

MINJUNG LEE

COLUMBIA UNIVERSITY
GSAPP MSAUD '20
SU2019 FA2019 SP2020



SU2019 RESILIENT IBZ

Sunset Park, Brooklyn, New York, USA

Team

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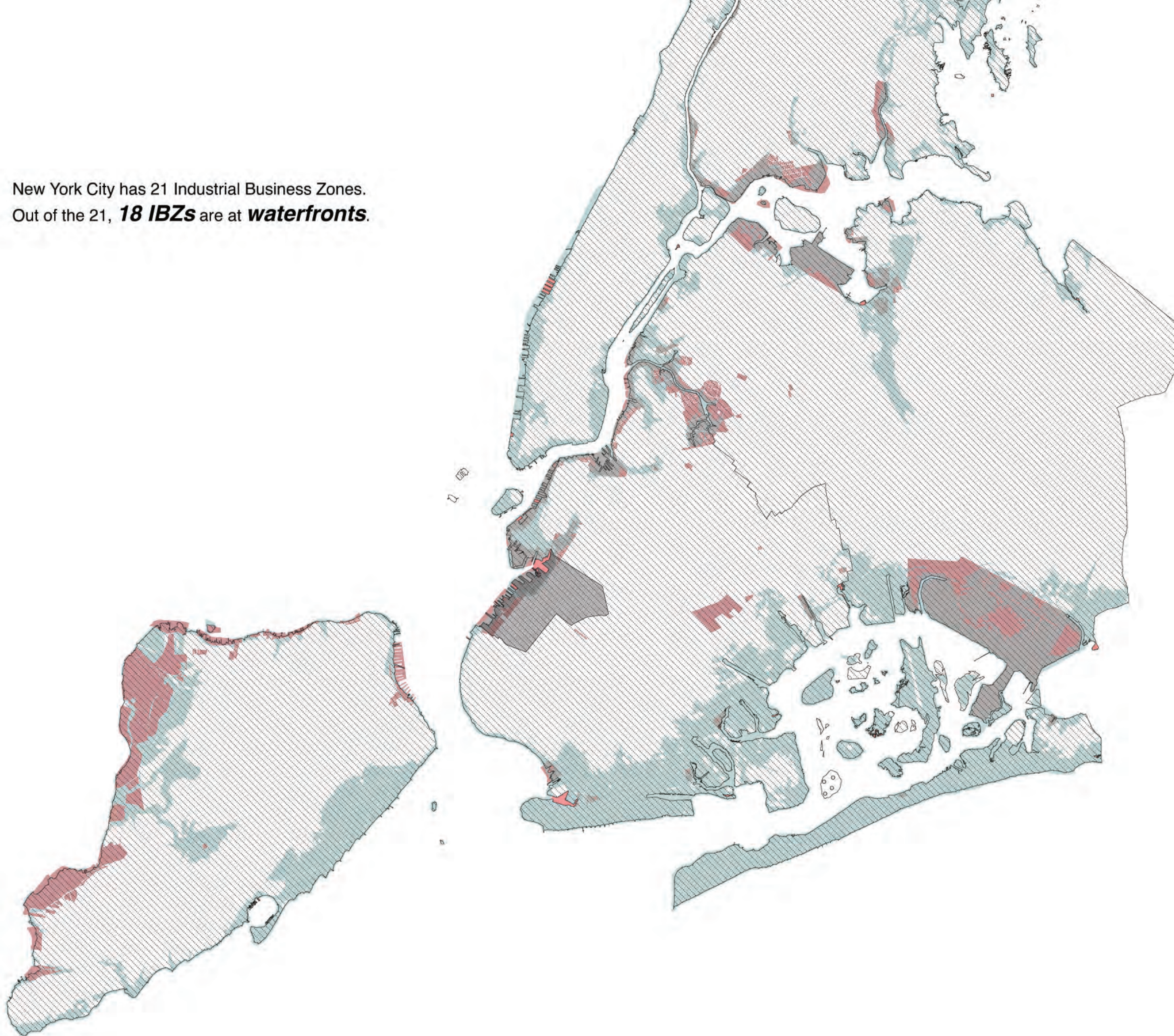
New York City has twenty-one Industrial Business Zones. Eighteen of these are located in waterfront sites. Global warming, sea level rise and extreme weather conditions threaten the IBZs, their ecosystems, and the prosperity of their communities. This project aims to provide a resiliency framework to protect the waterfront Industrial Business Zones through the lens of Ecology, Community, and Economy.

How can this greenway become a tool in safeguarding the IBZ. Our plan is to move the path of the greenway and use it as a barrier for sea level rise and inland water overflow. Taking advantage of the existing bathymetry, we plan to use natural ecosystems to reduce the energy of the waves and restore the coastal environment by cleaning the water and providing habitat.

Living shorelines stabilize the shore, and reduce erosion and storm damage. They increase the flood storage capacity and strengthen the ecosystems. Hard infrastructure decays, while living shorelines naturally grow stronger over time.

NEW YORK CITY IBZs AND FLOODPLAINS

New York City has 21 Industrial Business Zones.
Out of the 21, **18 IBZs** are at **waterfronts**.



- NYC 21 Industrial Business Zones
- Future Floodplains 2020s [NYC Flood Hazard Mapper]
- Sunset Park, Brooklyn

SUNSET PARK IBZ

Ecology

Sunset Park IBZ lies in region where **water table at 11ft** from ground.
55% of IBZ is under **floodplain**.

Community

73% don't have **education** over high school degrees.
29% under NYC government **poverty** line.

Economy

Potential **infrastructure** in IBZ.
Expansion of **existing industries**; Garment, film, and food production.
Existing **SIMS** recycling and **BAT** facilities.

