

THE RAMPART

PROTECTING TARRYTOWN FROM FLOODING AND SLR

Natural disasters will directly impact Tarrytown in the next few decades. Two of the most critical climate problems are sea level rise and flooding. Based on existing flood and water level projections, the Tarrytown station area along the Hudson river will be the hardest hit area, with most of the land flooded by the river.

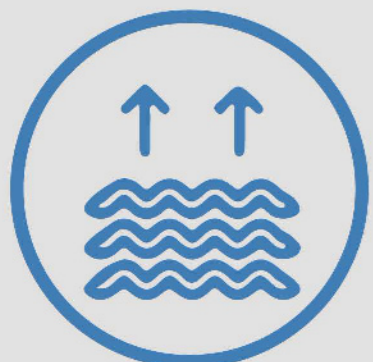
I put forward my adaptive design proposal based on this urgent issue of flood risk. My design concept is to build a landscape levee to protect the train track and the Franklin Court residential area; for frequent and increasingly violent floods, I plan to deal with severe flood problems by setting floodgates. In addition to the main landscape levee and floodgate design, my design also includes raising the building foundation, designing stormwater wetlands, and other schemes. These adaptive designs can jointly face the climate problem of the riverside.



New Landmark



Landscape Construction



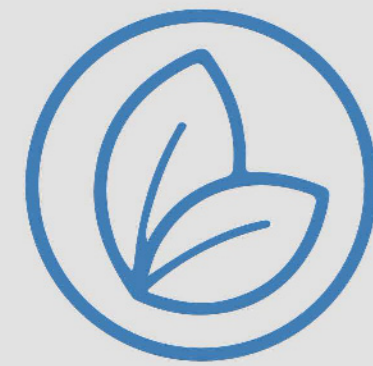
Waterfront Renovation



