

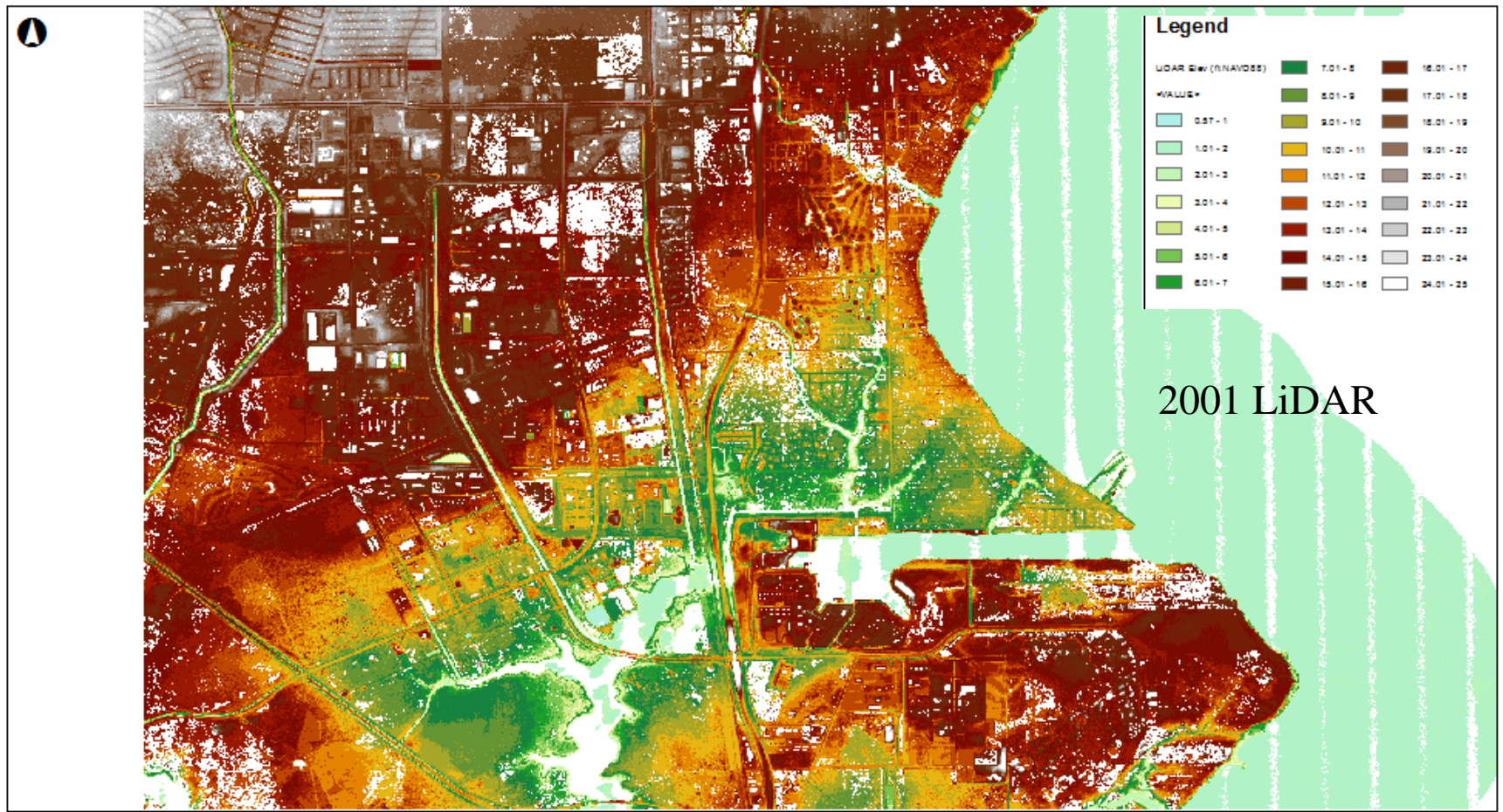
Miramar Shoreline Restoration

1st Public Meeting
May 20, 2014

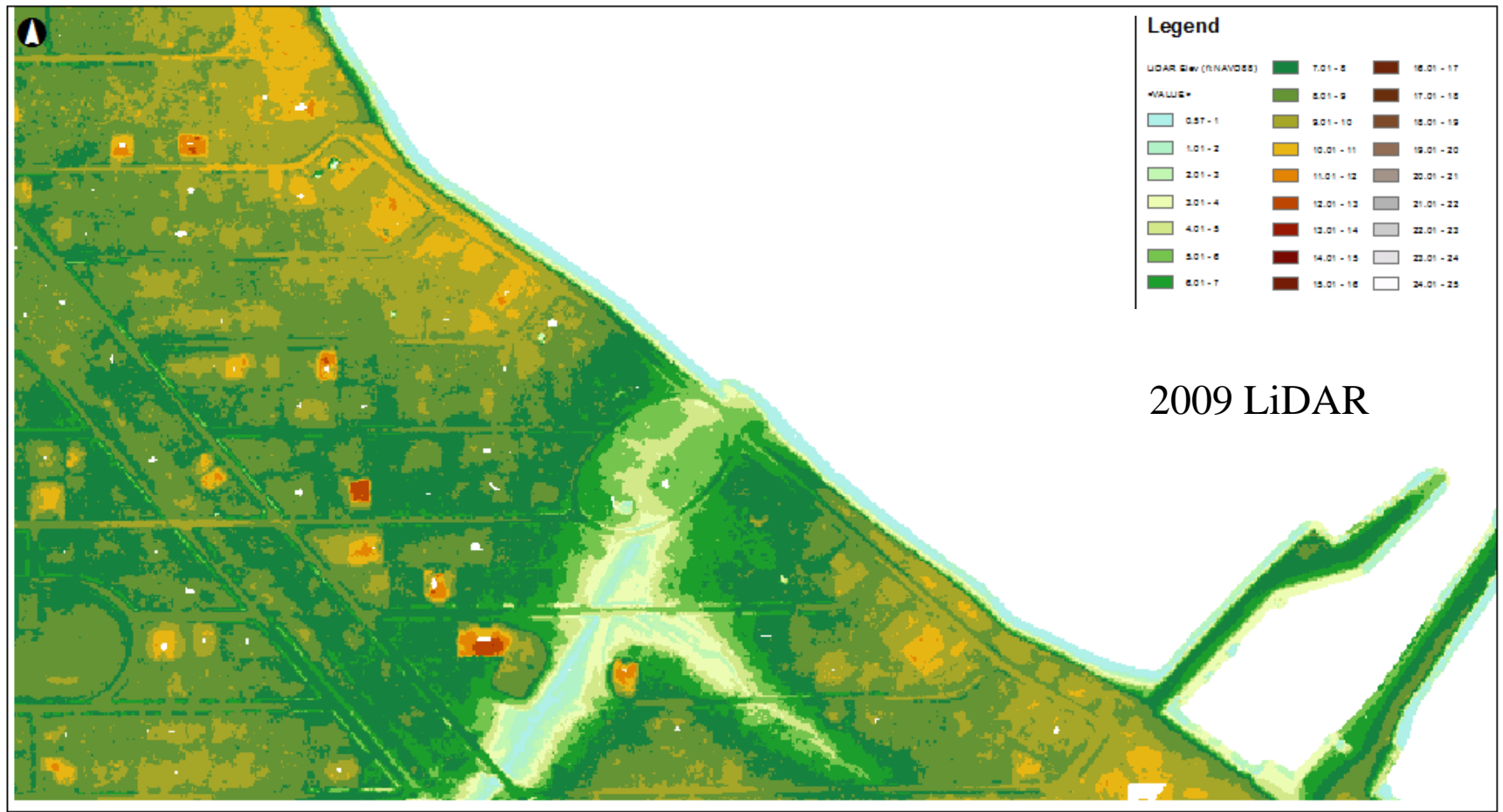
Agenda

- Physical Environment
- Project Overview & Objectives
- Shore Protection Alternatives
- Park Planning & Amenities