50 40 35 15 10 25 35 10

Bay Ridge Flats

Ruins

Estimated % building loss
in category 3 storm with
2080 sea level rise

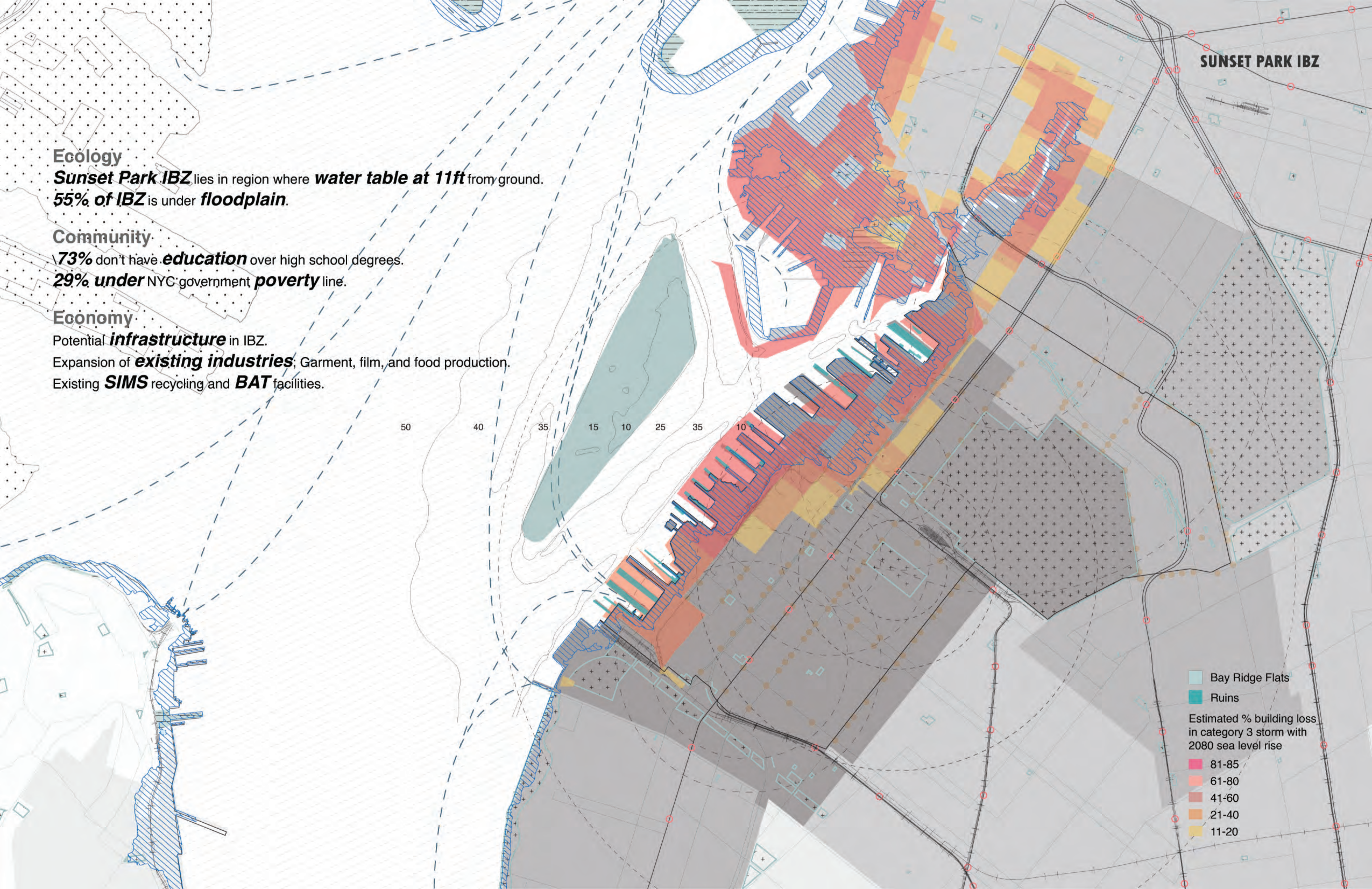
81-85

61-80

41-60

21-40

11-20



