

Variable Vulnerability

A comparative understanding of different socio - economic systems.
San Francisco bay region

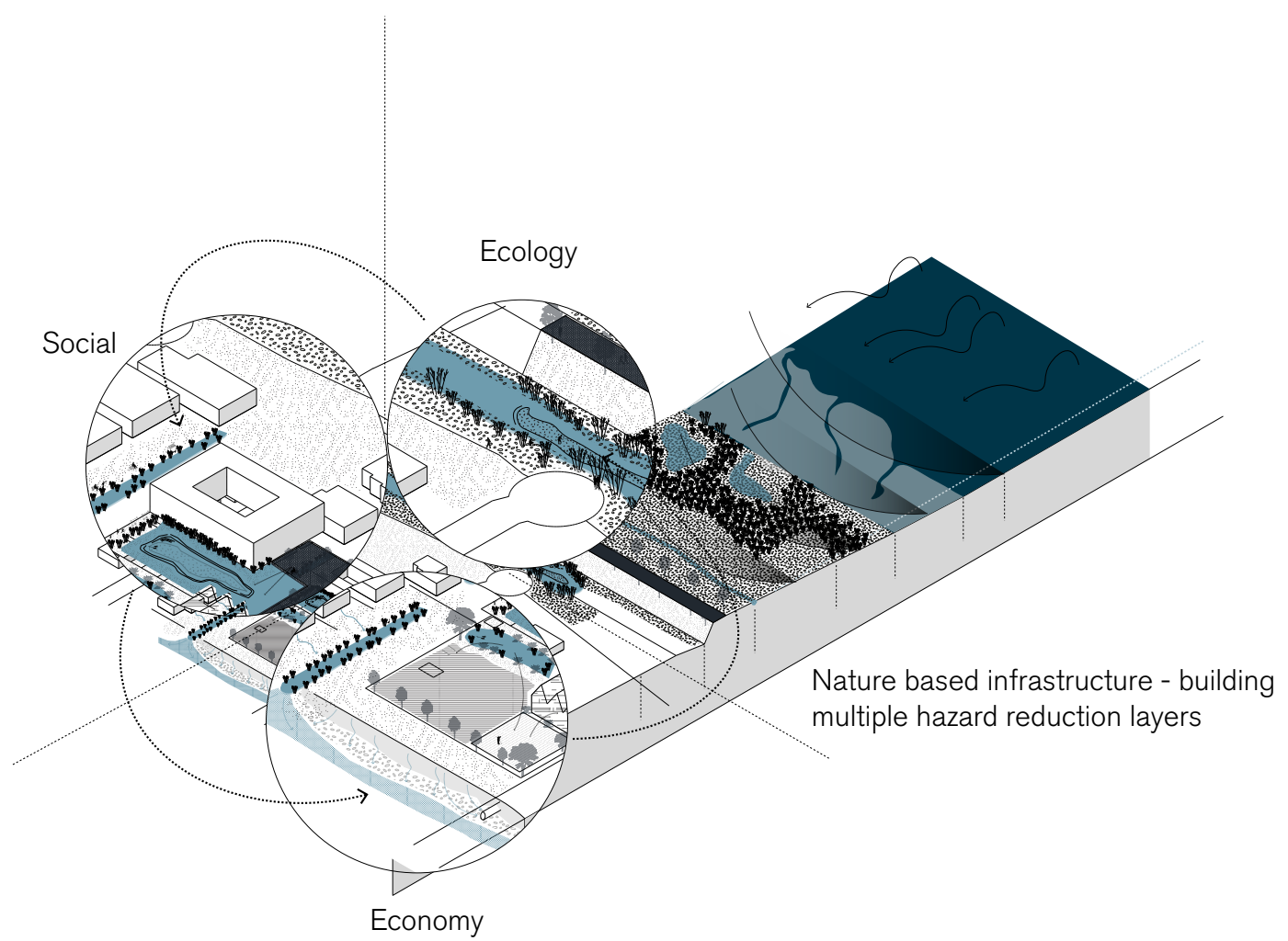
Project description

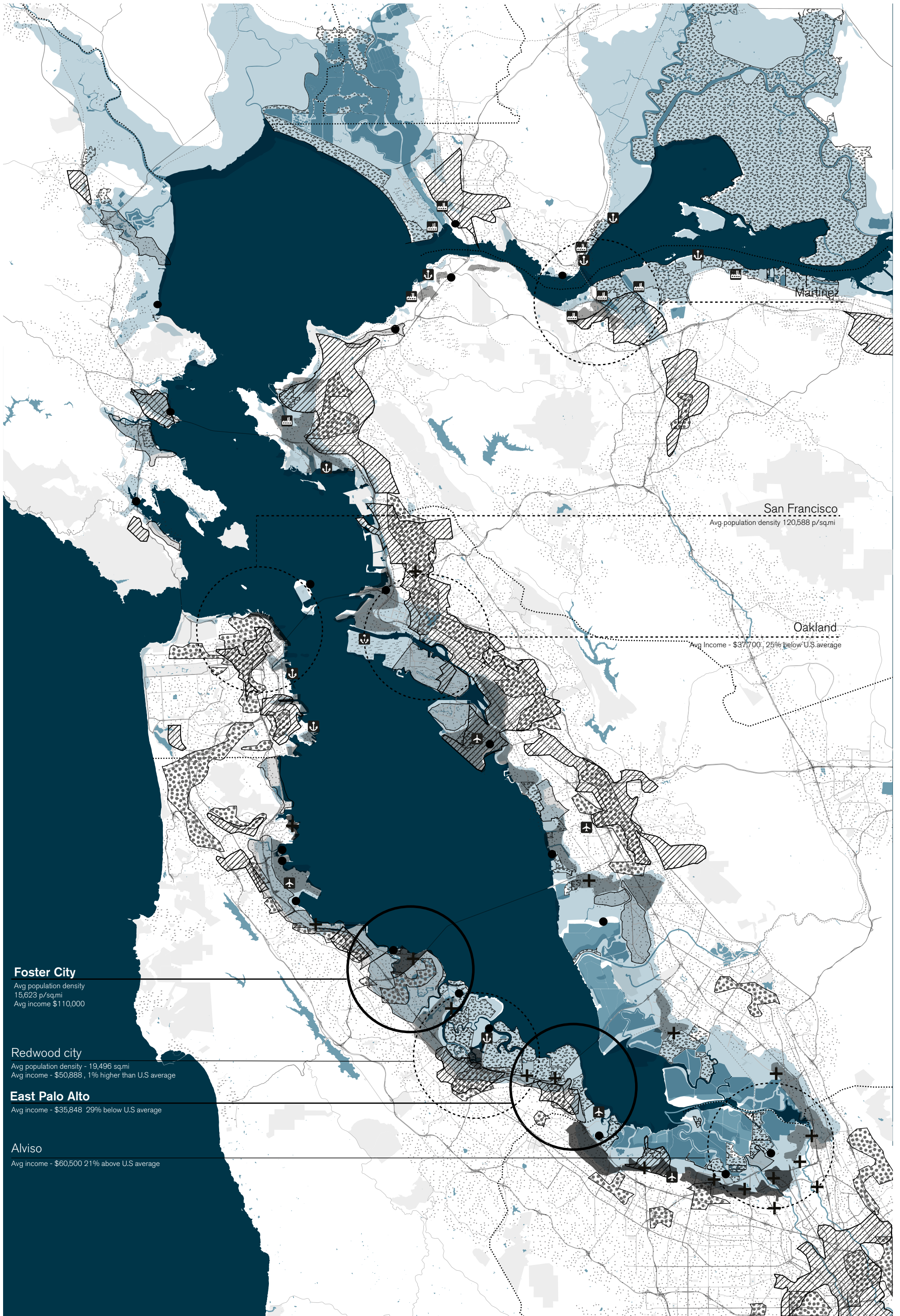
In this graduation project I have tried to focus on the aspects of socio-economic development and resilience to floods in the San Francisco Bay region. The comparison is between two cases namely East Palo Alto and Foster City which has a variable difference in their socio – economic system in terms of the communities that it hosts and the vulnerability due to risk that is generated by the type of flood risk management deployed towards flooding. The project also compares the spatial quality and synergies generated by its social systems to understand what qualities exists and what qualities should be added in order to attain a sustainable urban environment.