Topography

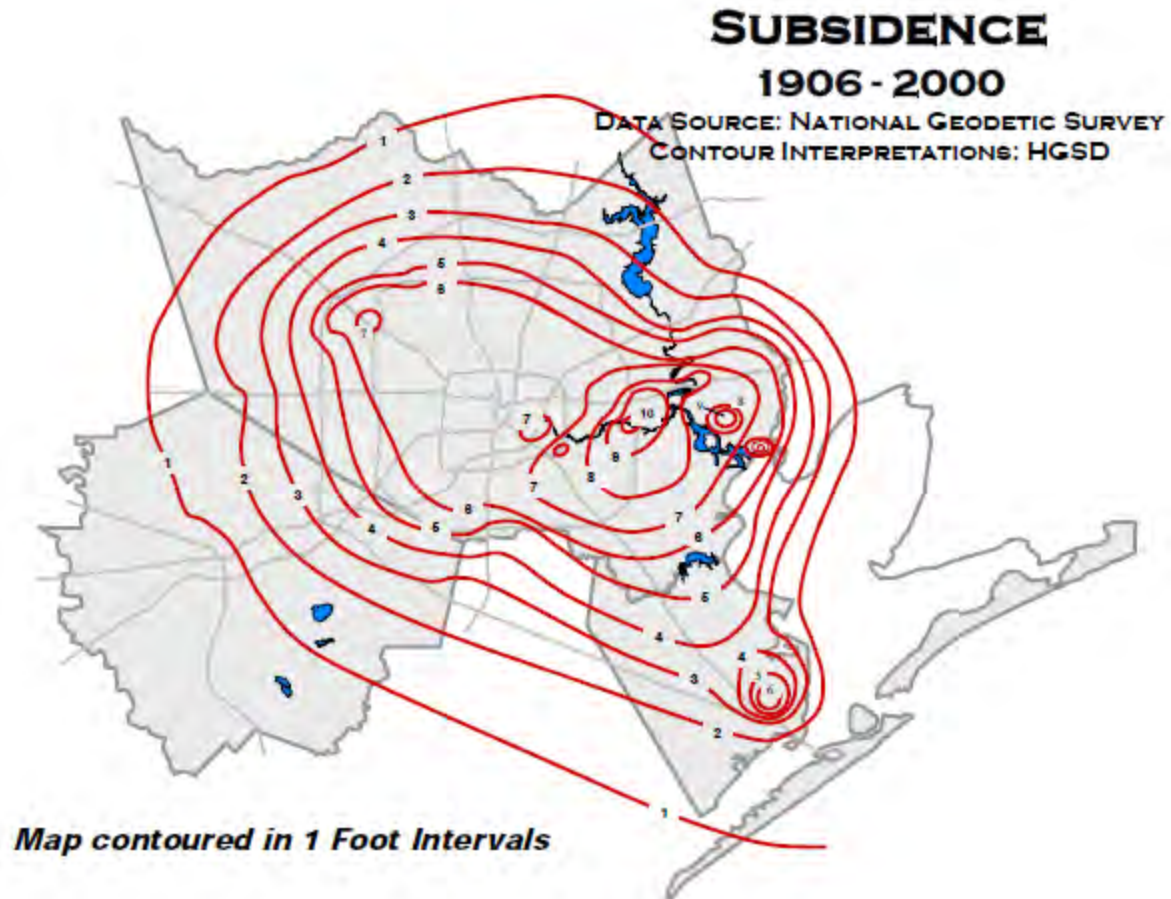


Topography



2009 LiDAR

Subsidence



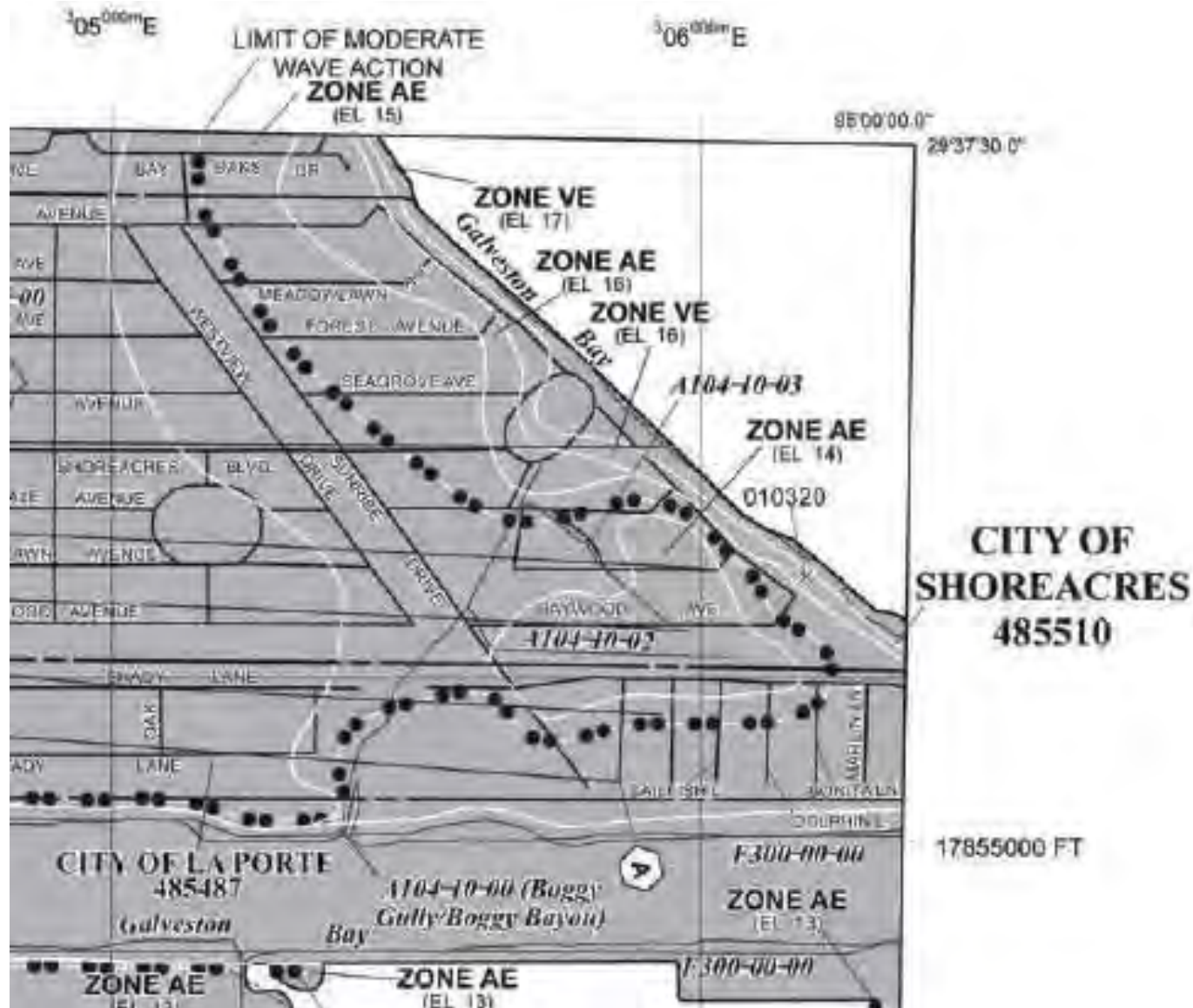
Erosion History



Storm Conditions

| <u>FLOODING SOURCE AND LOCATION</u> | Elevation in Feet (NAVD 88 -- 2001 Adjustment) | | | |
|---|---|---|---|---|
| | 10% Annual Chance¹ | 2% Annual Chance¹ | 1% Annual Chance¹ | 0.2% Annual Chance¹ |
| B100-00-00 (ARMAND BAYOU) | | | | |
| At the confluence with Clear Lake (A100-00-00) | 9.20 | 12.00 | 14.80 | 19.70 |
| At Bay Area Boulevard | 9.40 | 12.40 | 15.10 | 20.80 |
| At confluence of B107-00-00 | 8.0 | 11.9 | 14.9 | 19.3 |
| F200-00-00 (GALVESTON BAY) | | | | |
| At mouth of Clear Lake (A100-00-00) | 8.90 | 11.80 | 14.50 | 19.80 |
| At Todville Road | 9.20 | 12.40 | 15.20 | 20.10 |
| At Meyer Road | 9.40 | 12.00 | 14.70 | 20.00 |
| At Pine Gully (F220-00-00) | 9.30 | 11.70 | 14.60 | 20.00 |
| At Port of Houston Terminal | 9.00 | 11.70 | 14.40 | 20.10 |
| At City of Shoreacres | 9.16 | 12.40 | 15.30 | 20.20 |
| At Little Cedar Bayou Park | 8.90 | 11.30 | 14.20 | 18.30 |
| At Sylvan Beach | 8.90 | 11.30 | 14.20 | 18.10 |
| At San Jacinto River, Houston Ship Channel (G100-00-00) | 8.80 | 11.30 | 14.60 | 18.90 |
| At Cedar Bayou (Q100-00-00) | 8.4 | 10.5 | 13.3 | 17.3 |

FEMA Flood Maps



Project Overview & Objectives

- Current work is grant funded by Federal government through the Coastal Impact Assistance Program (CIAP)
- Scope of current work is to:
 1. Develop consensus based design
 2. Obtain required permits from Corps of Engineers & others
 3. Develop plans & specifications
- Construction not funded by current grant
- Construction funds to be sought through other grants
- Planning work includes shoreline protection, potential environmental restoration, and planning for park as whole
- Final plan to be approved by City Council
- Public notice as part of Corps permitting process

Project Overview & Objectives

- Objectives derived from Advisory Committee discussions:
 1. Preserve Shell Beach and recreational uses of it.
 2. Preserve nearshore boating & fishing.
 3. Preserve views of Bay
 4. Create storm durable structure able to withstand “at least Ike” (50 to 100 year design storm)
 5. Preserve access and function for fishing pier and boat ramp
 6. Consider improvements to park, especially planting vegetation and walking path. Address parking issues.
 7. Wetlands creation / restoration not favored, but potentially integrate oyster habitat creation into design
 8. Tie-in to private property at each end to preserve properties and not cause or increase erosion
 9. Mitigating upland damage is secondary benefit, not focus