RESILIENT IBZ WITH LIVING SHORELINES

Greenway
Activate Industry Spaces
SIMS Pla Recycling Factory

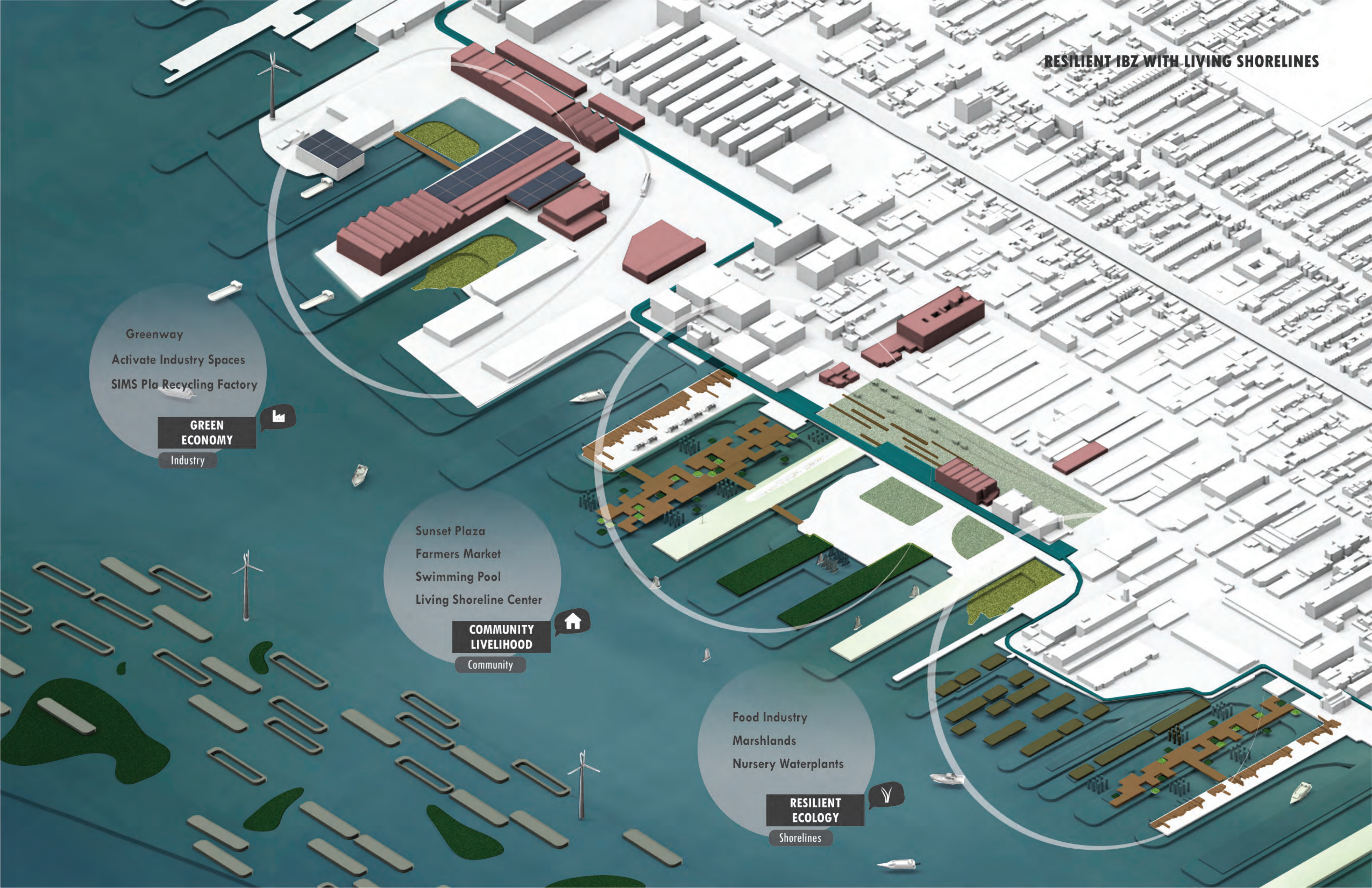
GREEN ECONOMY
Industry

Sunset Plaza
Farmers Market
Swimming Pool
Living Shoreline Center