Flood Resistant Housing



Railroad protection

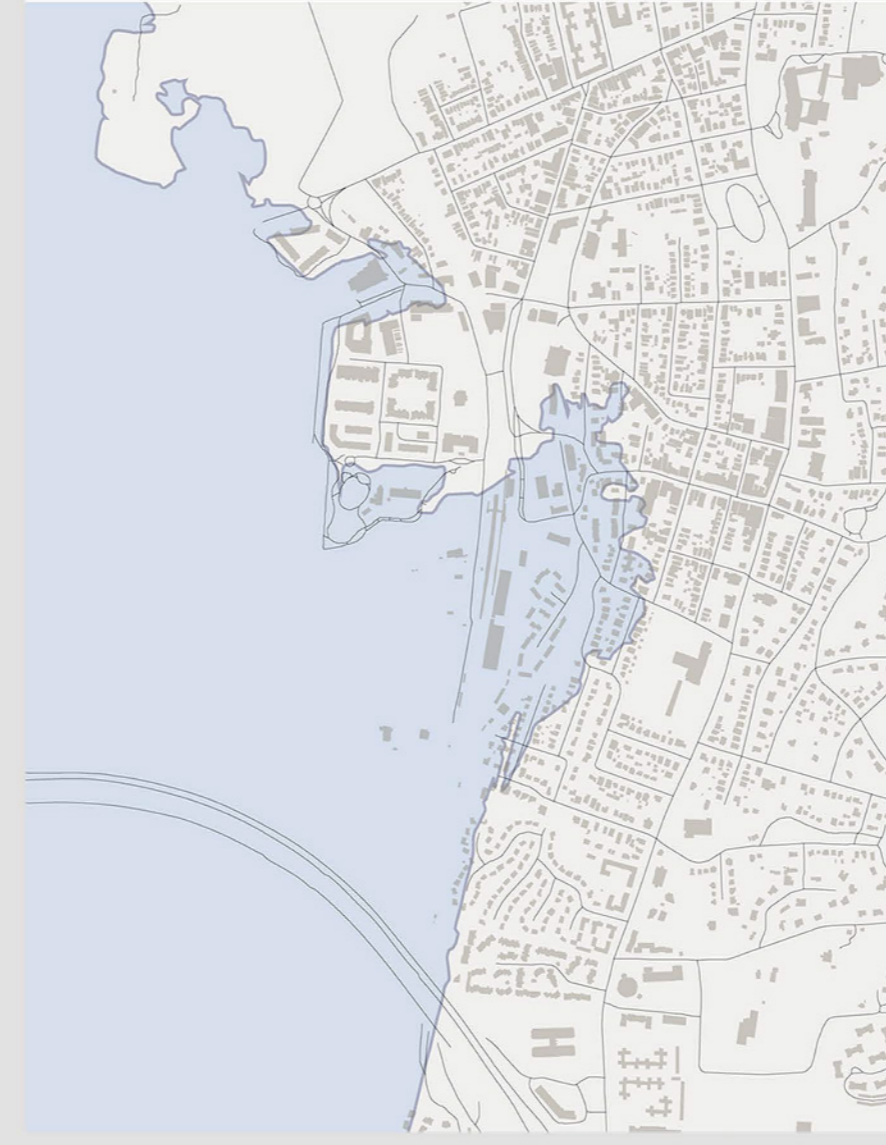


Resilience Design

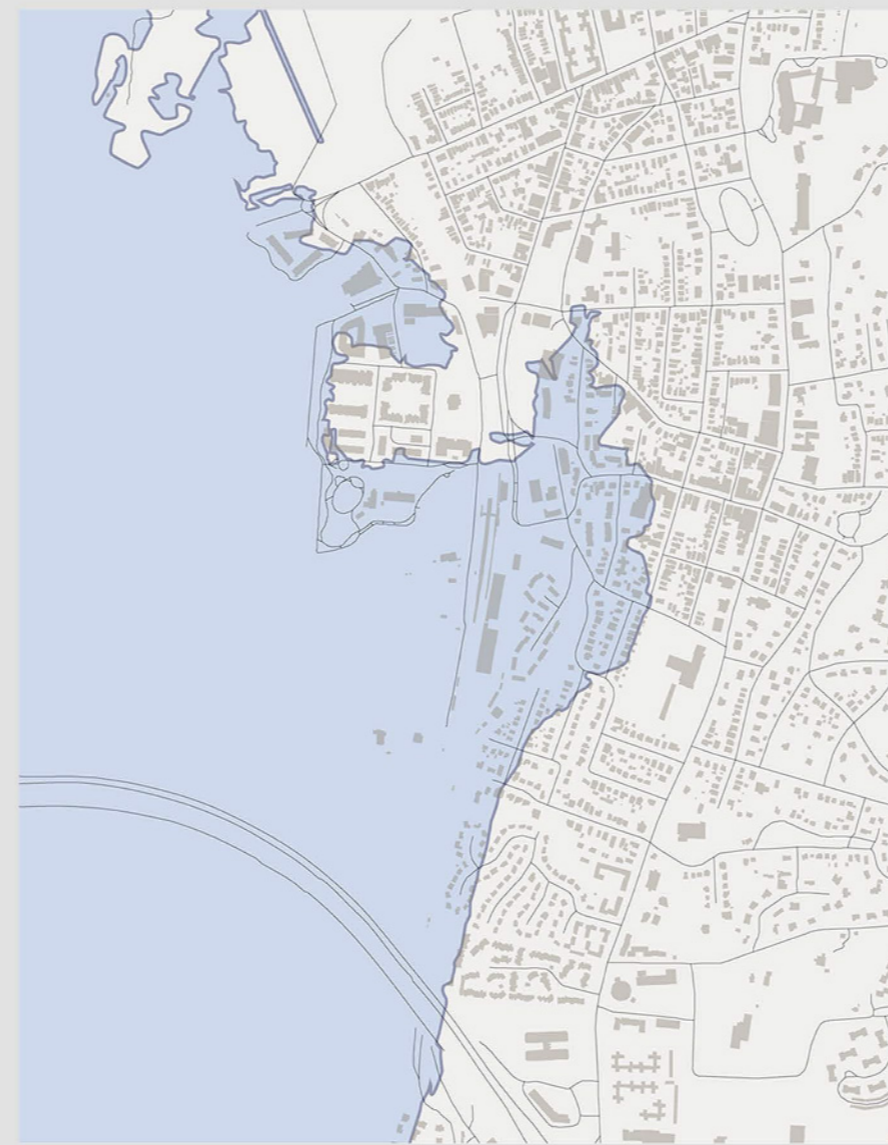
Inundation Map



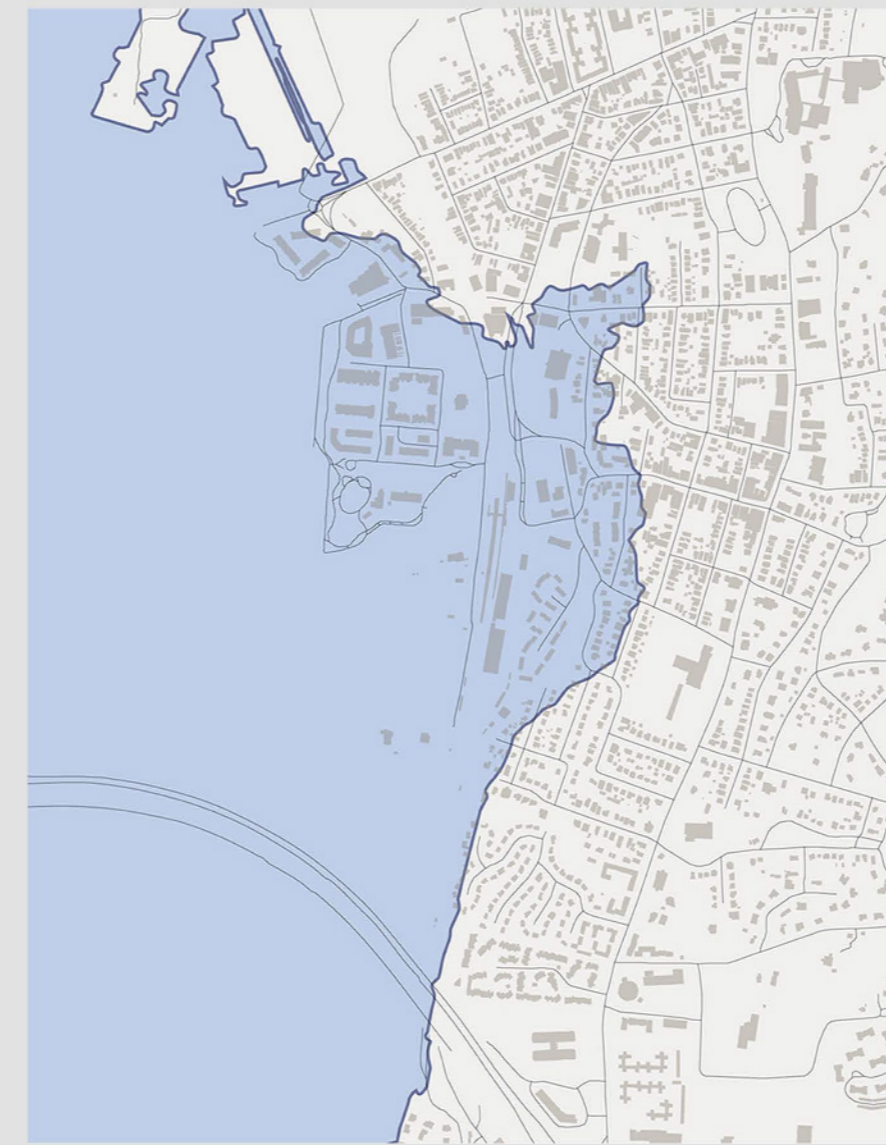
Current Shoreline



2020s SLR: 12" 100 Year Flood

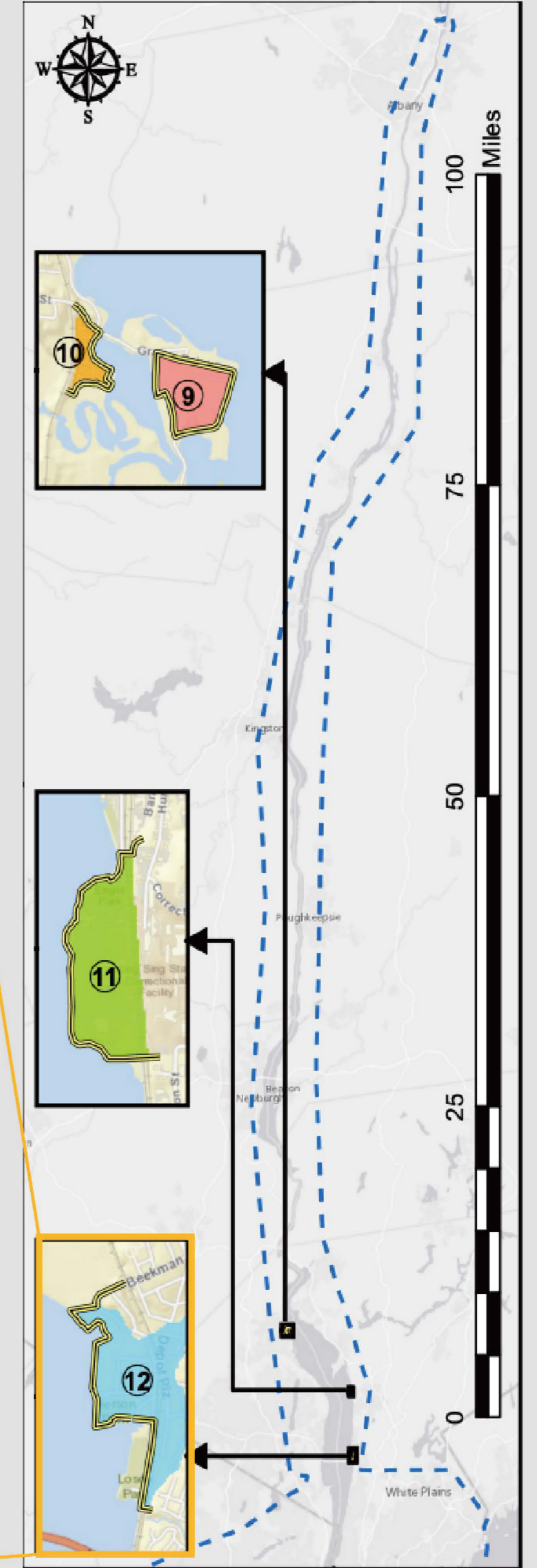


2050s SLR: 30" 100 Year Flood



2080s SLR: 60" 100 Year Flood

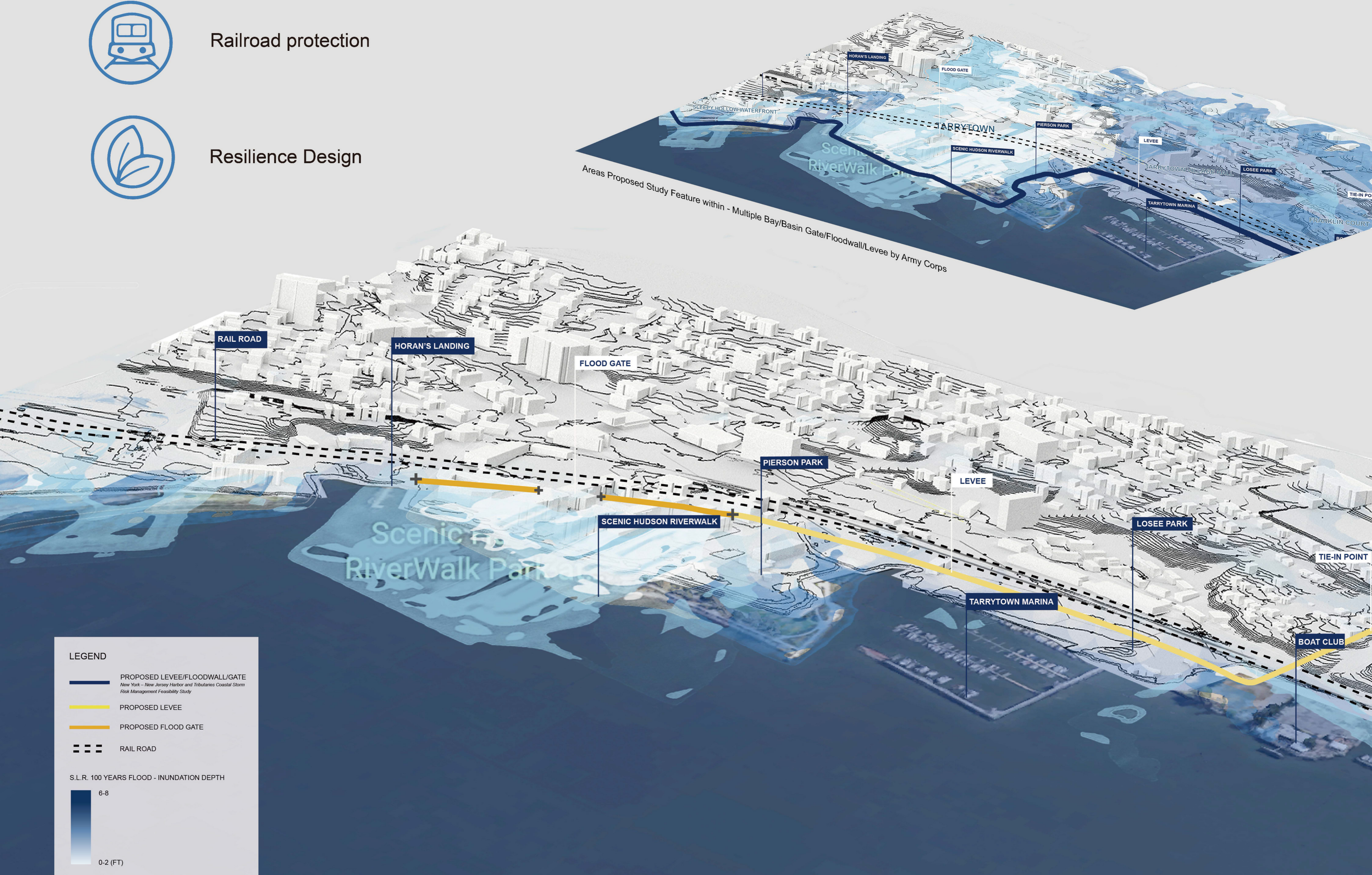
Shoreline Based Measure



NY / NJ Harbor and Tributaries Study Areas by US Army Corps of Engineers New York District

* The NY & NJ Harbor & Tributaries Focus Area Feasibility Study (HATS):

In 2019, The New York-New Jersey Harbor And Tributaries Coastal Storm Risk Management Feasibility Study (HATS) by US Army Corps of Engineers New York District chose the 9 high-risk focus areas including Tarrytown, identified in the North Atlantic Coast Comprehensive Study (NACCS). The HATS proposes about 56,327 ft of shoreline-based flood wall measures for low-lying communities along the Hudson river. These communities include Tarrytown and the dark blue line is designed for Tarrytown waterfront areas.