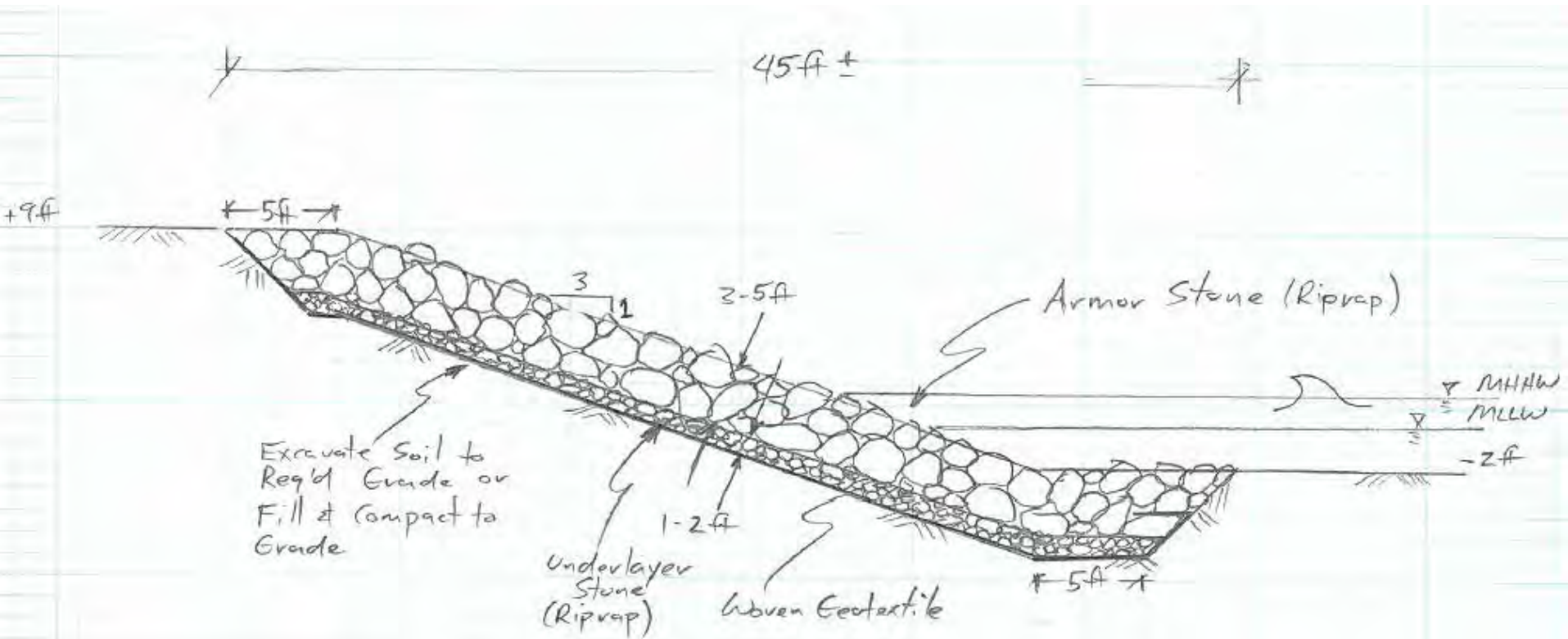
Alternatives

| Alternative | Advantages | Disadvantages |
|---------------------------|--|---|
| Rock Riprap Revetment | <p>Durable</p> <p>Easy repair & raising</p> <p>Reasonably economical</p> | <p>Not walkable access</p> <p>Somewhat non-uniform appearance</p> <p>Rock may be truck hauled</p> <p>Difficult to remove trash & debris</p> |
| Concrete Rubble Revetment | <p>Inexpensive</p> | <p>Not durable</p> <p>Dangerous rebar</p> <p>Not walkable access</p> <p>Unsightly</p> <p>Difficult to remove trash & debris</p> |
| Beach Nourishment | <p>Shore access</p> <p>Scenic</p> | <p>Relative expensive</p> <p>Requires structures to hold in place</p> <p>Likely maintenance</p> <p>Attracts crowds</p> |

Alternatives

| Alternative | Advantages | Disadvantages |
|---|---|---|
| Concrete cellular mattress (articulating block mattress) | Fast, easy installation Reasonably economical Uniform appearance Reasonably walkable access | Potential settlement and scour issues Difficult to repair or raise Not suited for larger wave climate |
| Wetland creation / restoration | Provides ecological benefits Scenic appearance if well established / maintained | Likely require breakwater structures May block access for some shore uses |
| Concrete or Sheetpile Seawall or Bulkhead | Uniform appearance Access to water's edge | Potentially restricted access to "bottom" of wall Moderately high cost Maintenance required |