The comparison leads to two specific based vision that leads to adaptation design principles. A context driven robust design framework establishes the connection between research and spatial interventions which steers communities into being resilient towards future uncertainties. The most important aspect of comparative research is the concept of cross evaluation to summarize what values should be added to the narrative of both the systems, and the socio – economic characteristics determines the best possible ways of achieving it.

The principles for adaptation is derived from the narrative of comparison and tries to build a collective approach towards building a sustainable living environment that is social - ecological resilient. It aims at building a nature based infrastructure that detains and conveys water which adds new values of spatial diversity, water sensitivity and economic development. The project also overcomes the usage of hard grey infrastructure that tries to control the natural hydrological process and builds an harmony with more soft, green infrastructure that provides multi benefits and robustness. The principles also embraces an inter-scaler approach where multiple scaled intervention are connected to build a bigger system that adds new values and dynamics to each scale.

Adaptation principles





San Francisco
Avg. population density 120,588 p/sq.mi

Oakland
Avg. Income - \$37,700, 25% below U.S. average

Foster City
Avg. population density
15,623 p/sq.mi
Avg. income \$110,000

Redwood city
Avg. population density - 19,496 p/sq.mi
Avg. income - \$50,888, 1% higher than U.S. average

East Palo Alto
Avg. income - \$35,848, 29% below U.S. average







Alviso
Avg. income - \$60,500, 21% above U.S. average











Martinez



Macro Scale - San Francisco Bay area

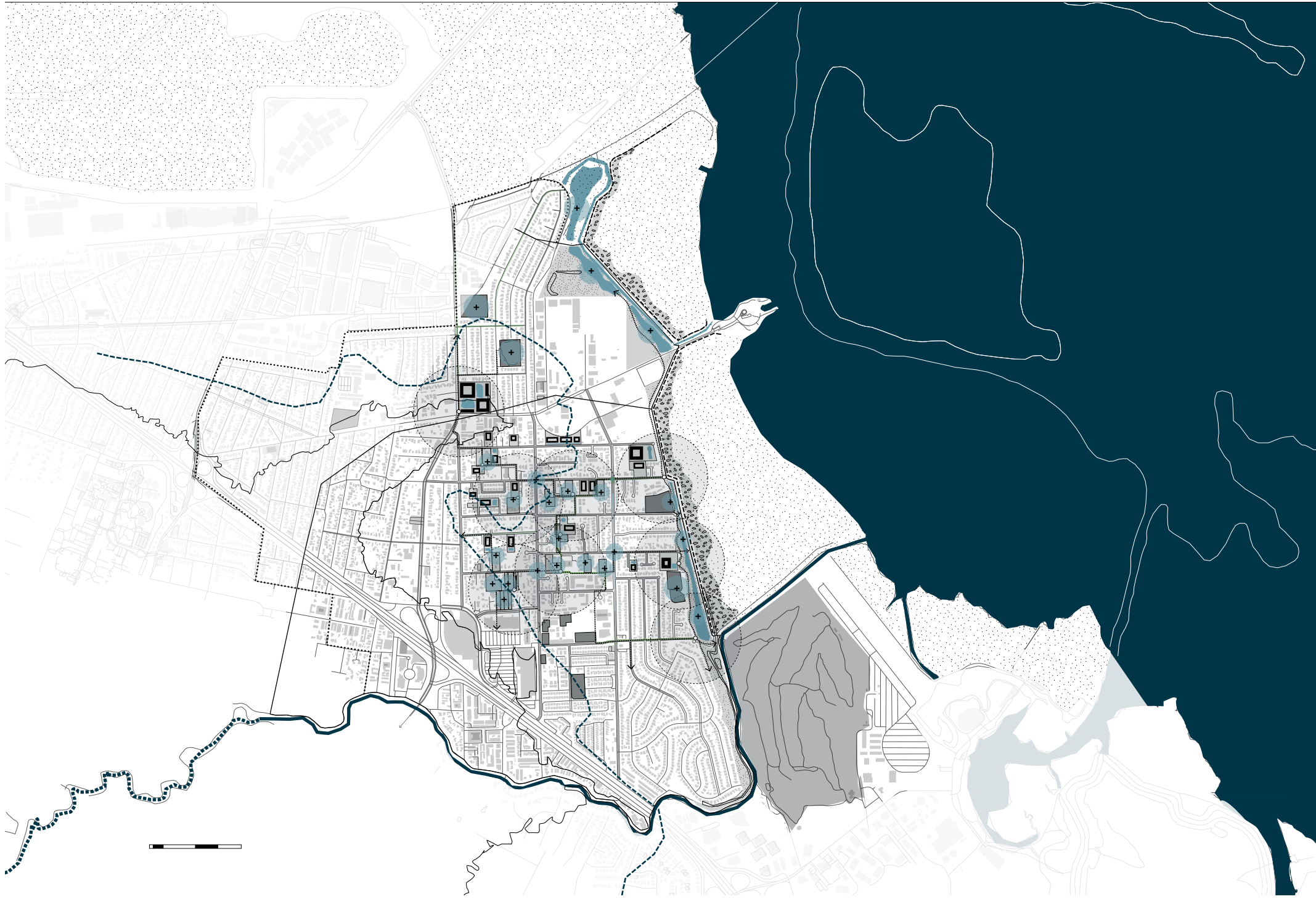
The following map intends to show the different socio - economic characters that exist around the bay region. Considering a Sea level rise of 1.5 m a risk analysis in terms of valuable assets, Critical infrastructure, population density , Low income communities to understand the vulnerability of the system. This is categorized to 7 different typologies in which 2 cases namely Foster City and East Palo with different aspects of vulnerability is considered for study.

Legend

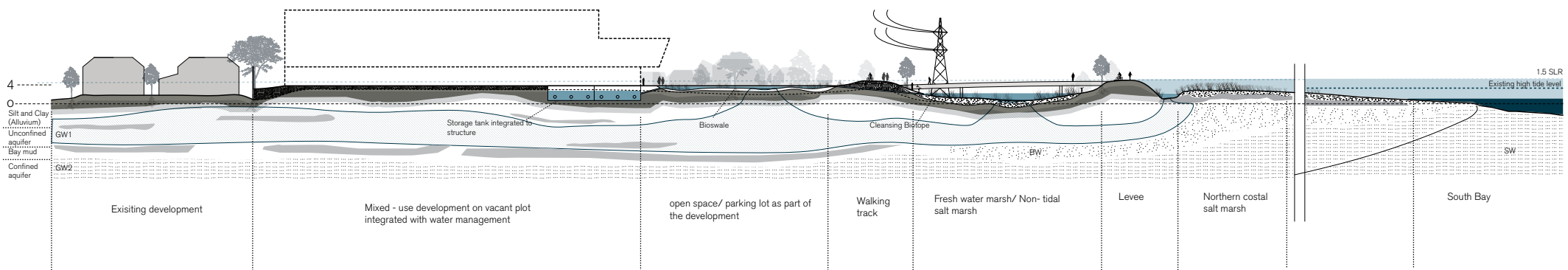
-  Urban Occupation
-  Large Green areas
-  Internal water bodies/ Creeks
-  Bay waters
-  Sea Level rise inundation area (1.5m)
-  Existing salt marsh plains