LEGEND

- PROPOSED LEVEE/FLOODWALL/GATE
New York - New Jersey Harbor and Tributaries Coastal Storm Risk Management Feasibility Study
- PROPOSED LEVEE
- PROPOSED FLOOD GATE
- - - RAIL ROAD

S.L.R. 100 YEARS FLOOD - INUNDATION DEPTH

6-8
0-2 (FT)

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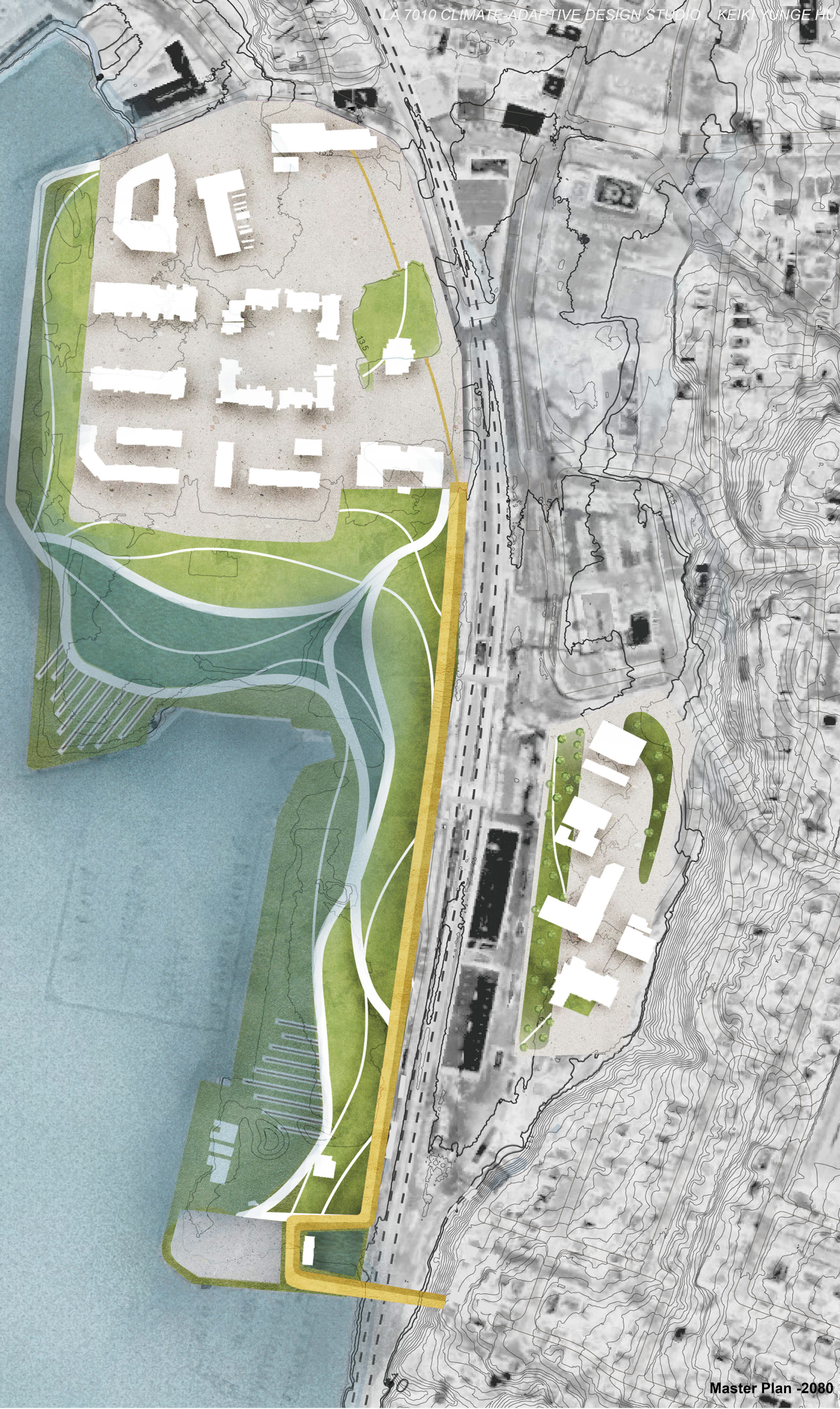
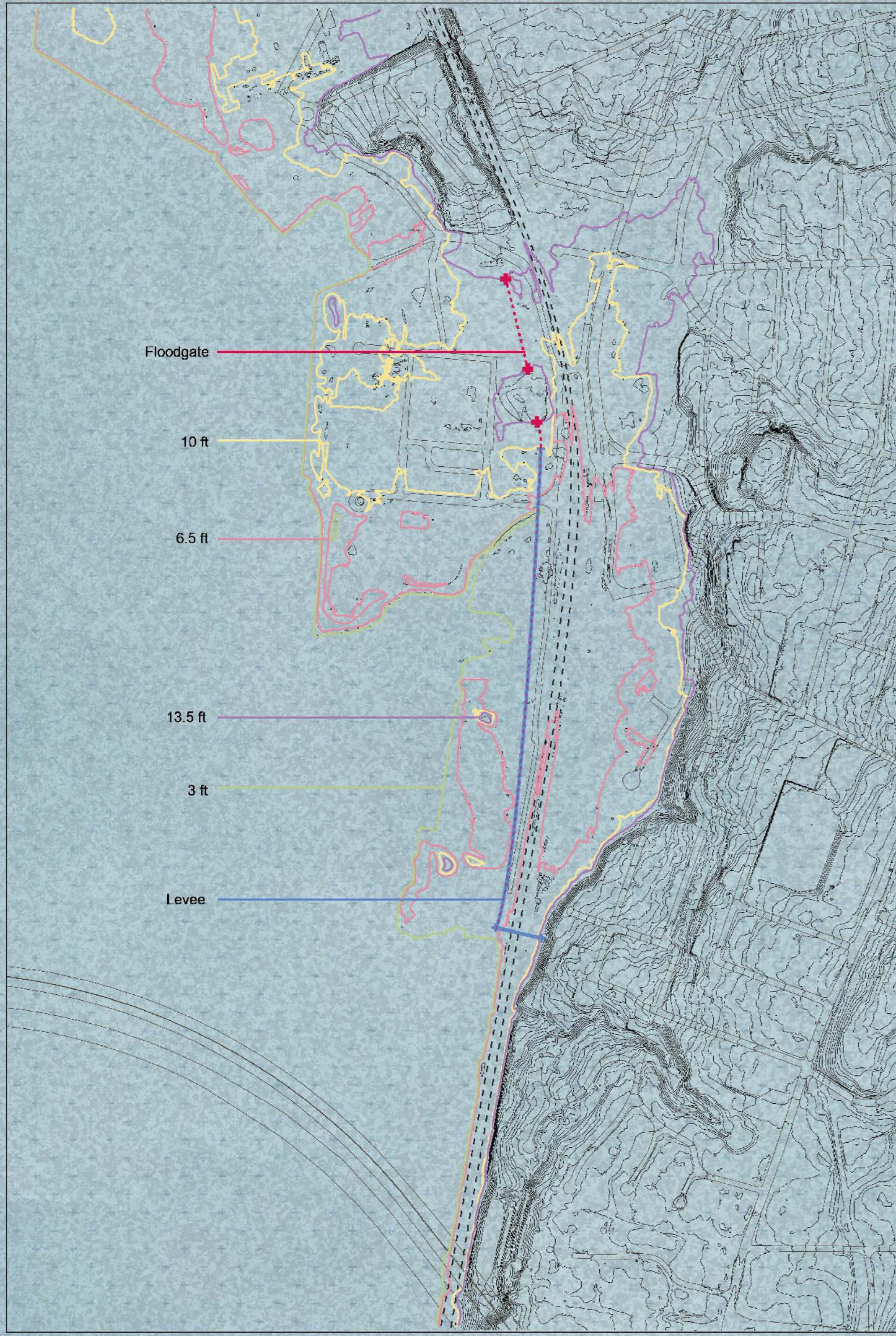
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The TRAVERSE project has three phases. The first phase focuses on raising the foundation of the Franklin Court and building the landscape levee. At the same time, to ensure the levee's operation, a drainage system such as a pumping station must also be built in phase 1 to assist the levee.

The second phase focuses on the design of ecological green space and floodgates. By 20250, as the sea level rises further, bioreactors such as ecological wetlands will be used to help levees adjust to the climate. At the same time, to solve the increasing flooding problem, floodgates will be built at this stage to prevent floods from invading the land.

In 2080, which is phase 3, the sea level will continue to rise, and the residential areas on the north side will be affected. Therefore, in this stage, the residential areas on the north side are mainly planned to reduce the negative impact of natural disasters.