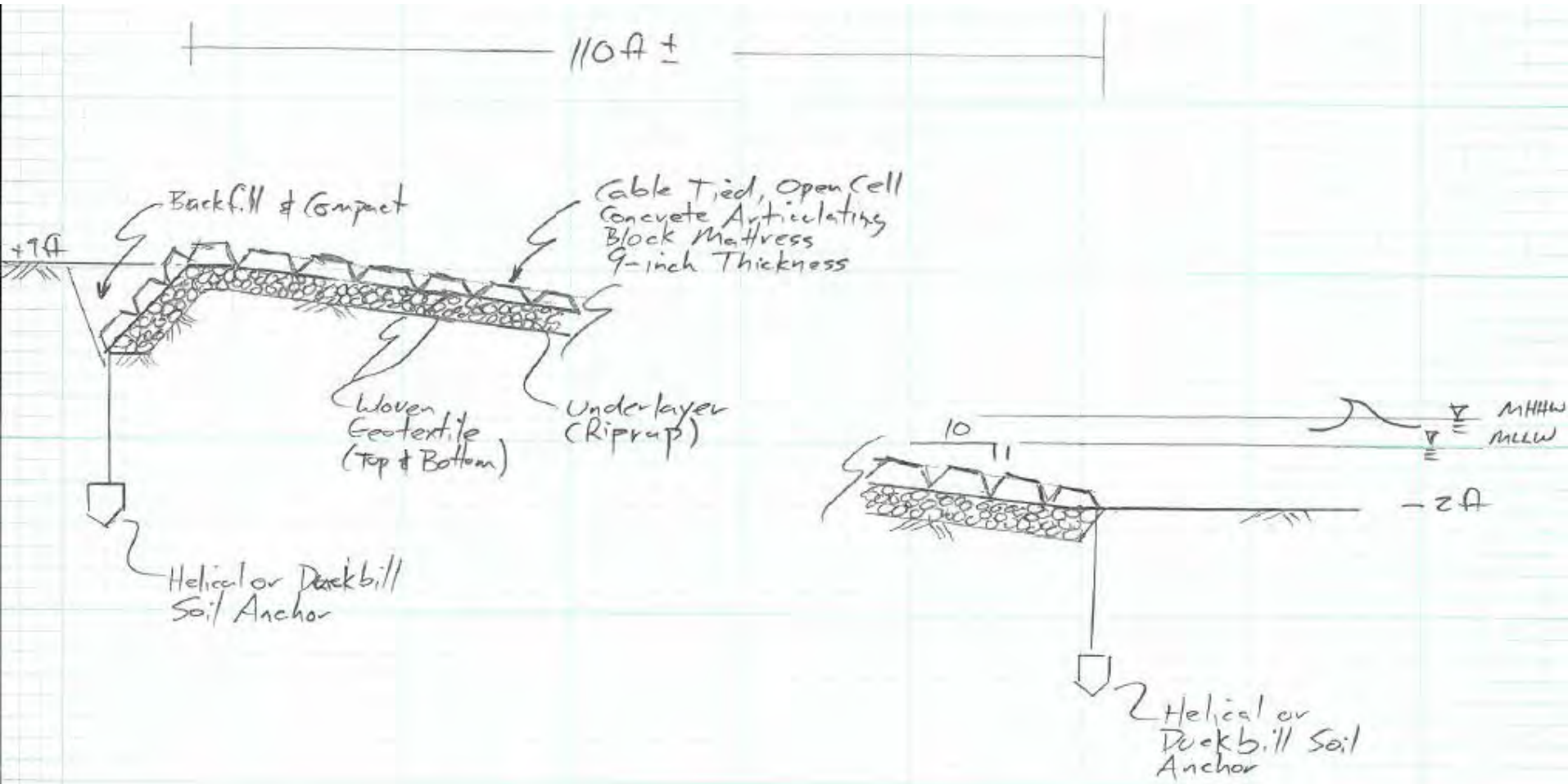
Rock Riprap Revetment



Example Structure – Rock Riprap Revetment



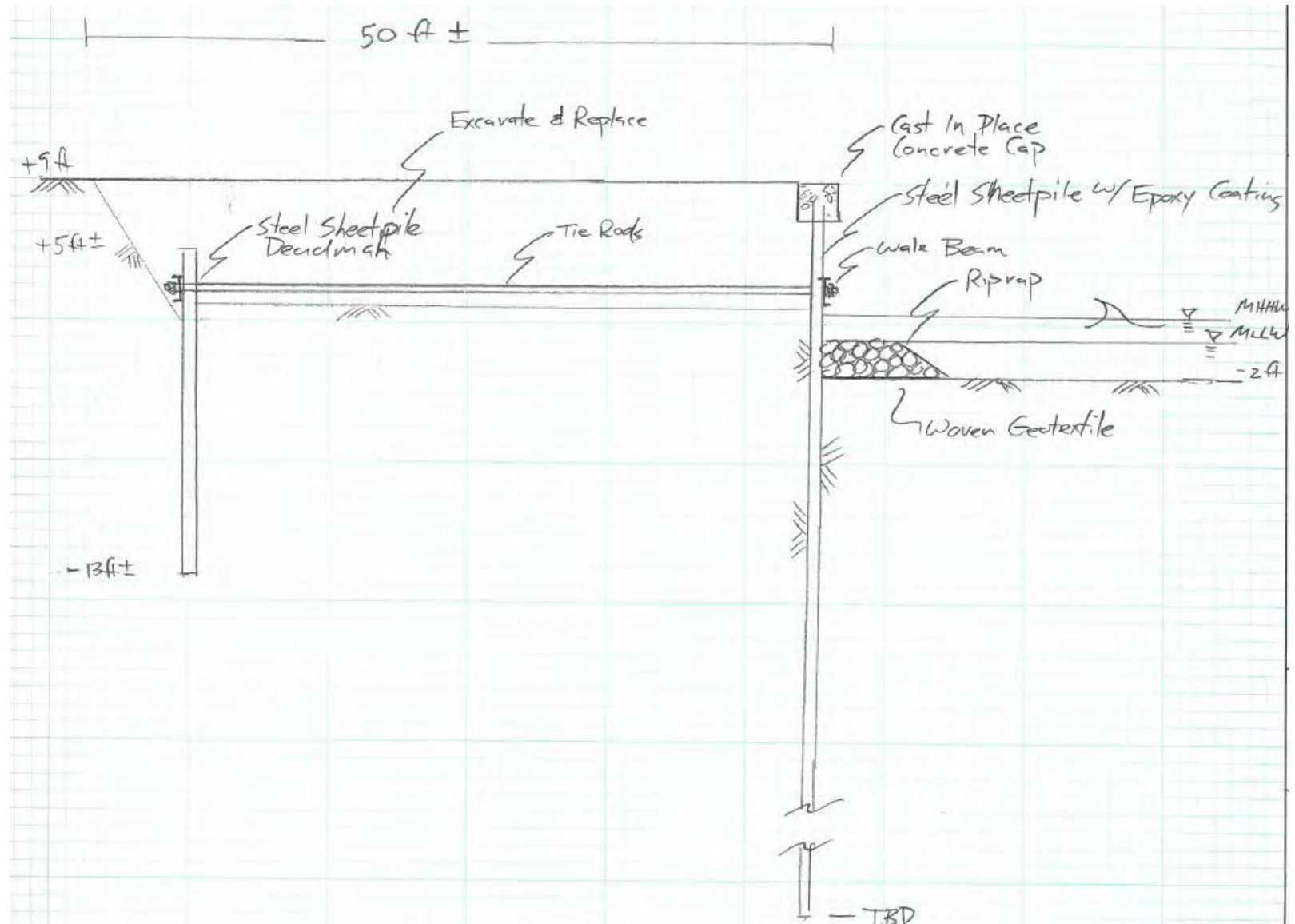
Concrete Cellular Mattress Revetment



Example Structure – Concrete Cellular Mattress



Bulkhead or Seawall



Example Structure – Seawall

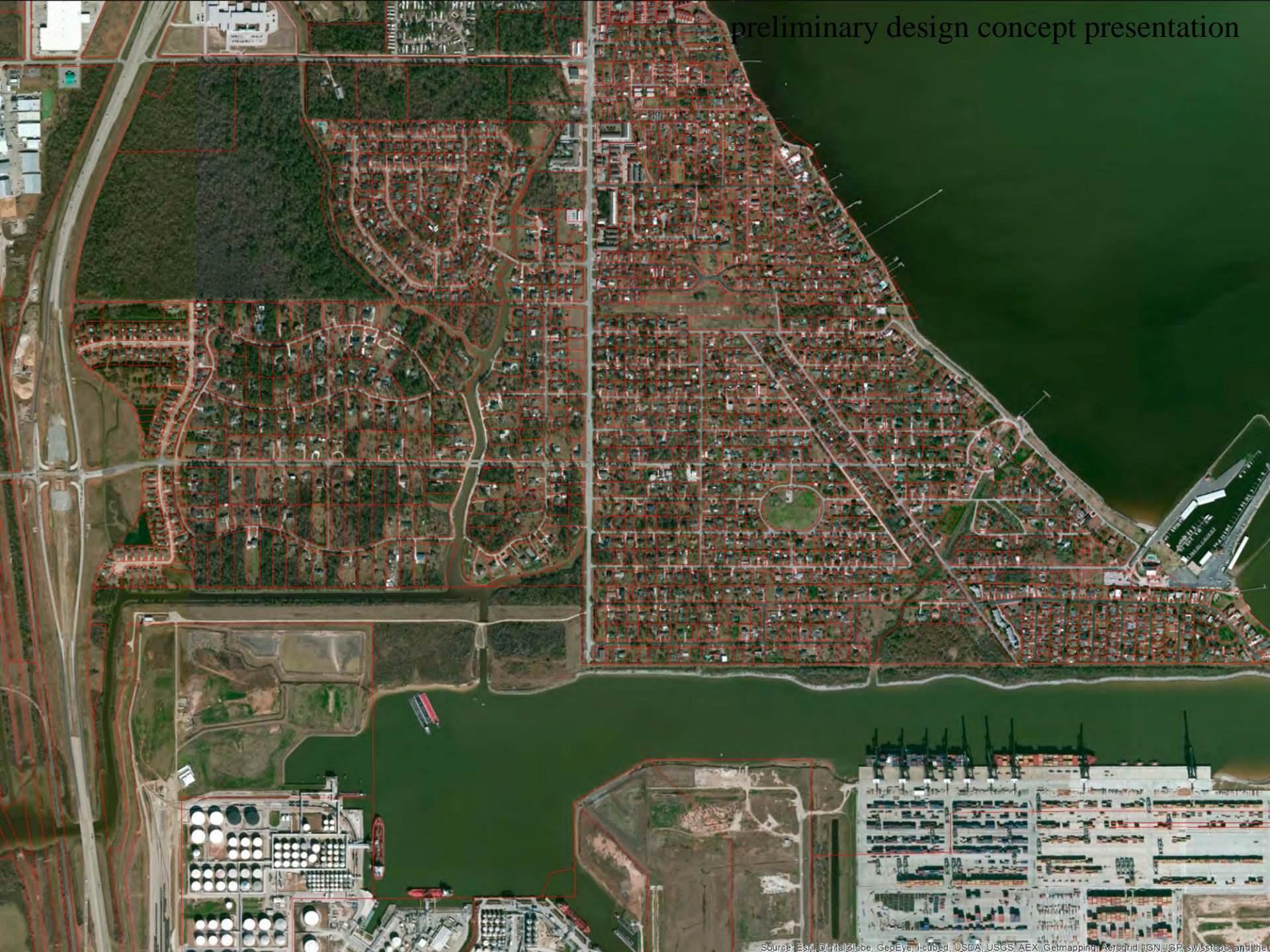


Preferred Alternative