-  Areas of high population density
-  Areas of Low income
-  Residential land use at risk of inundation
-  Industrial land use at risk
-  Commercial land use at risk
-  Critical infrastructure at risk
-  Important economic drivers of region (silicon valley)
-  Airports
-  Ports
-  Port related industries

-  County borders
-  Interstates and major roads



Section across water - East Palo Alto













Meso Scale - Vision for East Palo Alto




Revitalize the past agriculture identity of East Palo Alto

To integrate and revitalize the existing local economy (urban agriculture) into the socio-economic system that seeds a process for urban transformation in East Palo Alto.

Legend

-  Public open space
-  Water storage infrastructure
-  Vacant plots identified for infill development
-  Urban agriculture land
-  New infill development with water storage
-  Urban nodes with shared facilities
-  Riparian vegetation/ brackish marsh
-  Fresh water/ brackish marsh
-  Northern coastal Salt marsh
-  Inundation due to 1.5 m of SLR

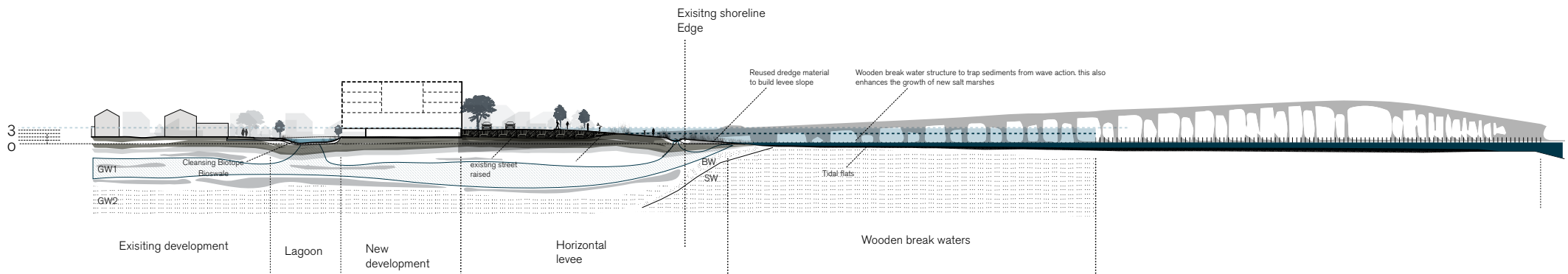
Section Legend

-  South Bay water
-  Fresh surface water
-  1.5 m SLR

- GW1** Unconfined aquifer
- GW2** confined aquifer
- BW** Brackish ground water
- SW** Salt water

















Section across water - Foster City






Meso Scale - Vision for Foster City

To induce natural processes by introducing more informal land- water gradients. Revitalizing the ecological sensitivity of existing socio- economic character by inducing more natural processes that steers the process of urban developments in Foster City.

Legend

-  Public open space
-  Surface water for detention
-  Storage corridor
-  Conveyence corridor
-  Location of water storage
-  New developments
-  Existing coastal salt marsh
-  New horizontal Levee profile
-  Riparian vegetation
-  New growth of salt marsh
-  Wooden break waters
-  Diked marsh
-  Zones of increased Bio - diversity
-  Inundation due to 1.5m of SLR

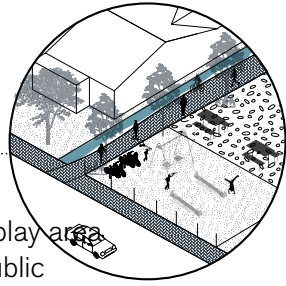
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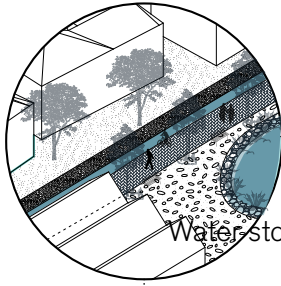
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Micro scale - New spatial quality