Grading Map



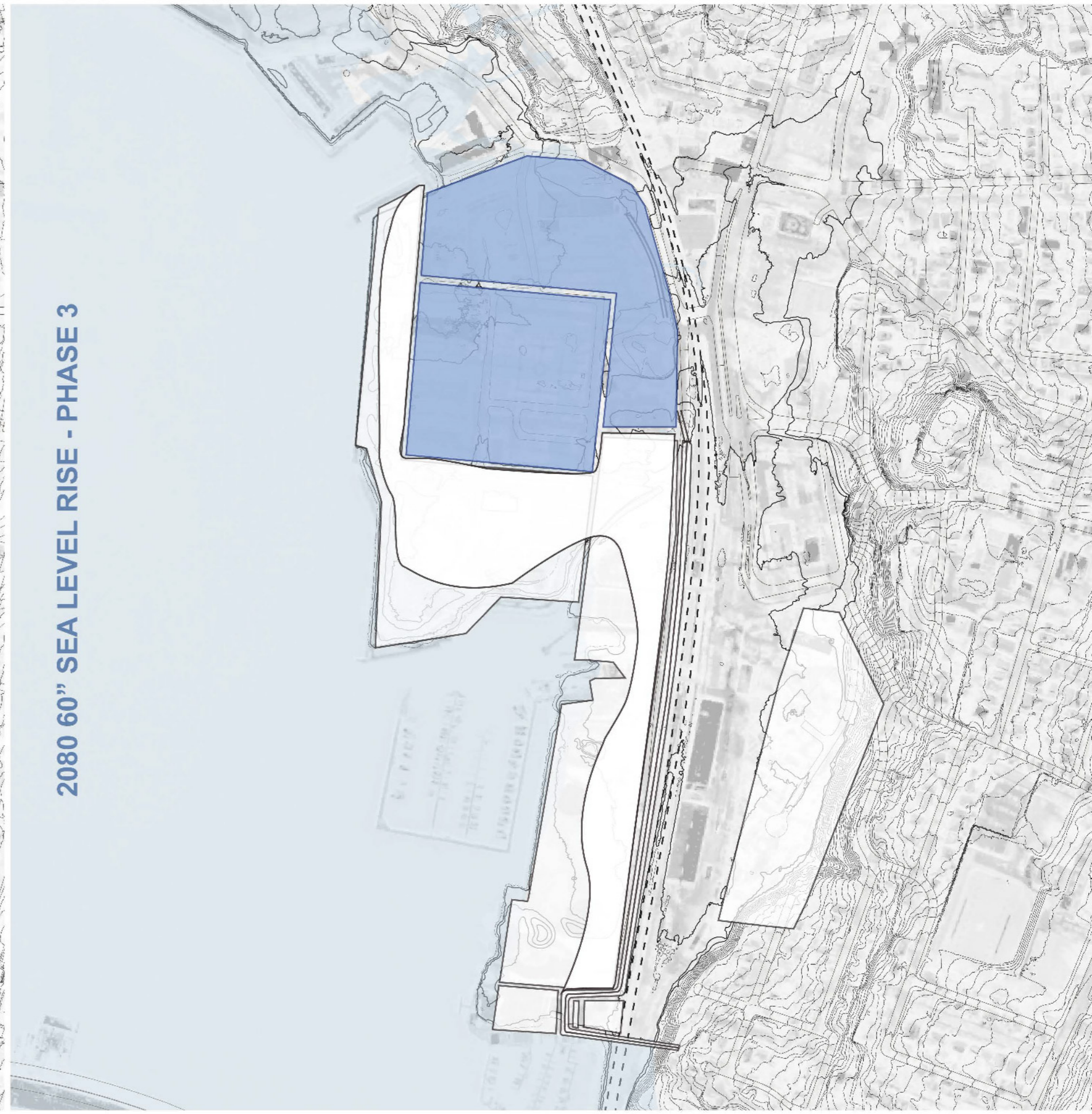
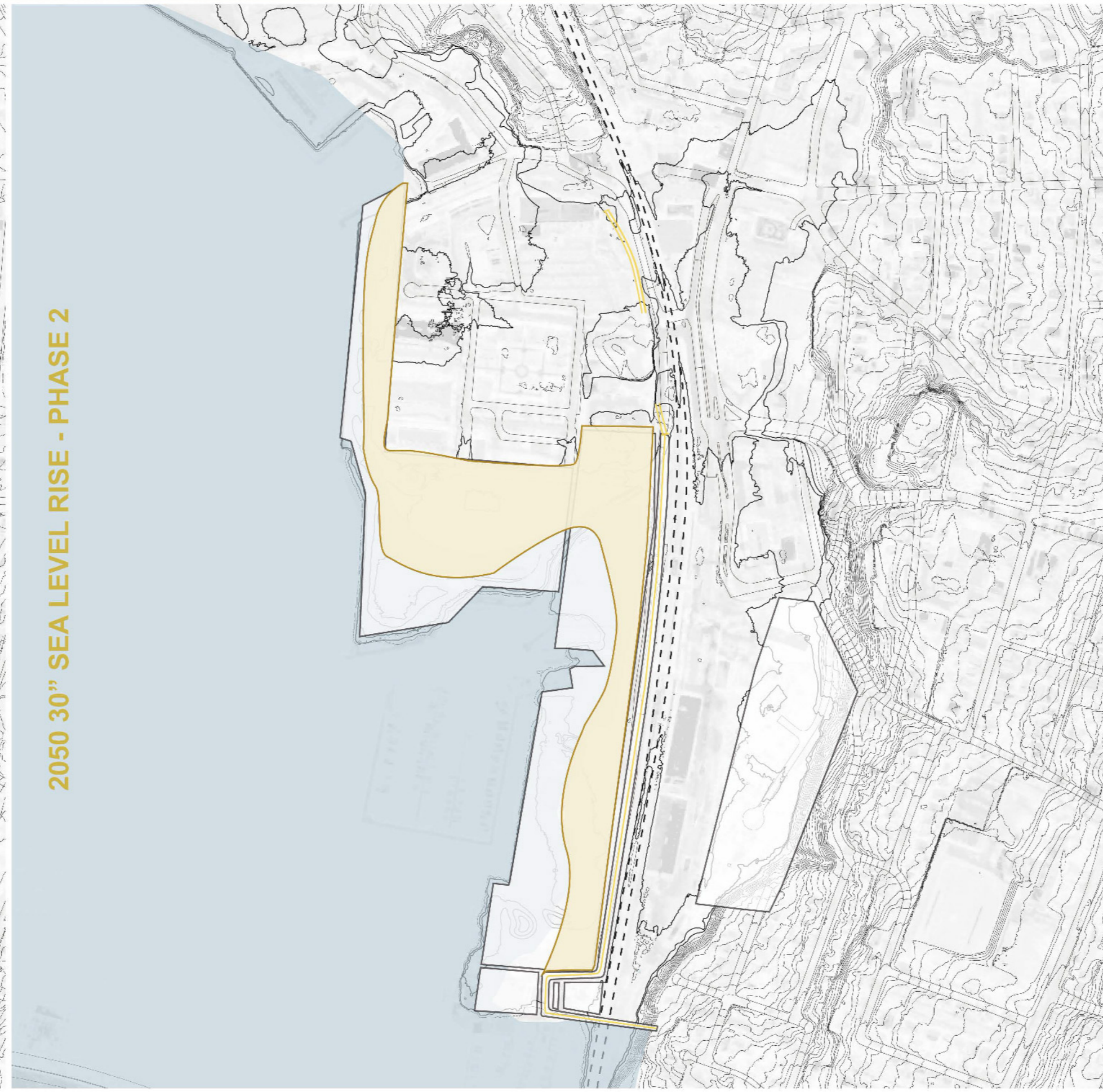
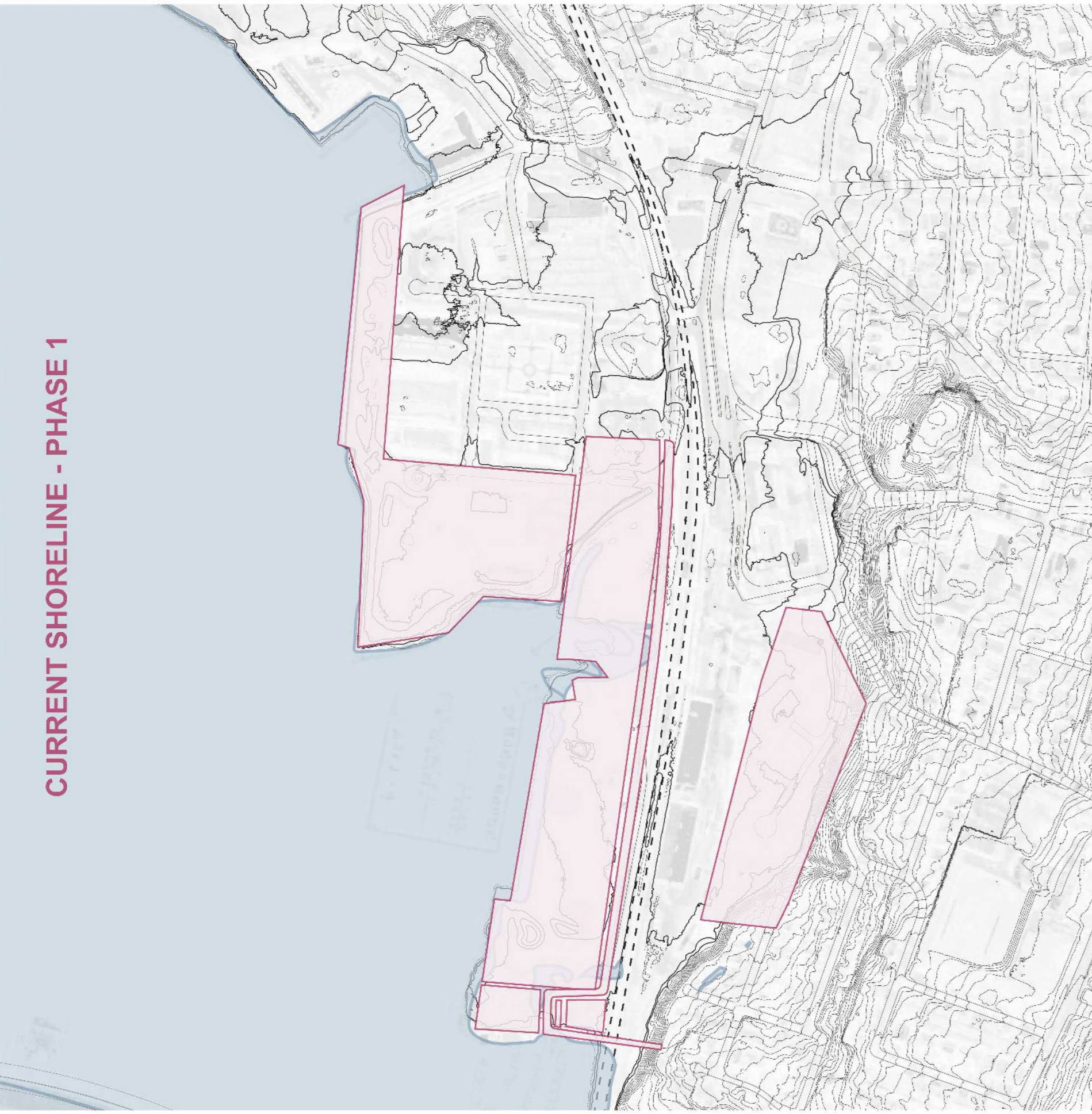
Phasing Plan