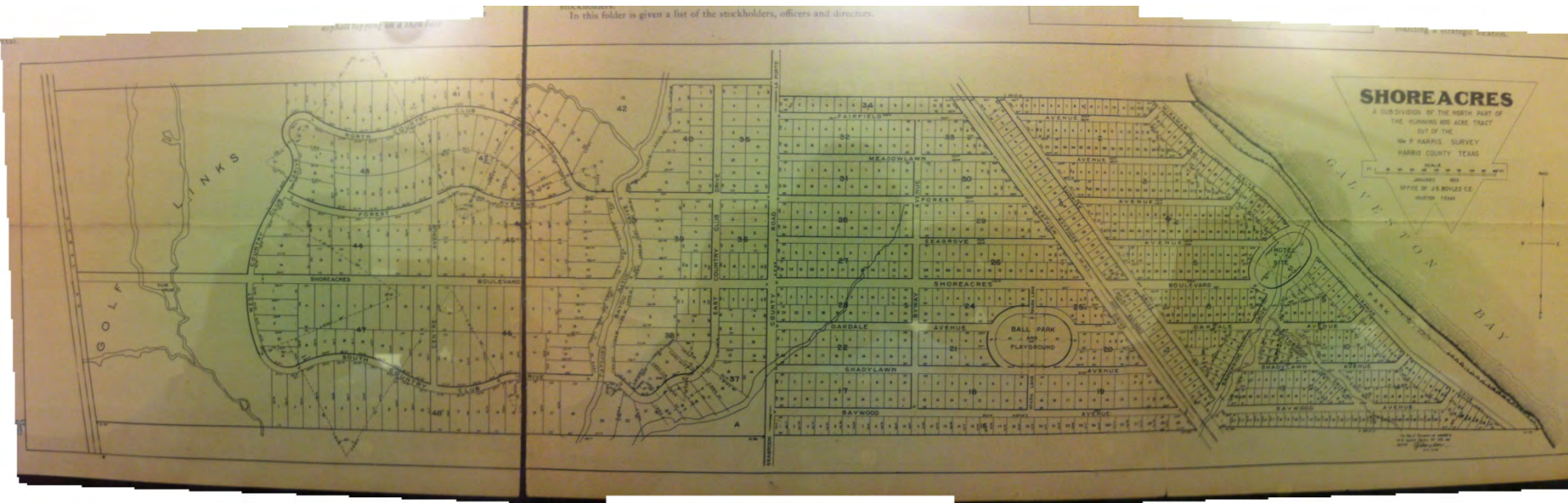
- Based on input from Advisory Committee the likely preferred alternative is:
 - Preserve Shell Beach, potentially expand length approximately 50 to 100 ft
 - Rock riprap revetment north along entire shoreline north of Shell Beach
 - Potentially integrate oyster reef habitat into toe of revetment