COMMUNITY LIVELIHOOD
Community

Food Industry
Marshlands
Nursery Waterplants

RESILIENT ECOLOGY
Shorelines



SUNSET PARK GREENWAY TO REDUCE FLOOD RISK



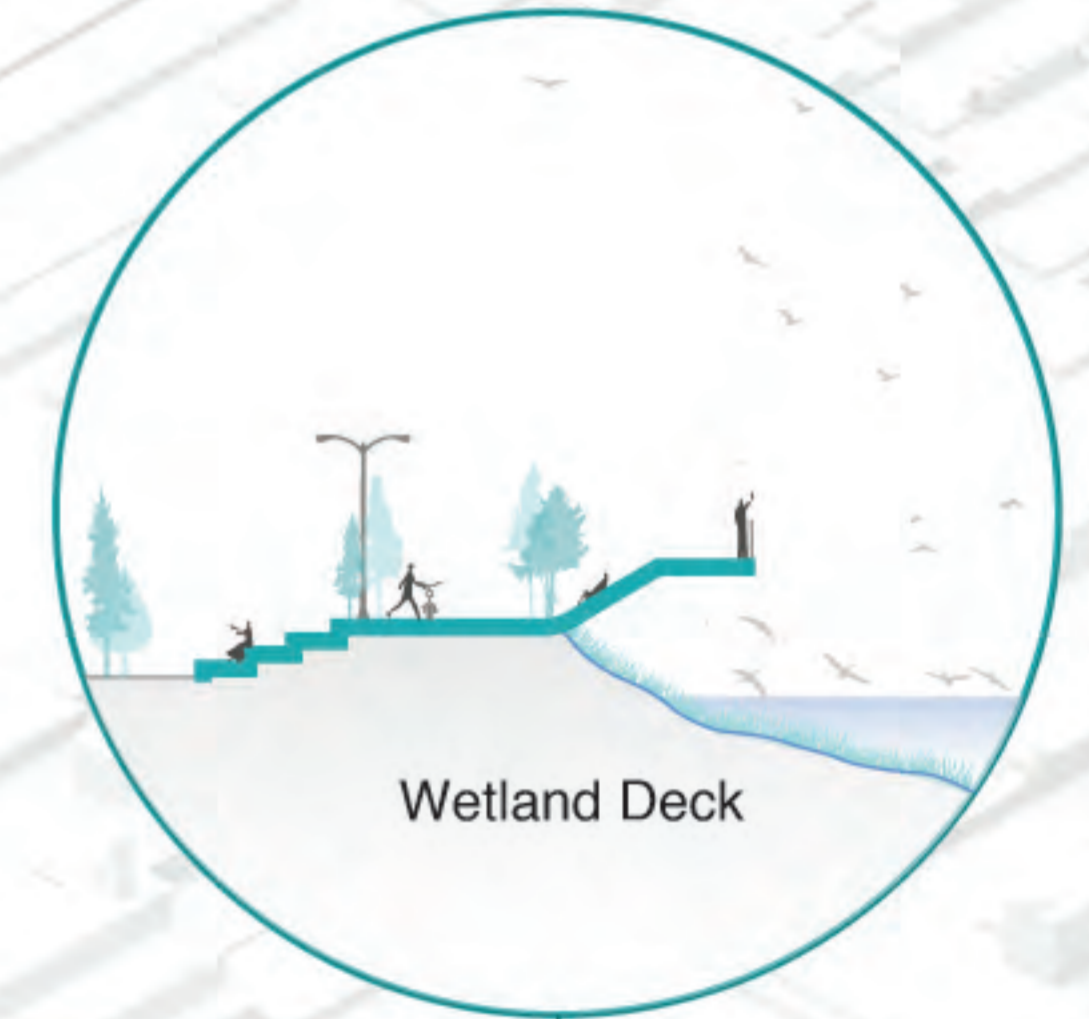