Master Plan -2080

CURRENT SHORELINE - PHASE 1

2050 30" SEA LEVEL RISE - PHASE 2

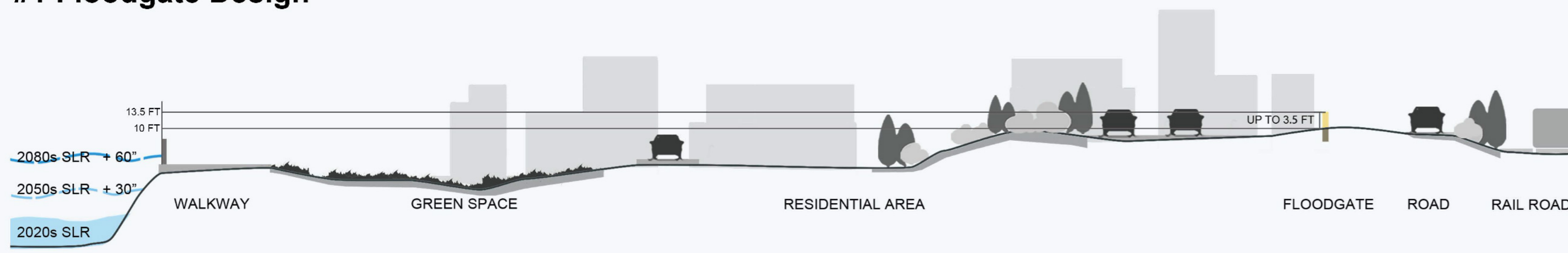
2080 60" SEA LEVEL RISE - PHASE 3



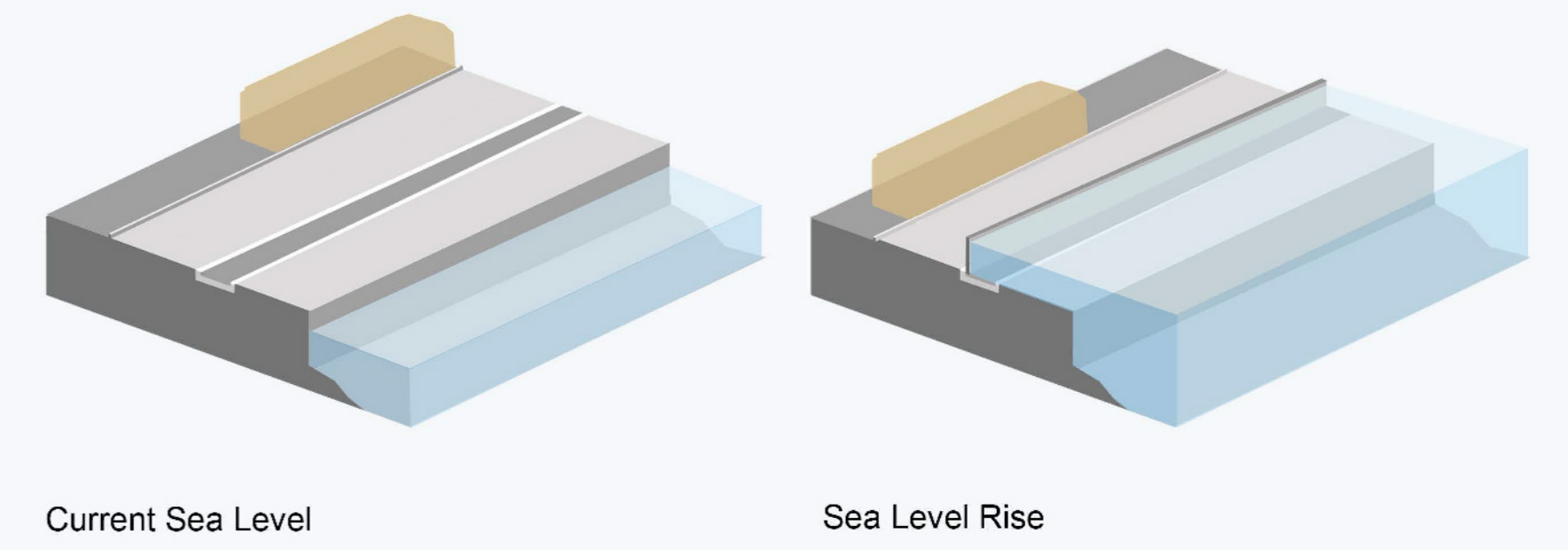
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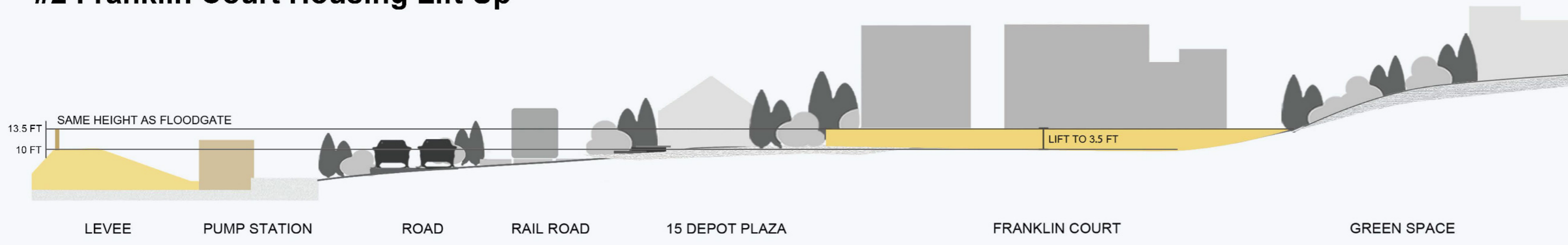
#1 Floodgate Design



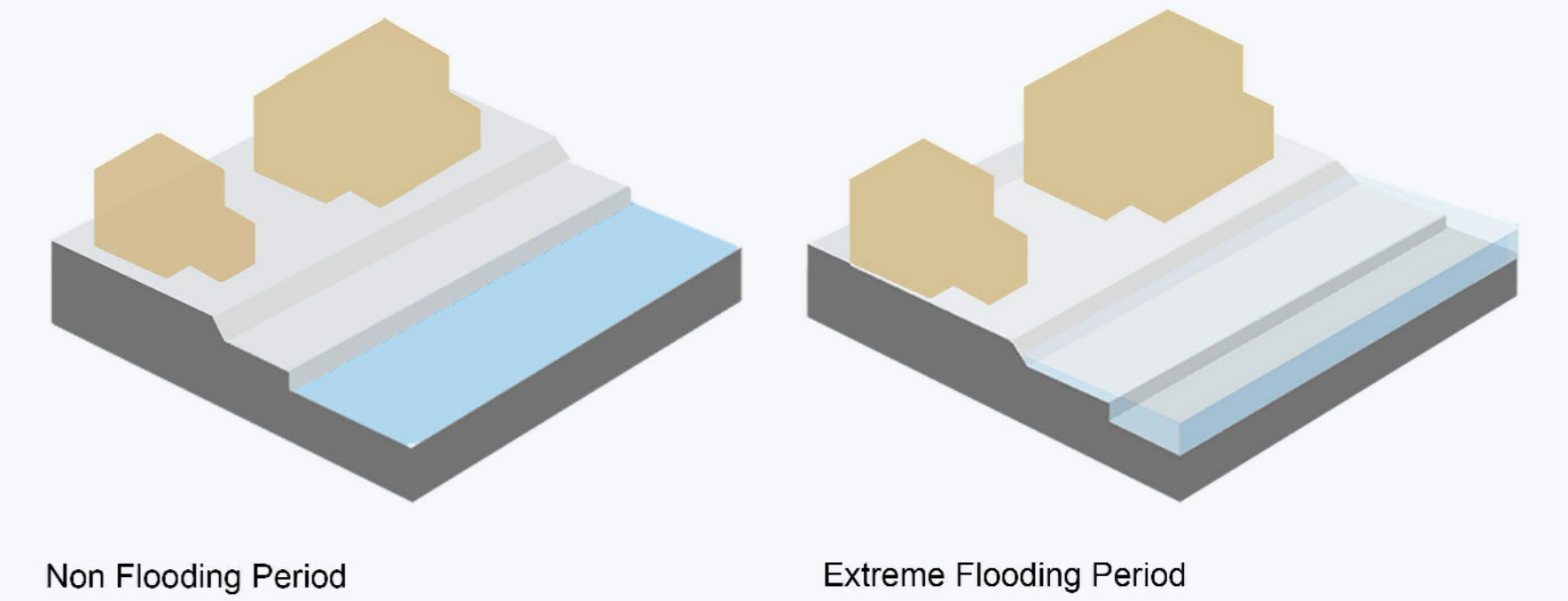
Grading: According to the contour map and the inundation map, the floodgates will be placed on the ground with a base height of 10 feet. The height of the gates will be 3.5 feet to meet the requirement of being tied in 13.5 feet contour.