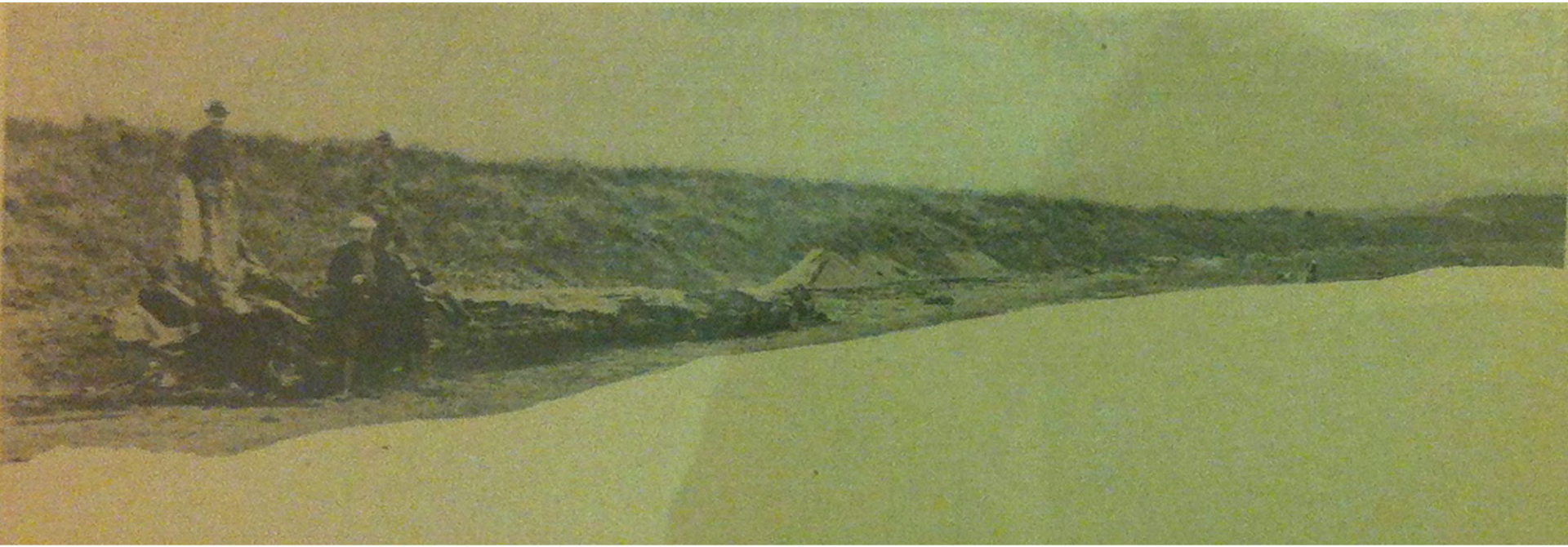
Park Planning & Amenities

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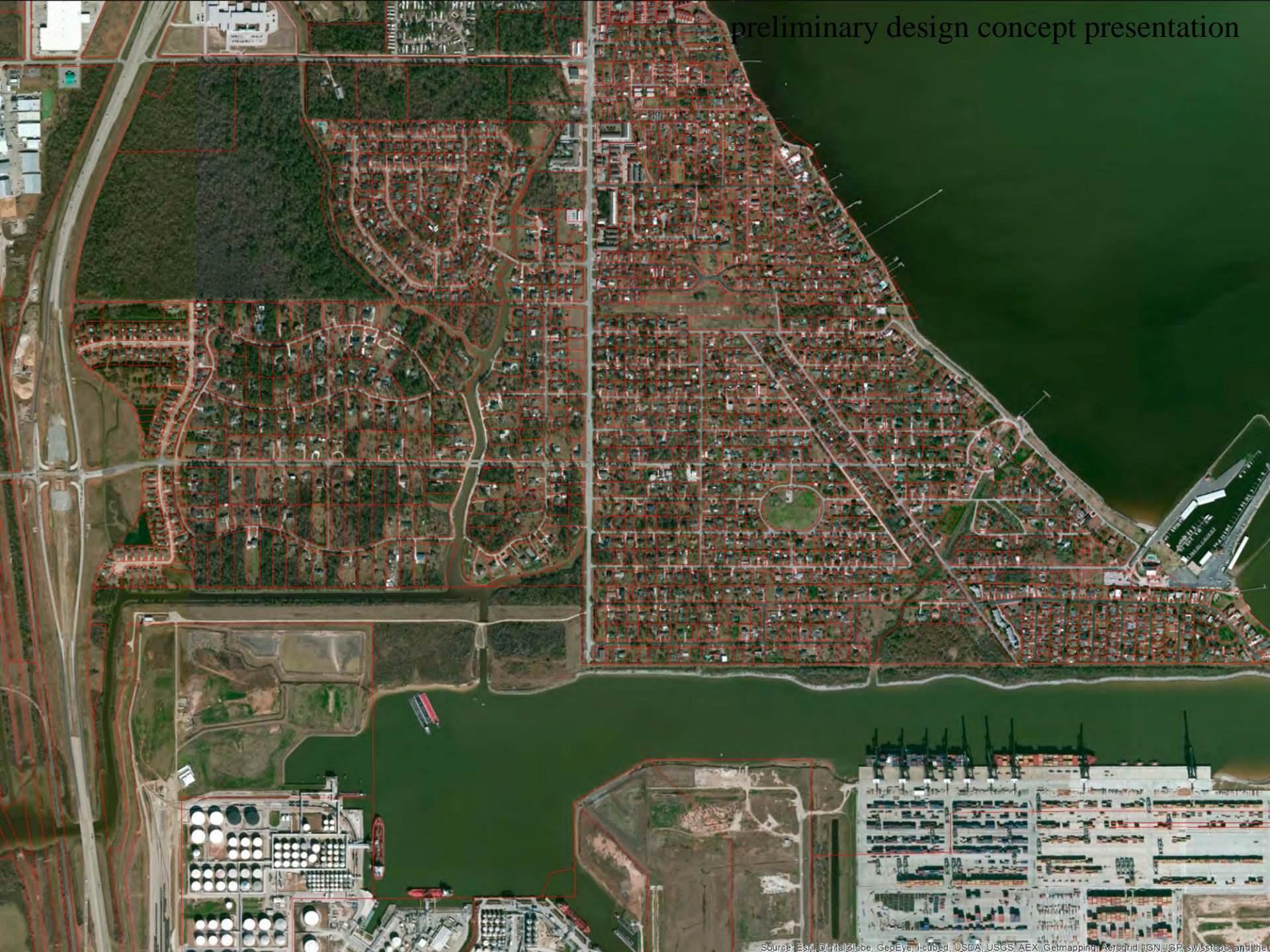




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3620 Miramar Dr