Up-wall Trail Stop



Up Bus Stop



Bicycle Station



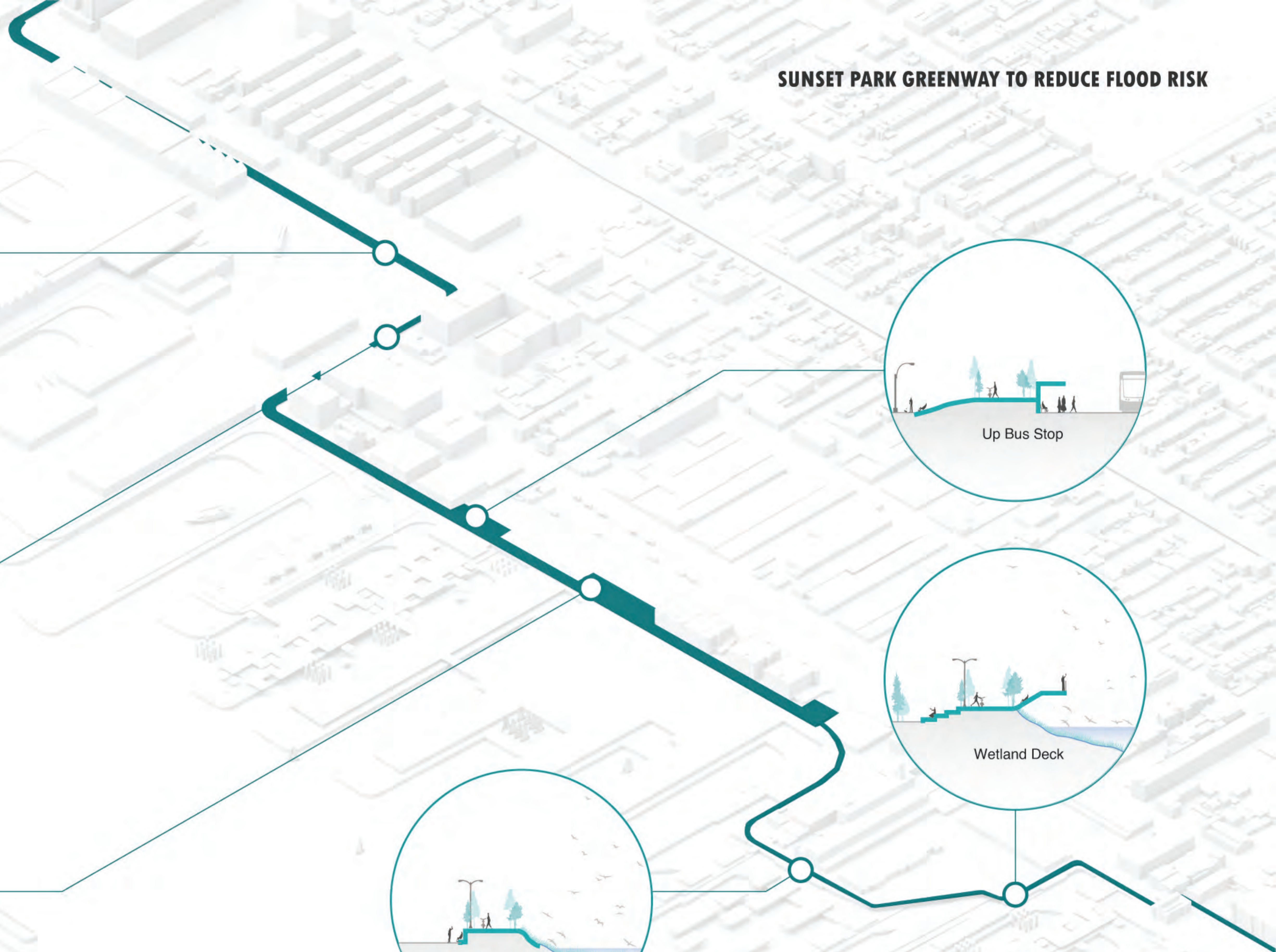
Wetland Deck



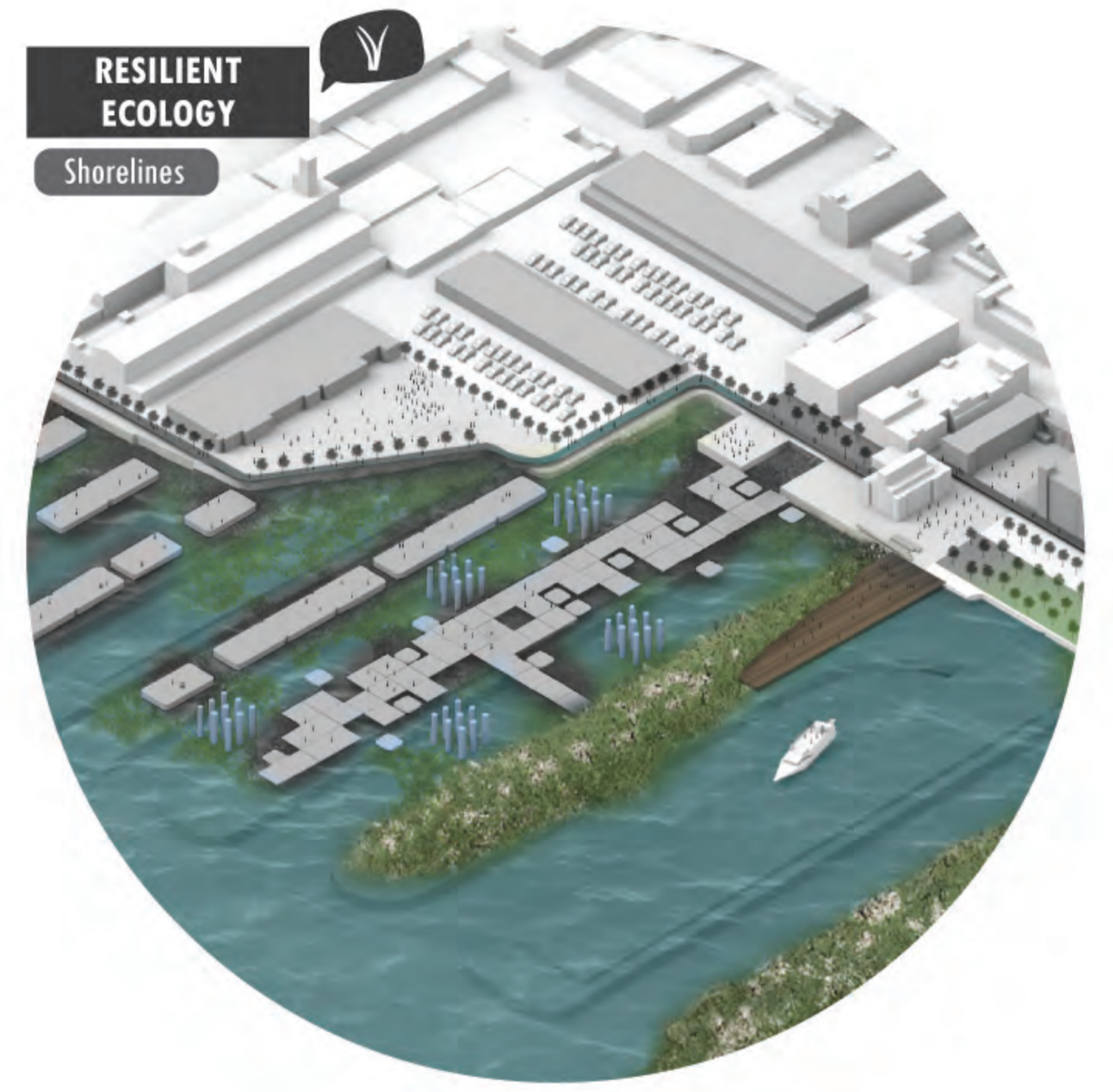
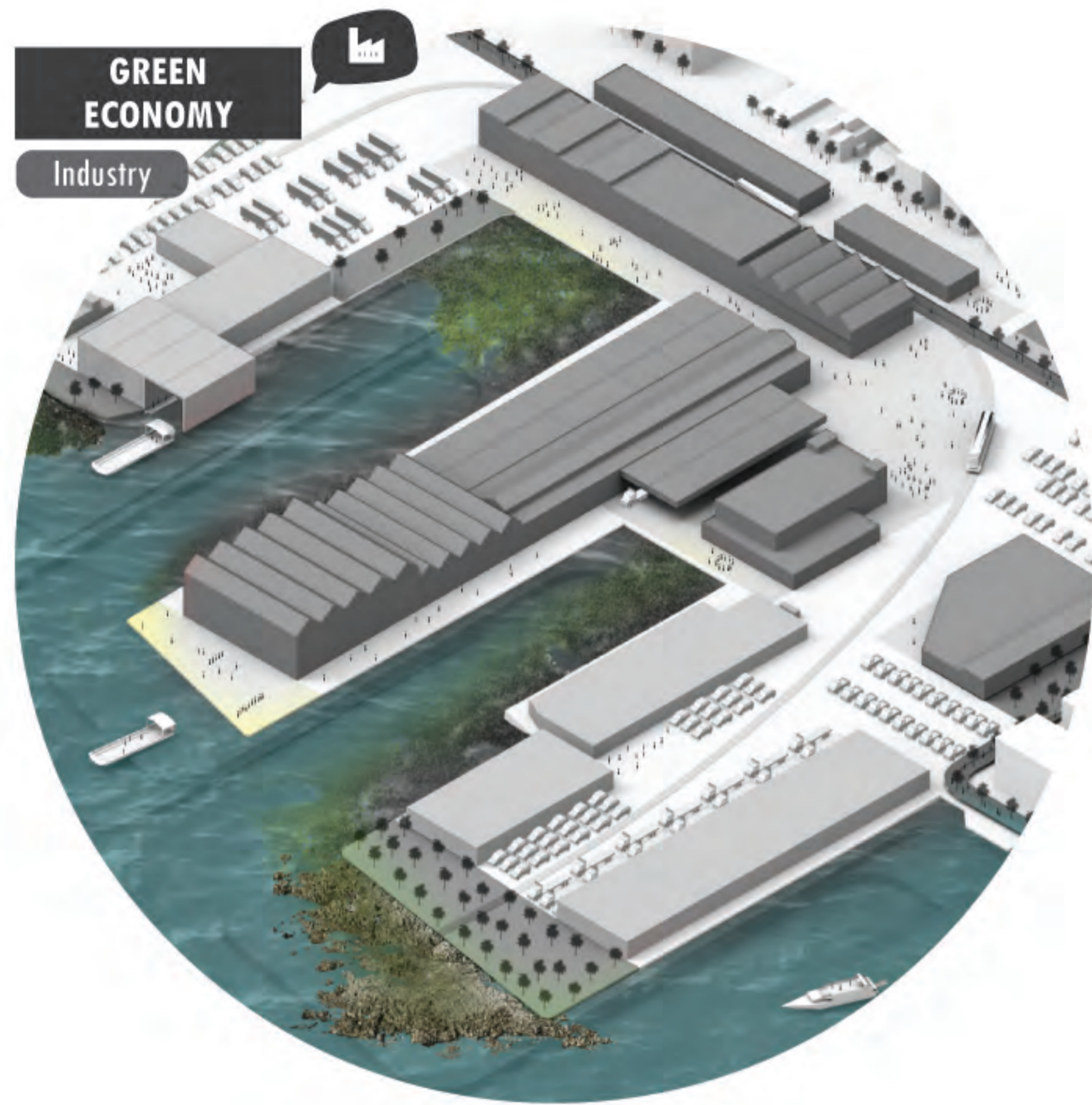
Terracing Public Space