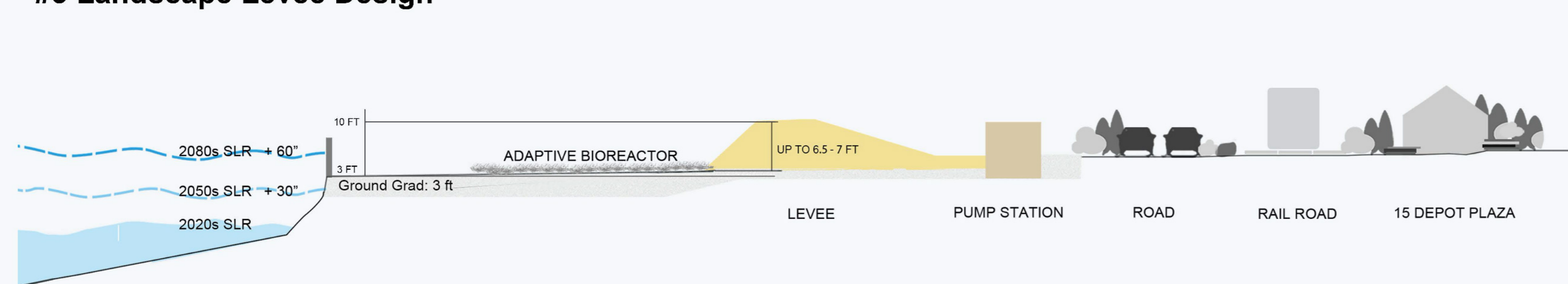
#2 Franklin Court Housing Lift Up



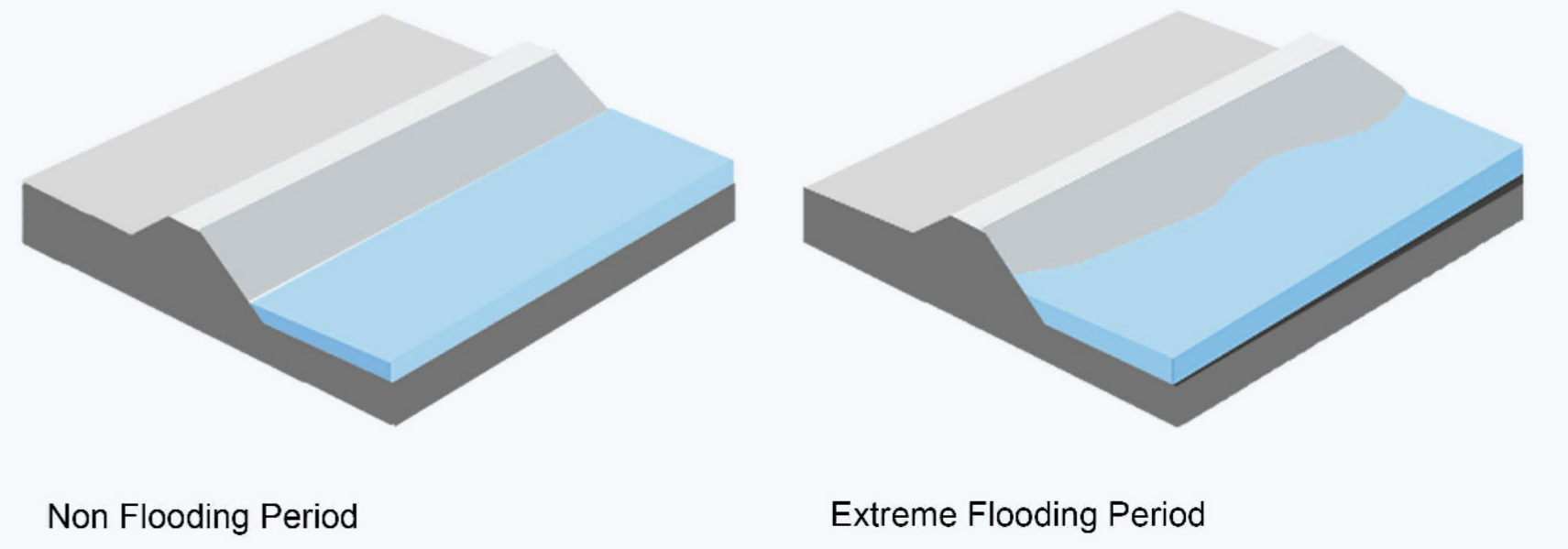
Grading: According to the contour map and the inundation map, the ground height of Franklin Court is 10 feet. In order to prevent the house from being flooded, the foundation of the house should be raised to the same height as the highest point of levee, that