Exit Street View

© 2014 Google

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Google earth

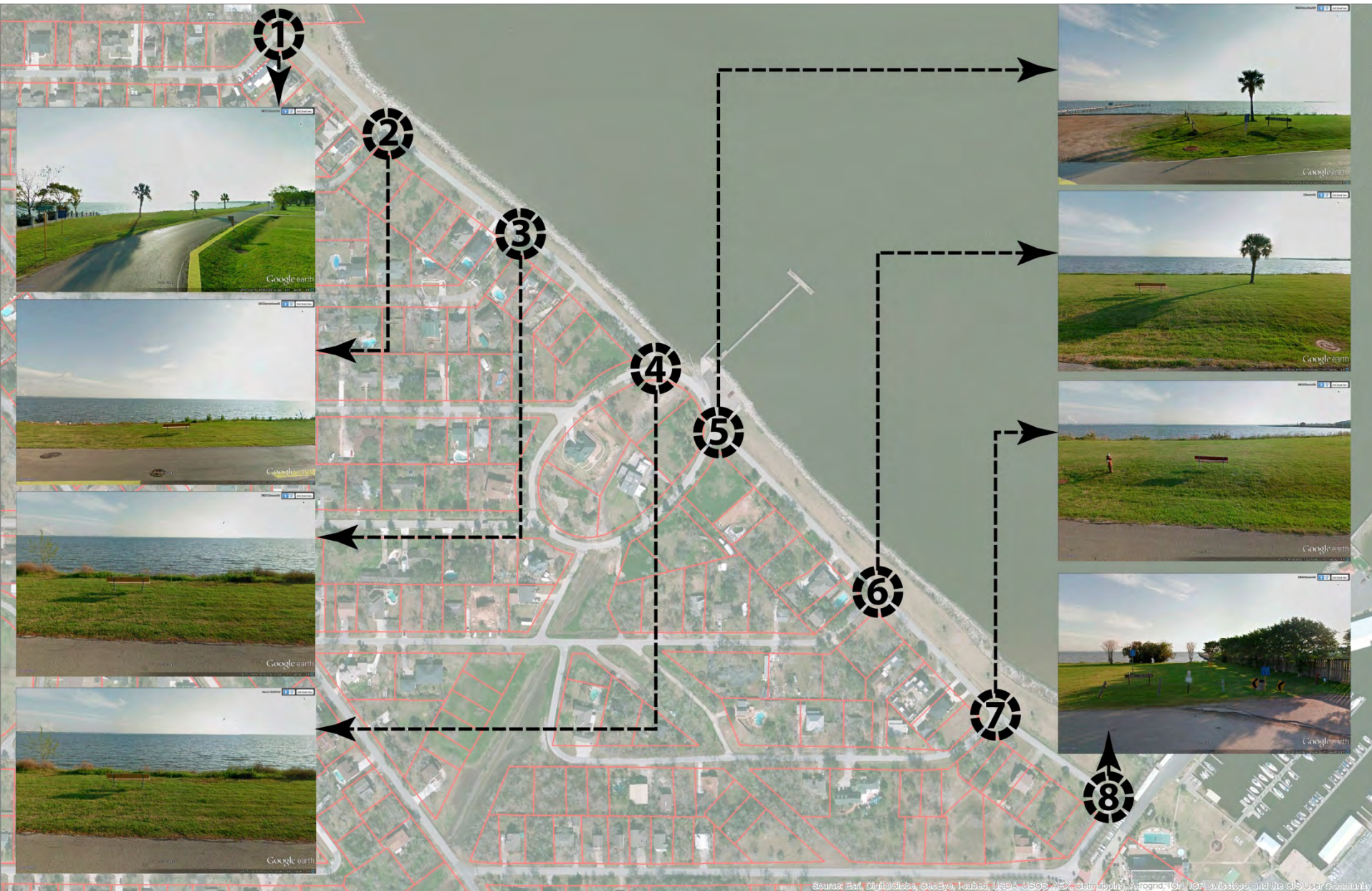
29°37'06.20" N 95°00'06.34" W elev 0 ft eye alt 8 ft