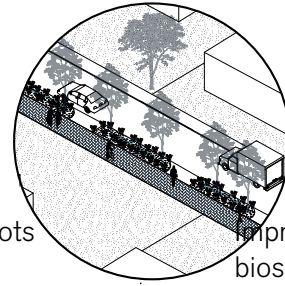
East Palo Alto



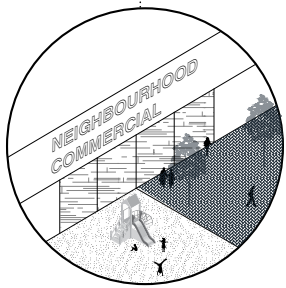
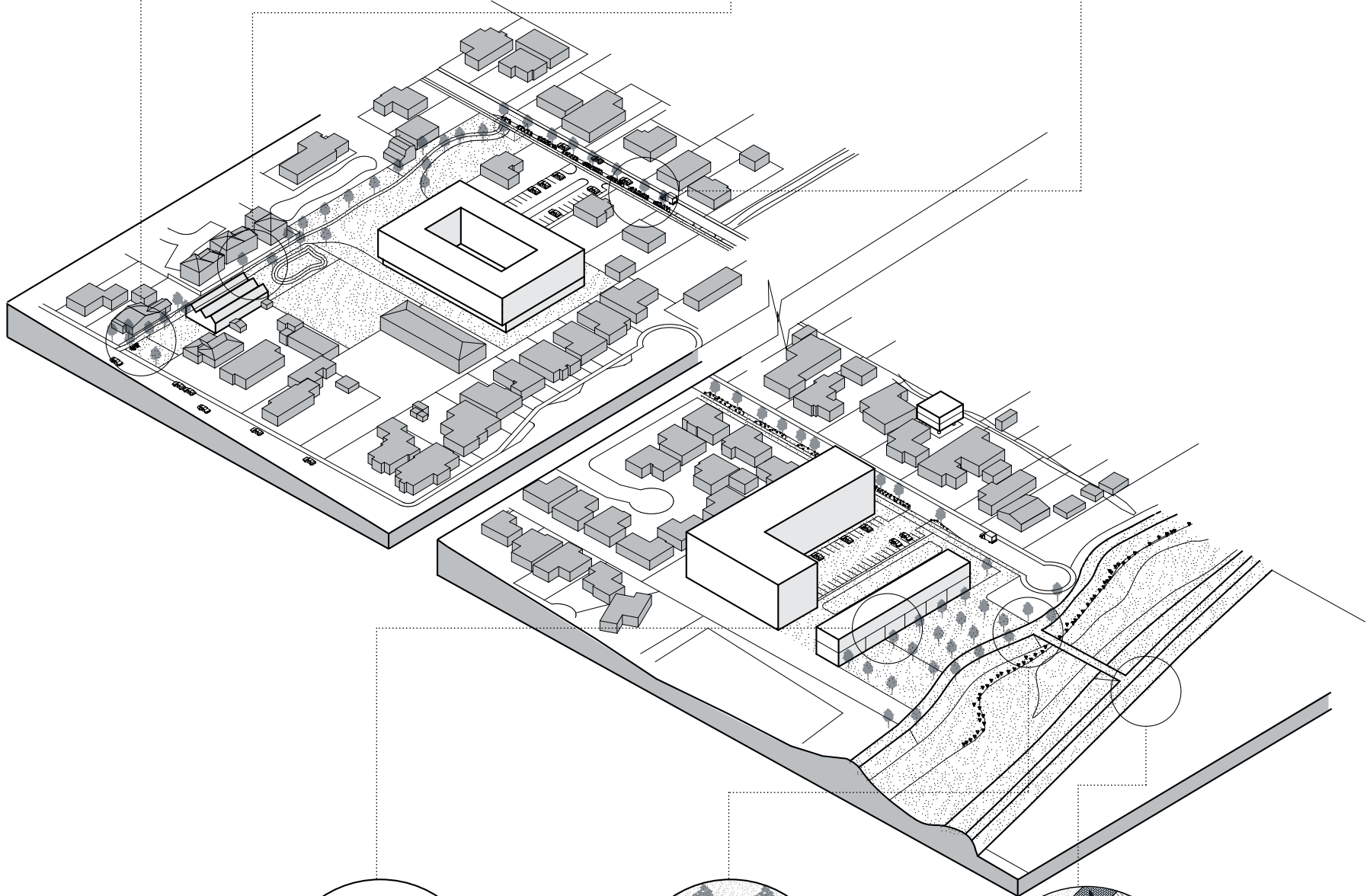
Farm plots double as play area and open space for public