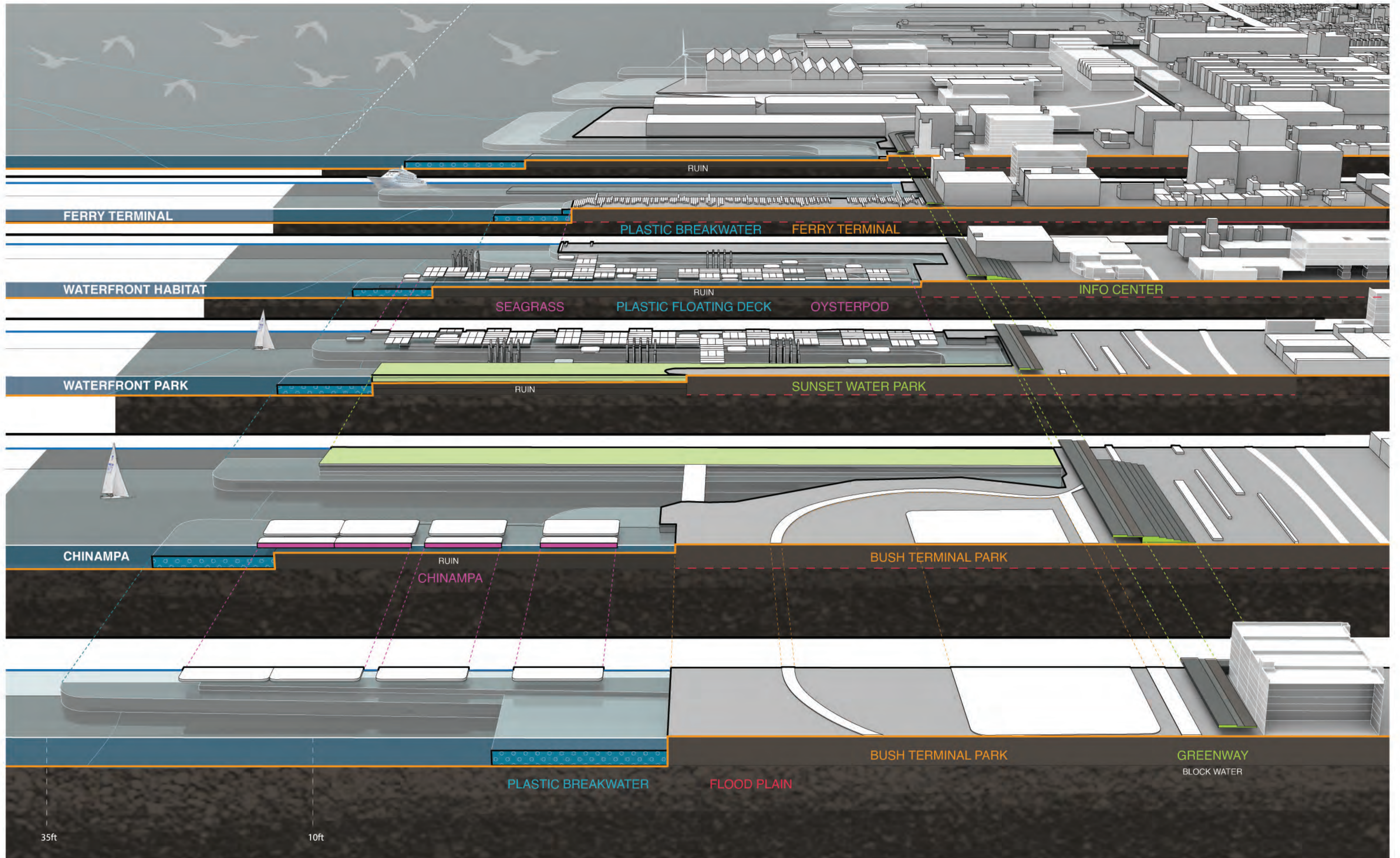


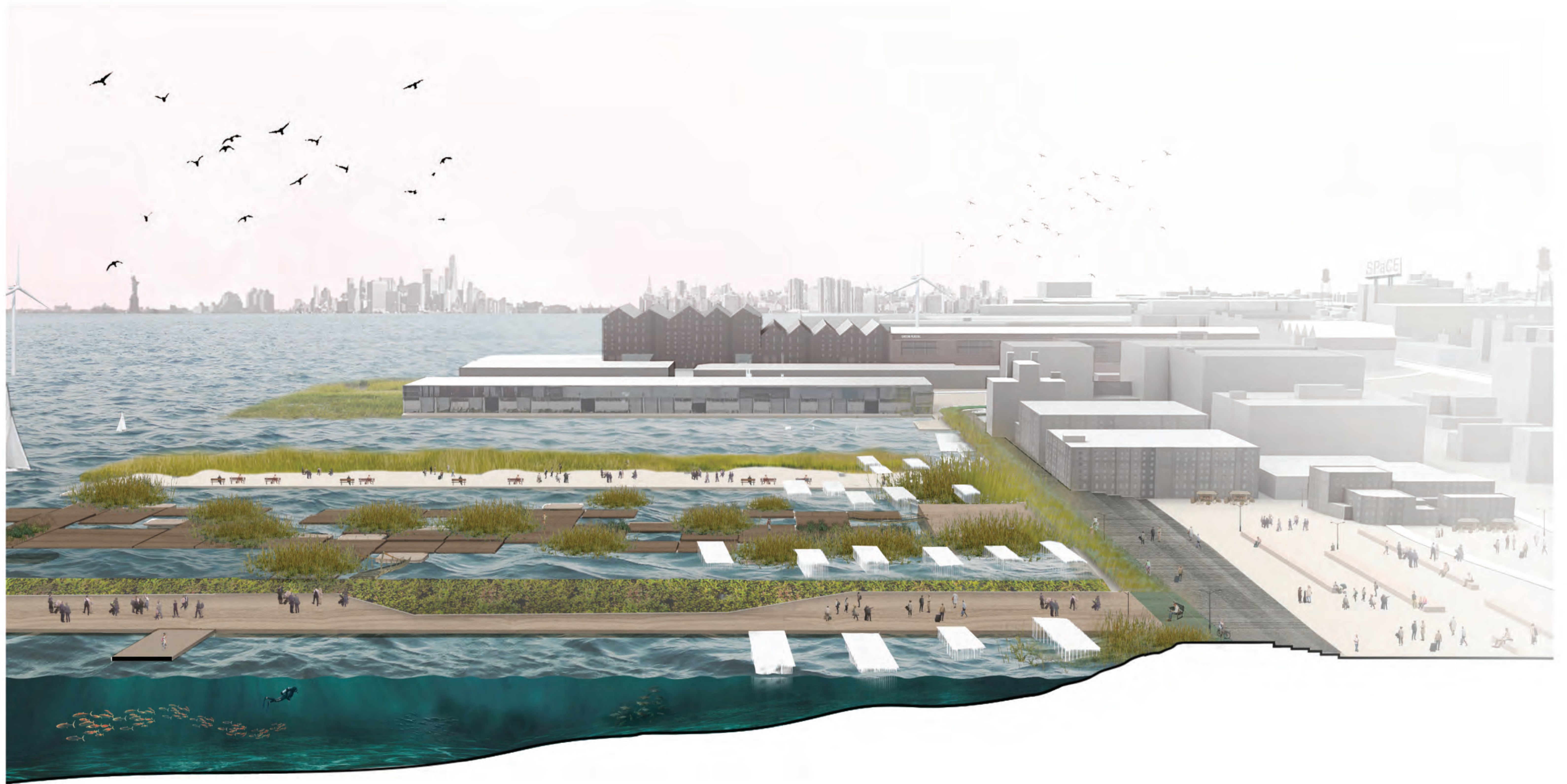
Up-Garden



RESILIENT IBZ WITH LIVING SHORELINES

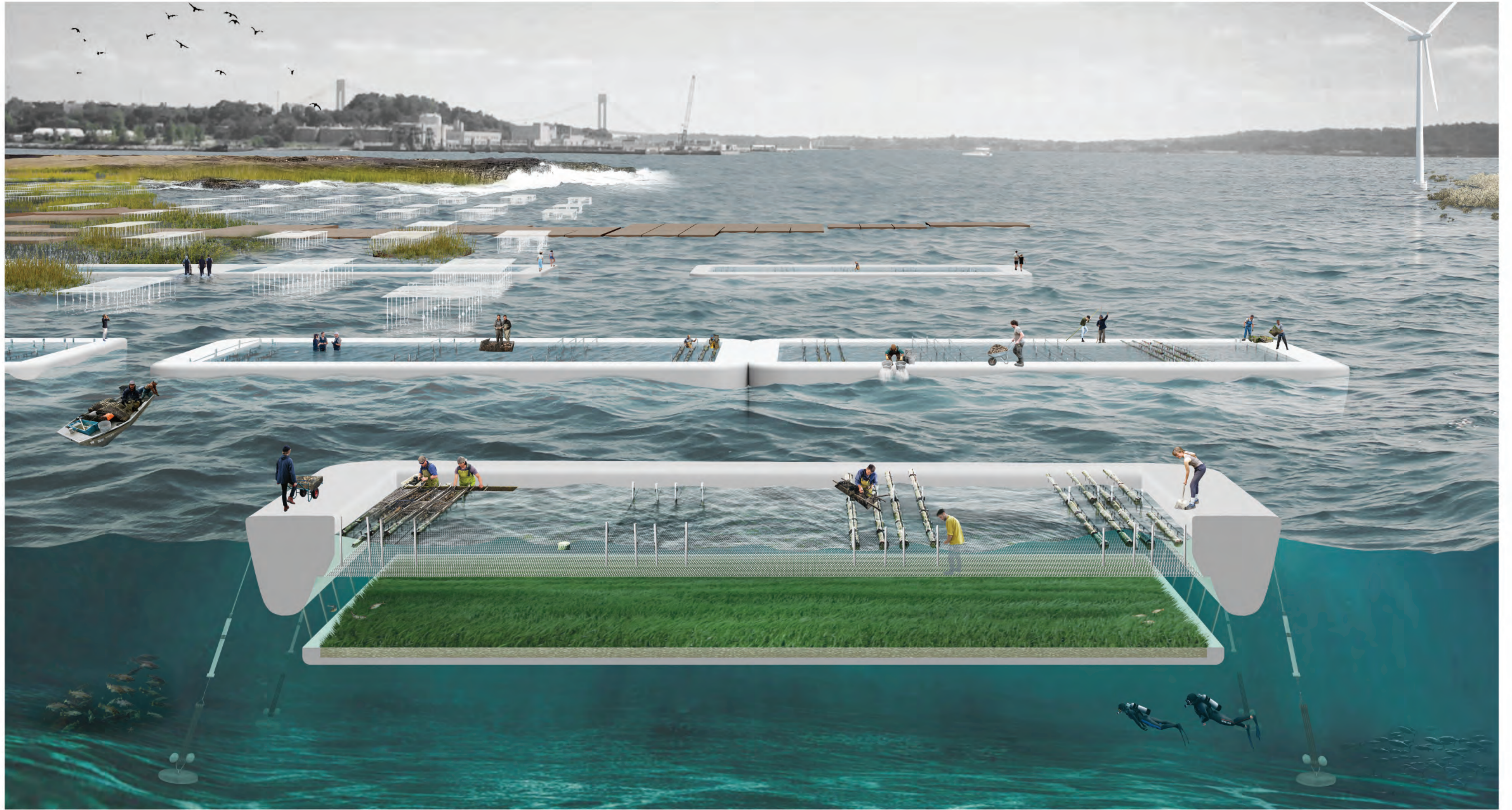












Oyster Reef Nursery Ecology



Living Shorelines A Natural Barrier



FA2019
SOCIAL CARBON
Hudson valley Initiative
Kinston, New York, USA

