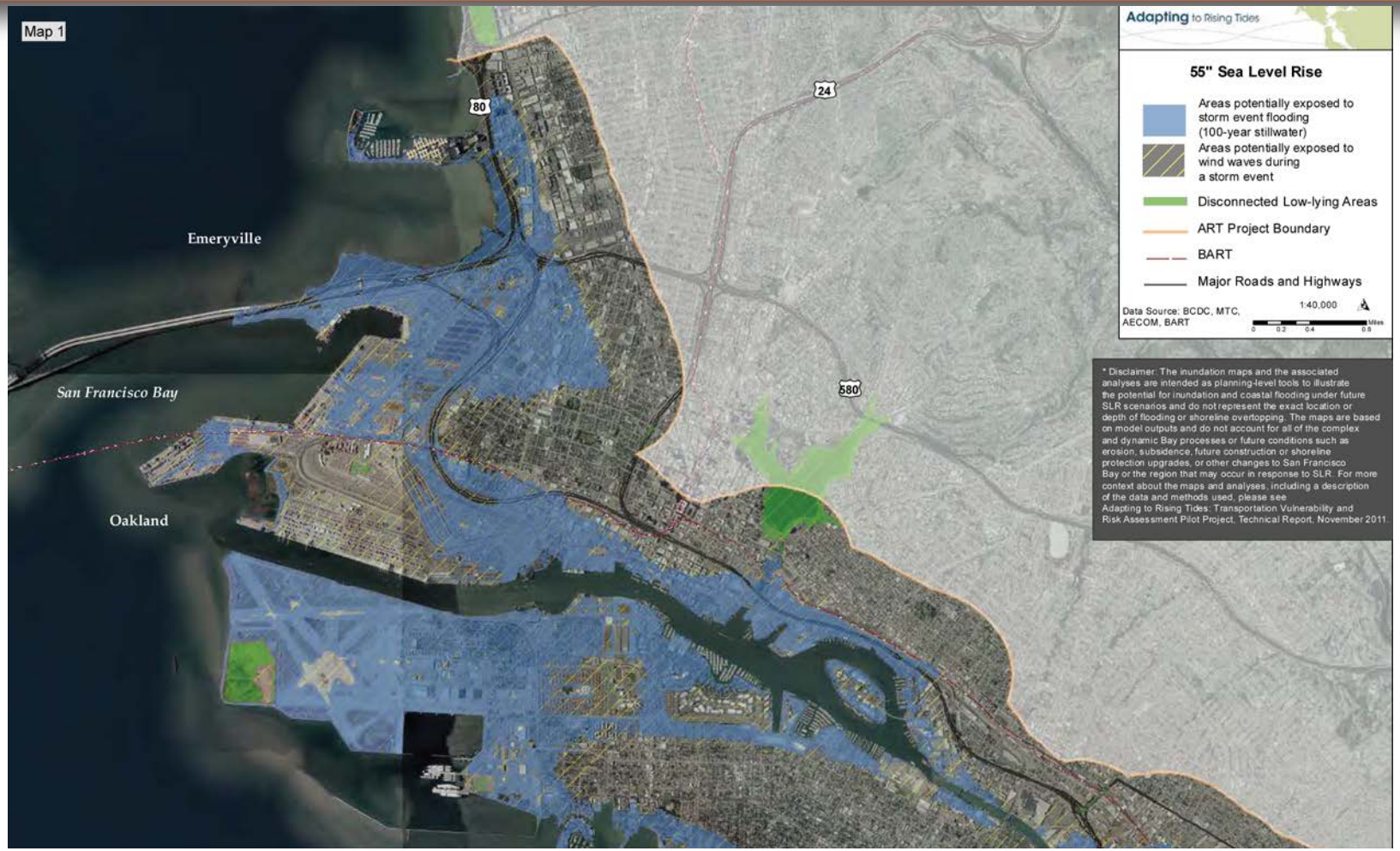

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