ARUP

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South End

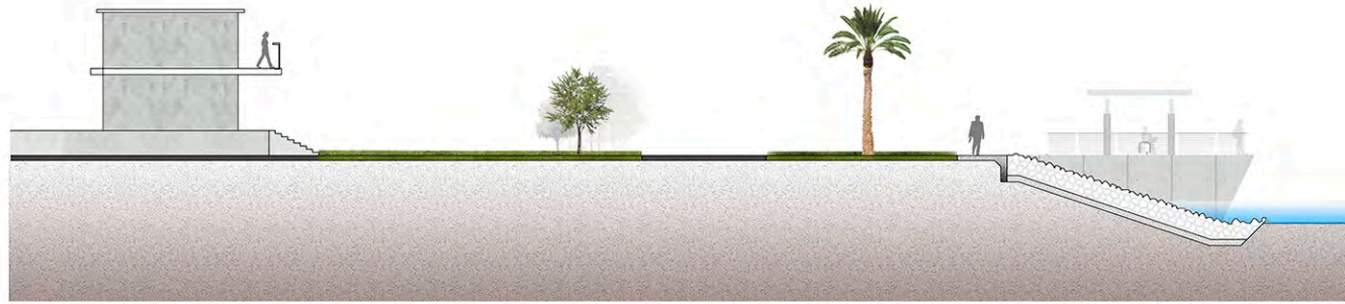


North End

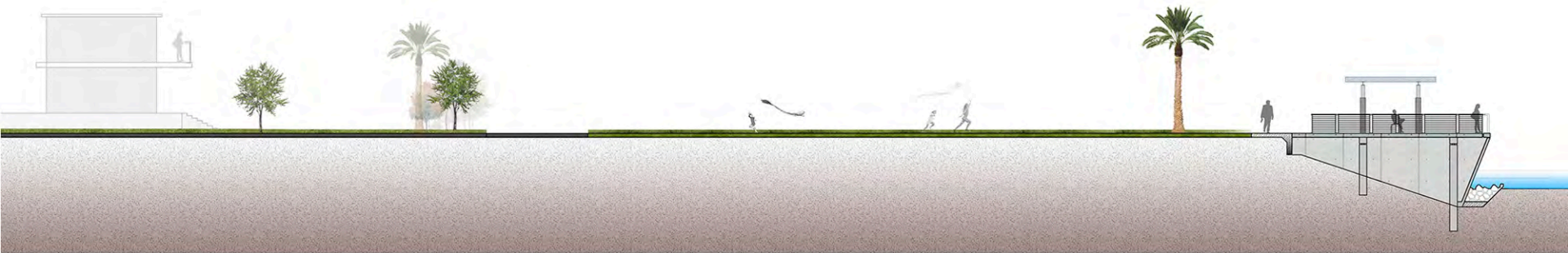


Fairview Ave.

Meadowlawn St.

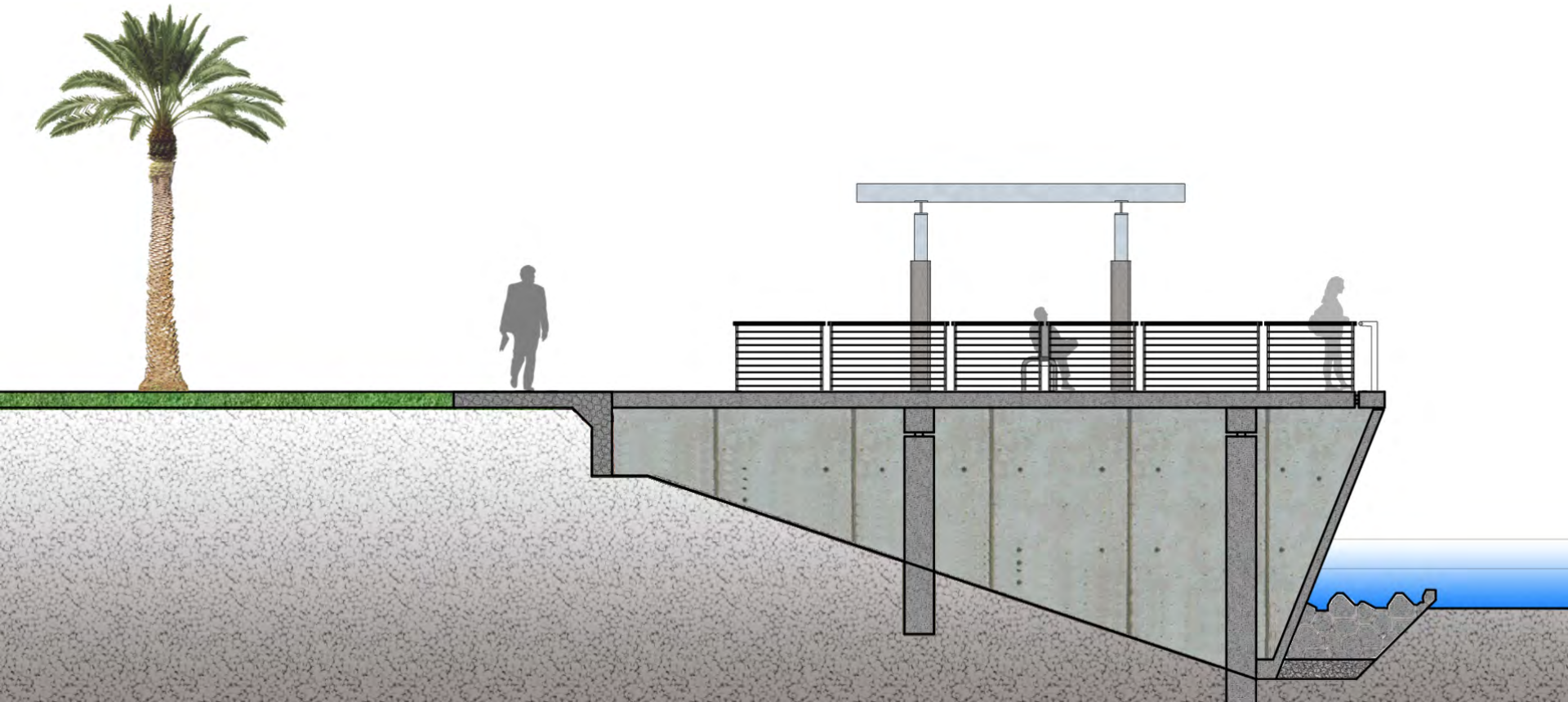


Section- Revetment



Section- Overlook

Enlargement of the overlook



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