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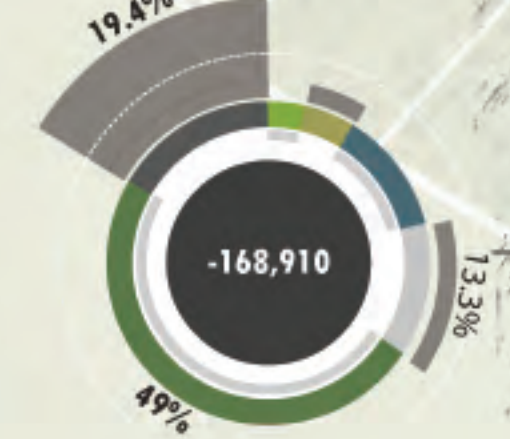
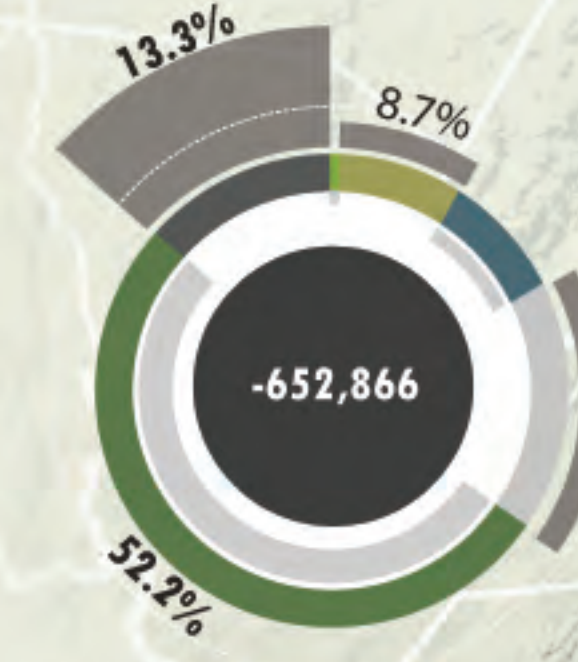
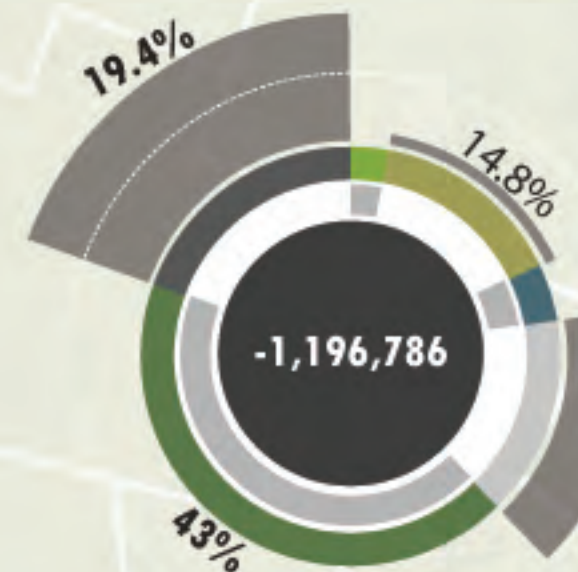
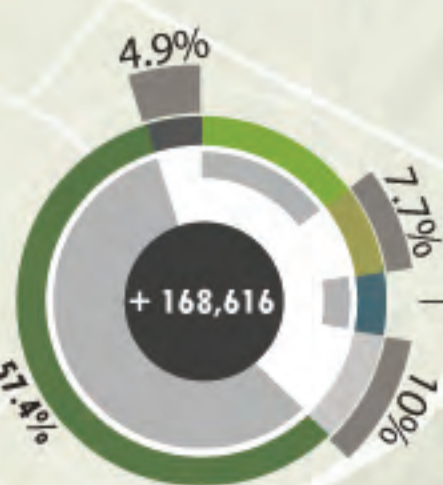
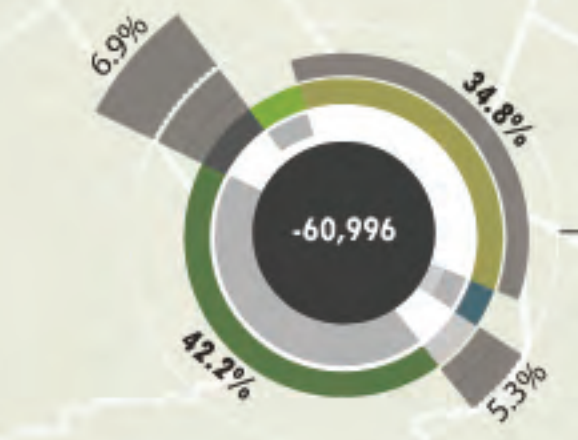
As it stands, the Green New Deal is lacking the practical tools to implement the grand goals the document puts forth.