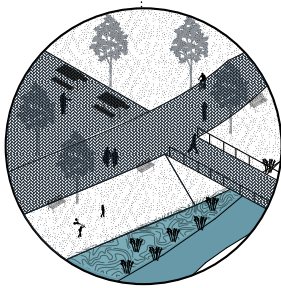
Water storage in farm plots



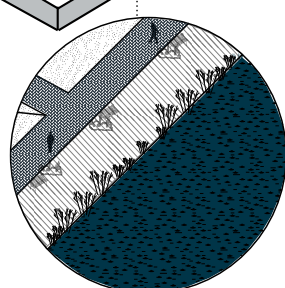
Improved street quality with bioswales



New developments to host several neighborhood commercials and housing



Open space next to Levee enhanced with new public space and water storage



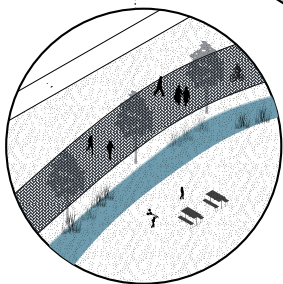
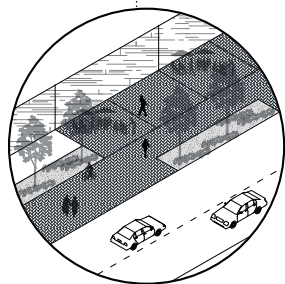
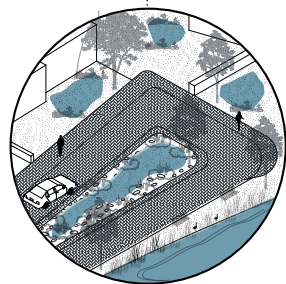
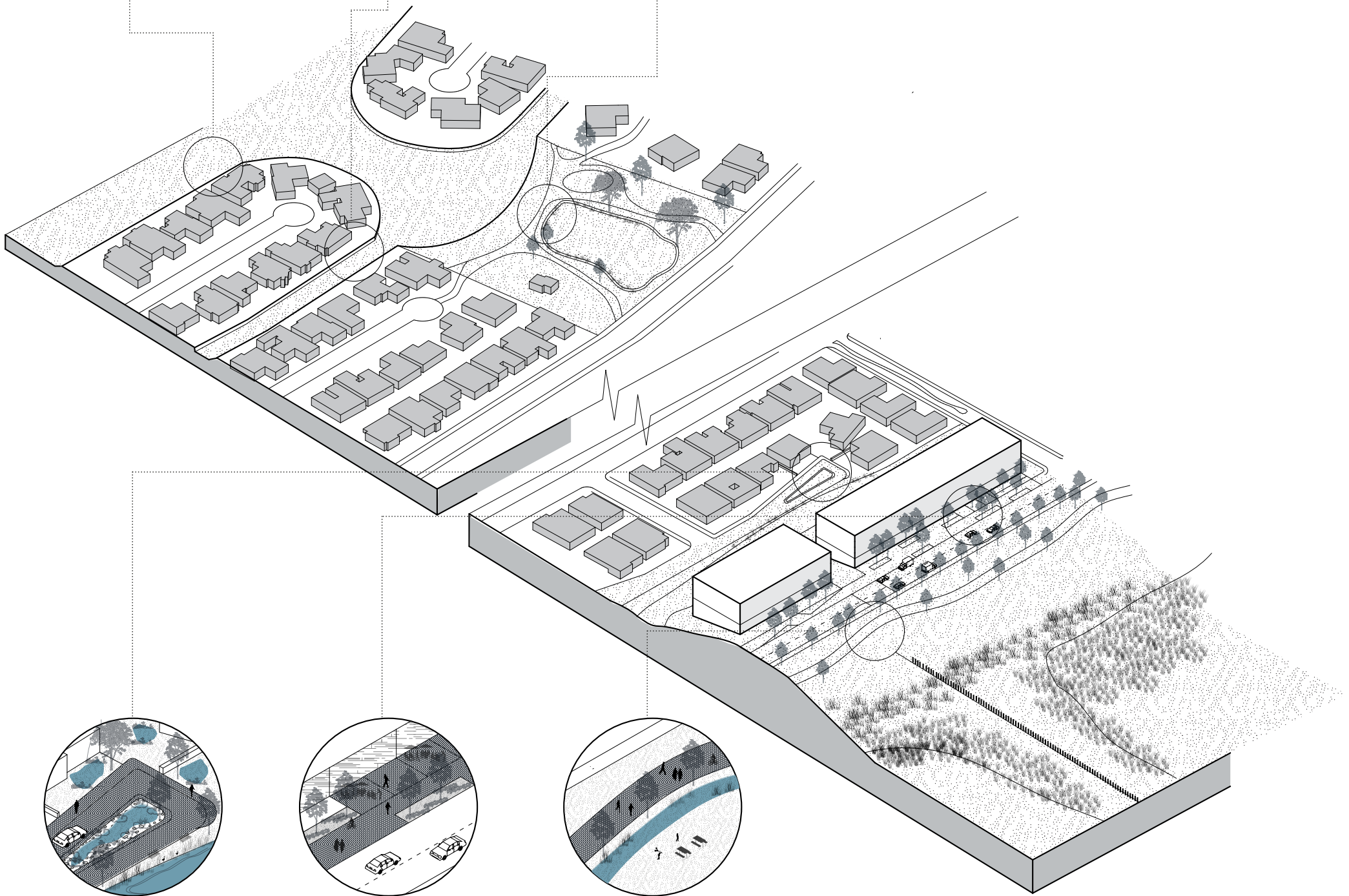
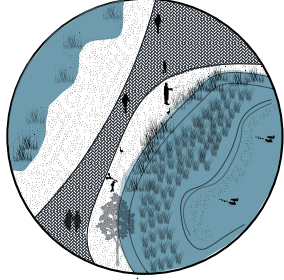
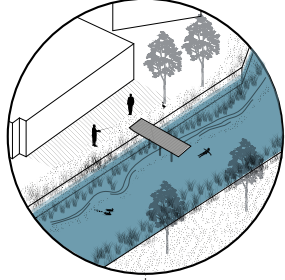
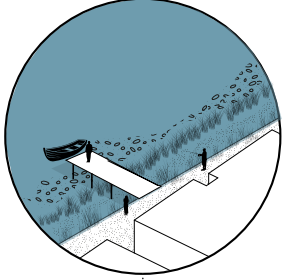
Access to marsh edge

Micro scale - New spatial quality

Foster City

Edge between Land and Lagoon naturalised with embankments and helophyte filters

Open spaces next to Lagoon to handle increased flooding along with helophyte filters for rain water filtration



New water storage in Cul- de sacs

New developments to host several new activities

Recreation along Levee also providing protection