is, the foundation of the house should be raised by 3.5 feet, and finally reach an elevation of 13.5 feet. (same height as the floodgate)



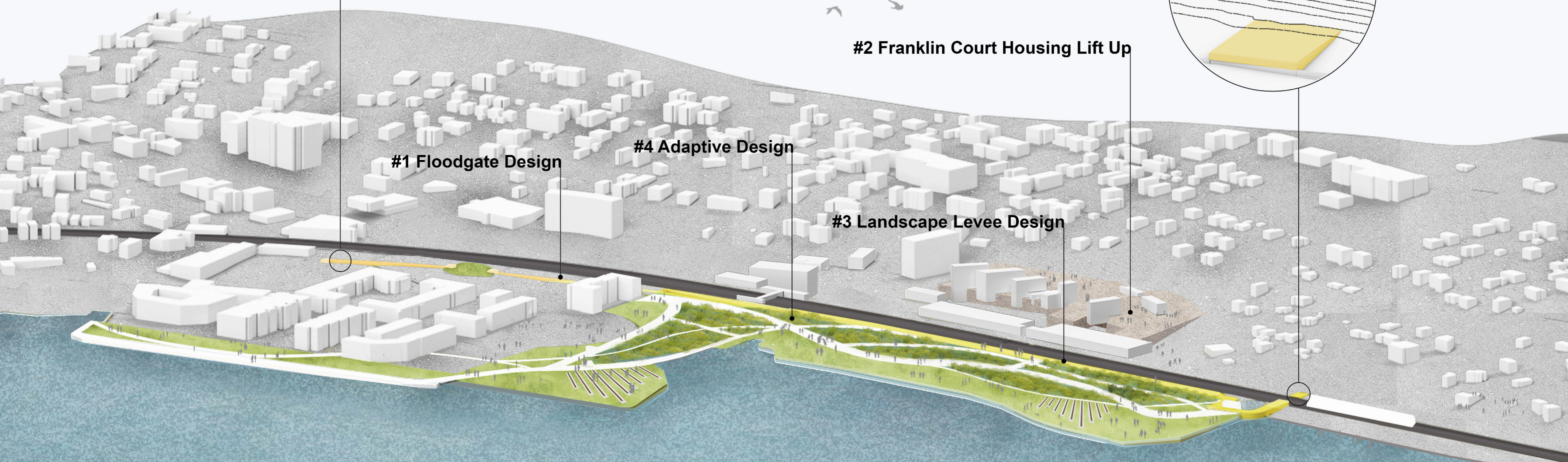
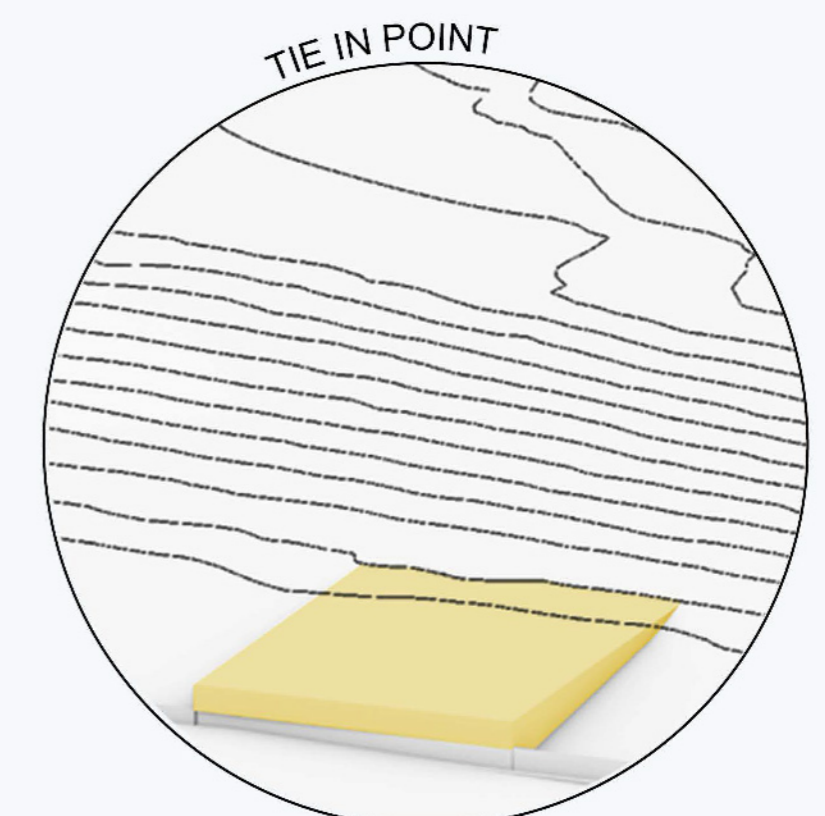
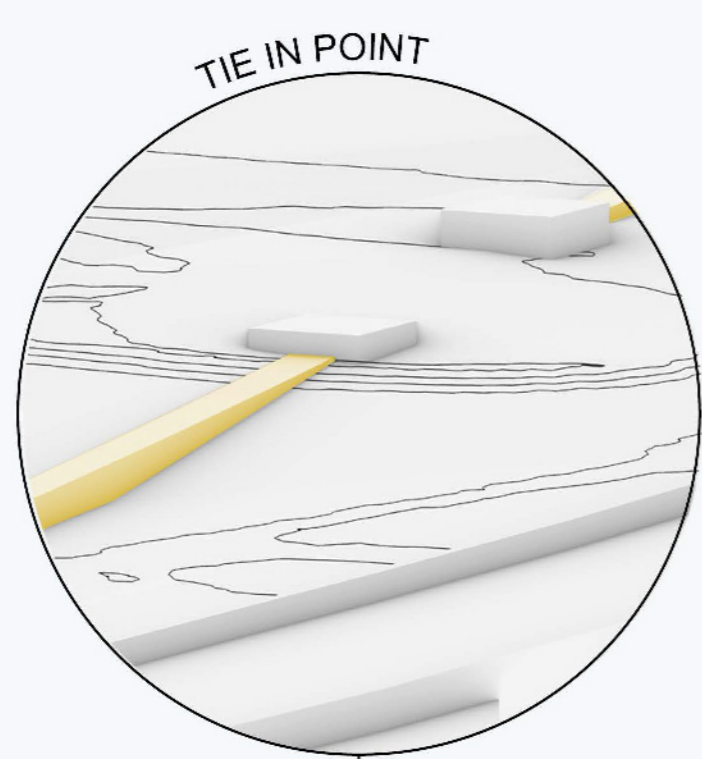
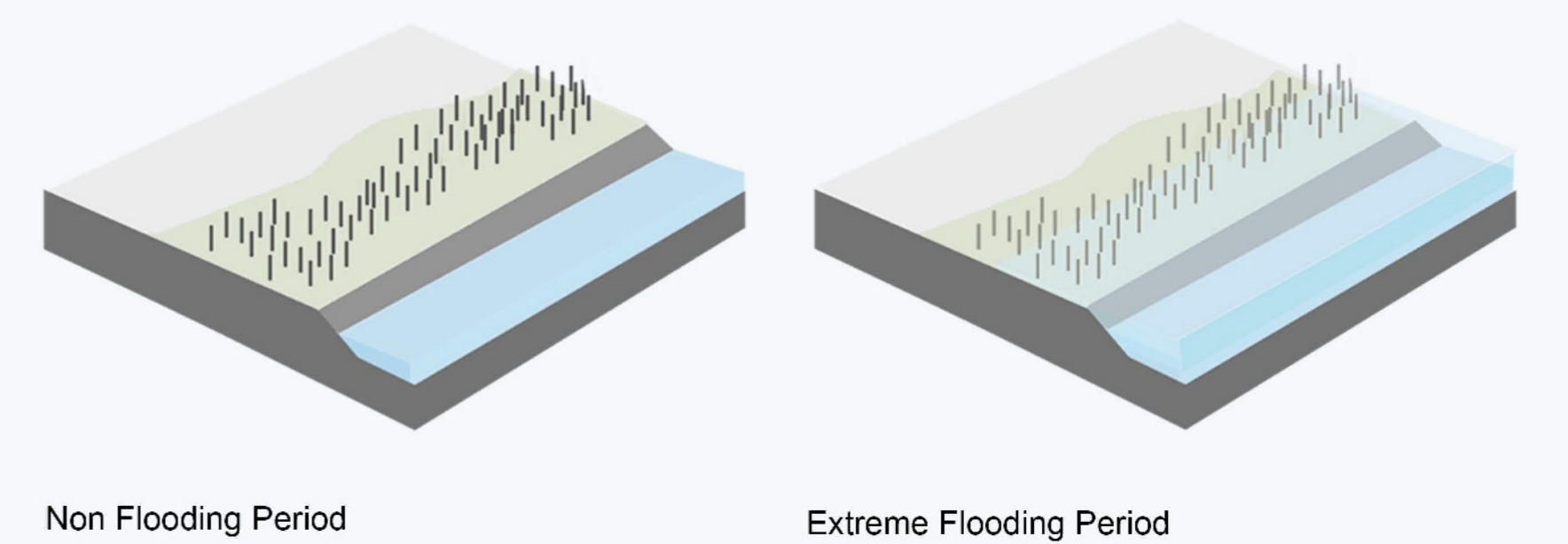
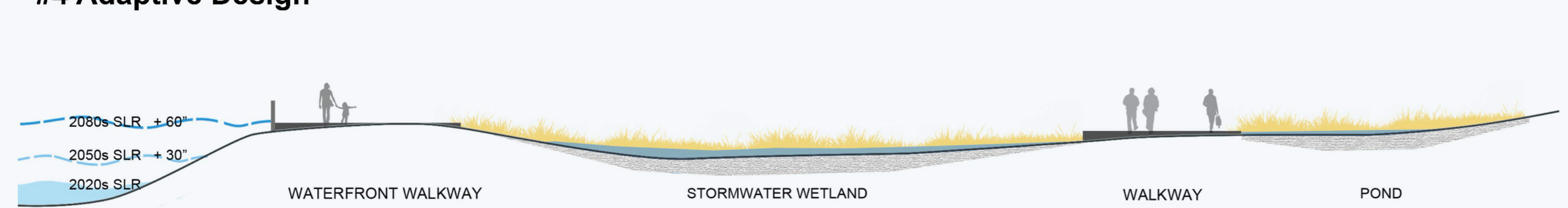
#3 Landscape Levee Design



Grading: A levee system's requirements should include that the levee system tie into natural high ground at either end of the system. High ground should be sufficient to provide a stable foundation for the levee system to meet the structural requirements at both upstream and downstream tie-in. According to the contour map and the inundation map, the levee should be placed on the ground with a base height of 3 feet. The height of the levee will be 6.5 - 7 feet to meet the requirement of being tied in 10 feet contour.



#4 Adaptive Design

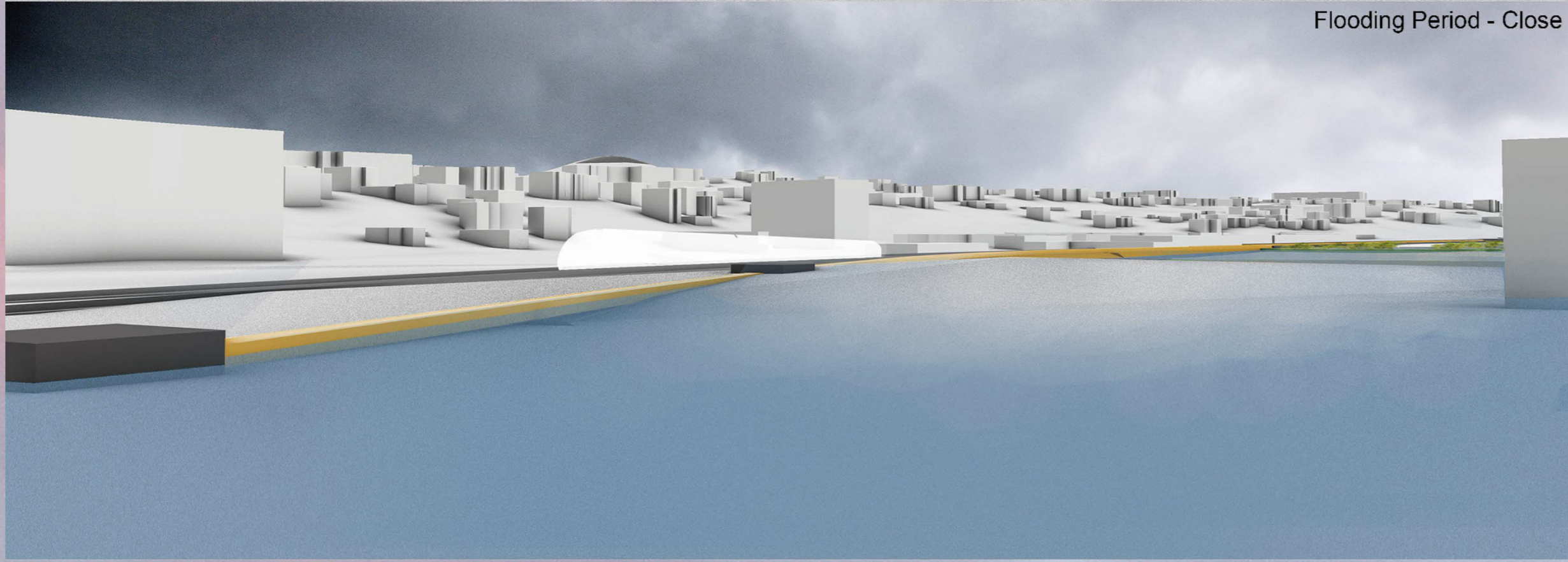


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Non Flooding Period - Open

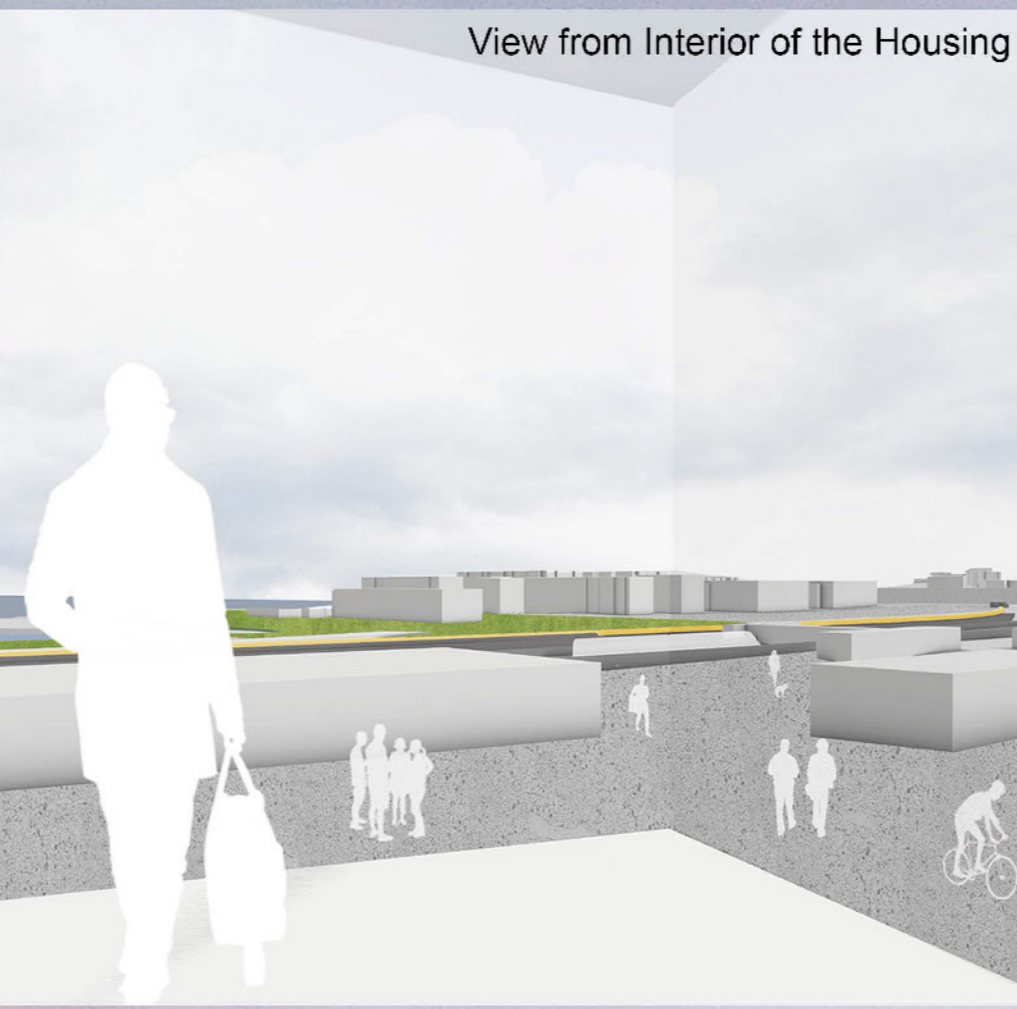


Flooding Period - Close

Floodgate Operation: The project utilizes floodgates to ensure persistent connections between the neighborhood and the waterfront. These floodgates will remain open (won't affect daily commute) in non-flood conditions and will only be closed in the event of a coastal storm. Flood gates are utilized throughout the project site. The design of these structures matches the floodgate design.

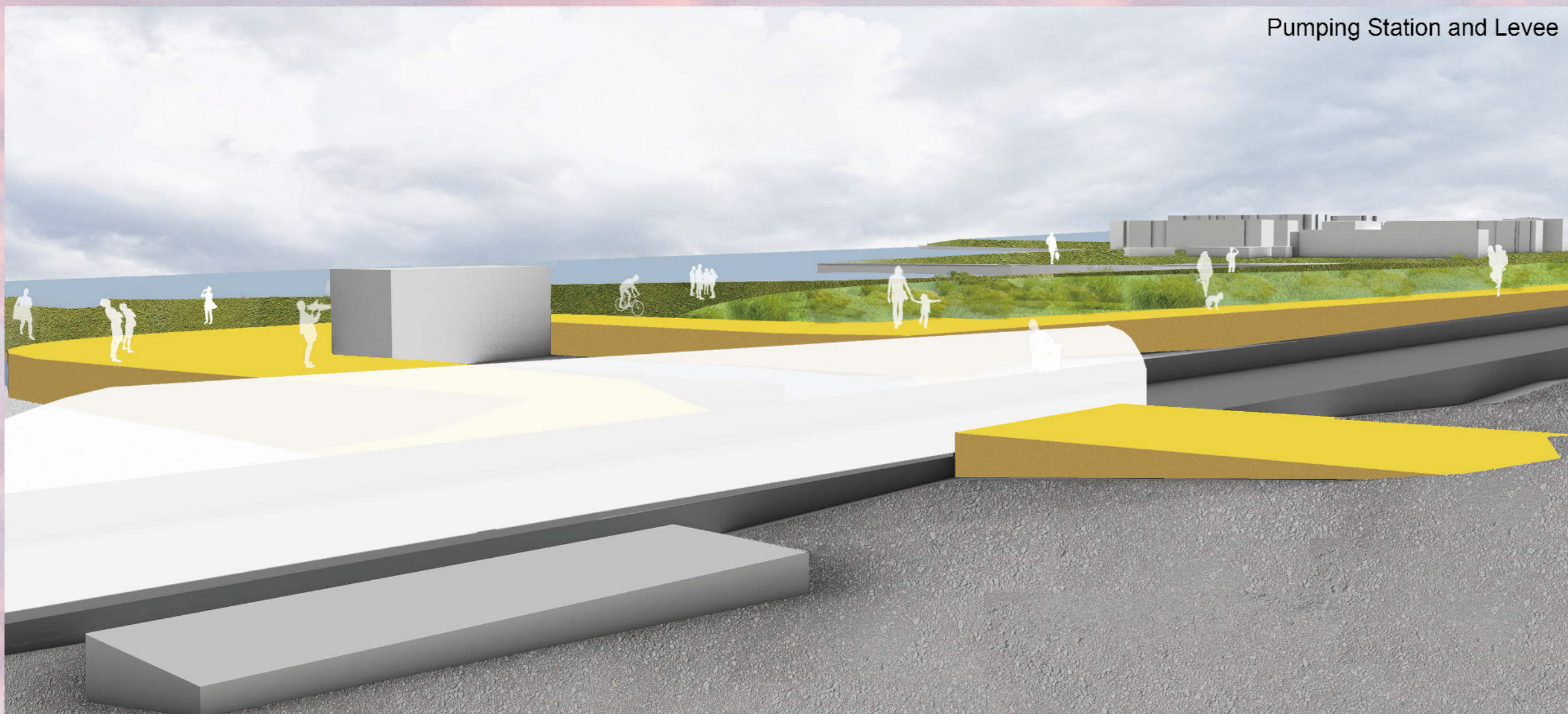


View from the House Ground



View from Interior of the Housing

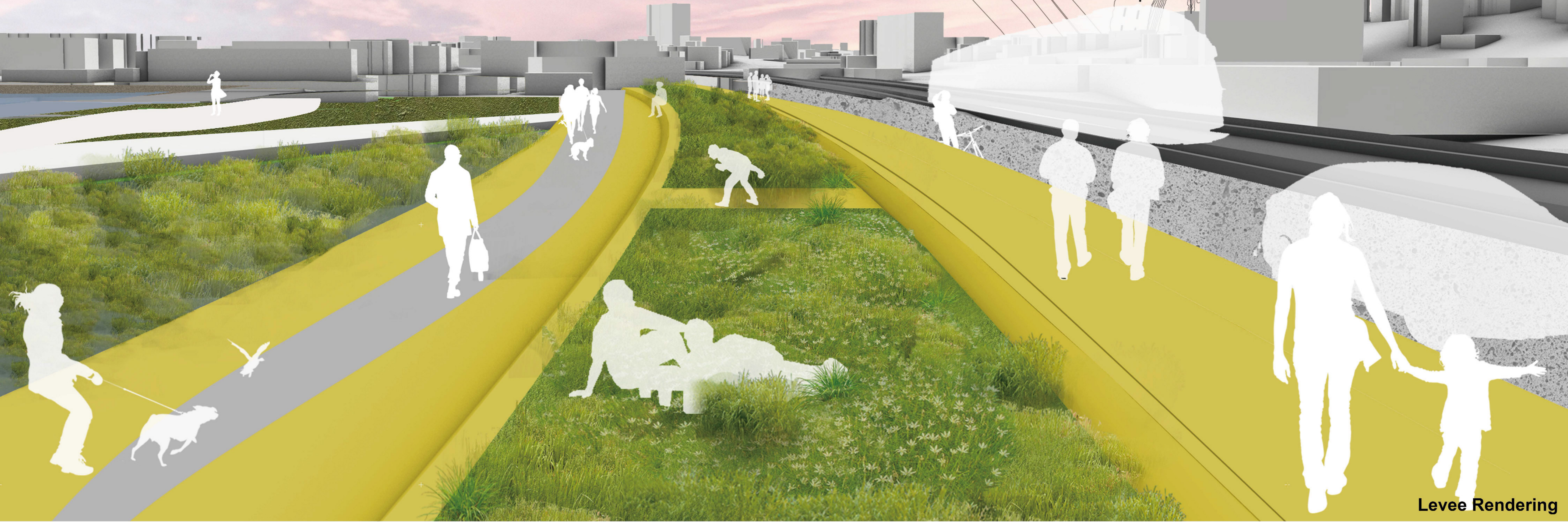
Sea levels are rising, global warming is causing more hurricanes, and flooding is four times more common than it was in 1980. Especially in coastal areas or flood-prone areas, this feature will be more obvious. Buildings in flood-prone areas can reduce flood damage to buildings. Faced with areas with severe flooding problems, designers should contact the local zoning of the planned construction area to understand the severity of flooding. Choosing a site on a slope or on top of a hill will reduce the risk of your home being flooded.



Pumping Station and Levee

A flood hazard-reduction system that consists of one or more levee segments/reaches and other features, which are interconnected and necessary to ensure exclusion of the design flood from the associated hydraulically independent levee impacted area, and which are constructed and operated in accordance with sound engineering practices. Systems associated with levee systems that usually include storage areas, gravity outlets, pumping stations, or a combination thereof to control interior drainage.

#4 Adaptive Design



Levee Rendering

#1 Floodgate Design

#2 Franklin Court Housing Lift Up

#3 Landscape Levee Design