There are plenty of innovative solutions to the climate crisis, but the largest flaw in the system is understanding how these solutions hit the ground, and how to prevent the inequalities that the original New Deal inflicted on many communities.

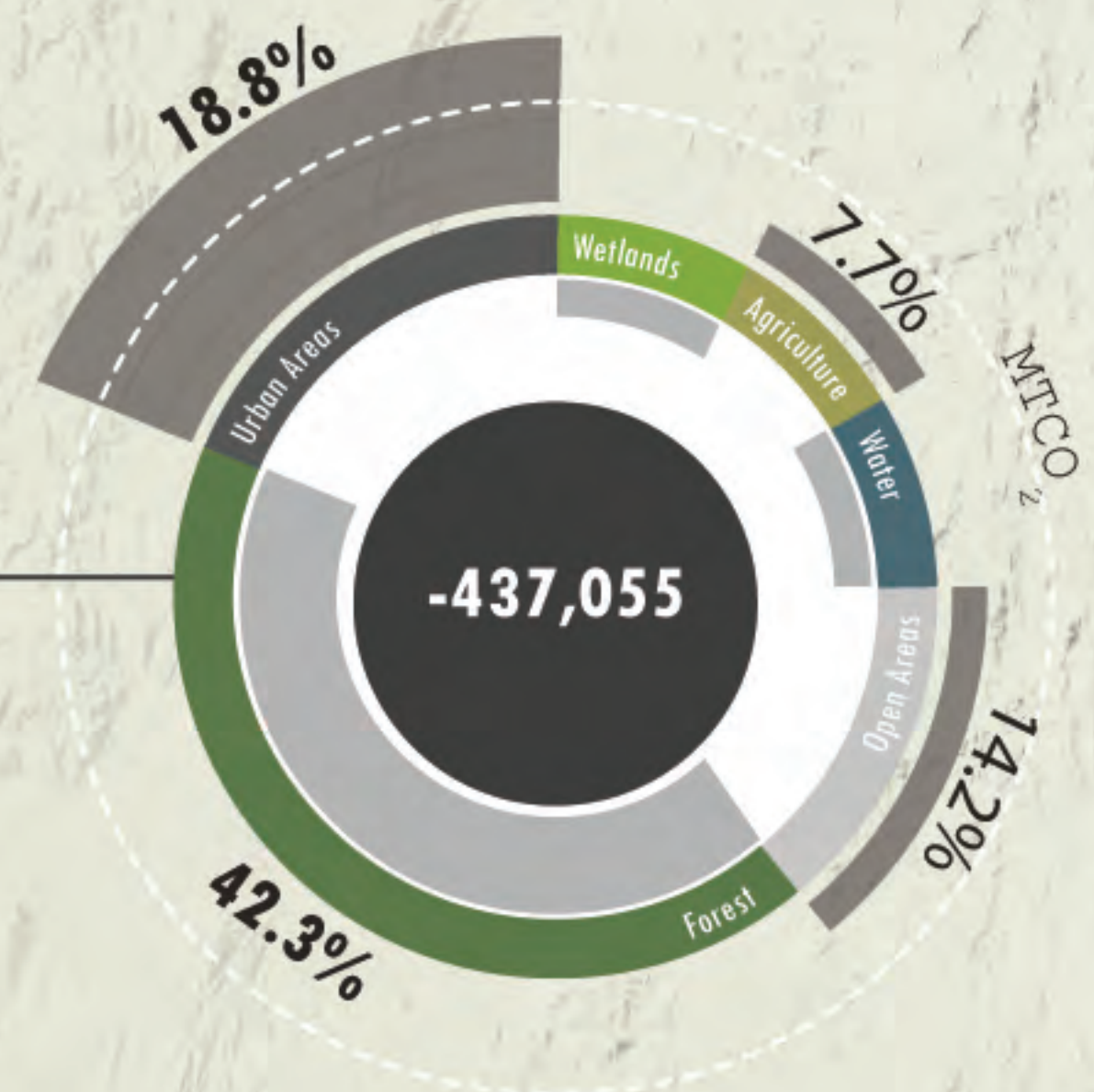
In order to visualize the complexities of the current system —where social needs and carbon emissions coexist—, we analyze the Hudson Valley on a transect that repeats along the region.

We apply design thinking through a coordinated approach of varied projects that prioritize both people's and environmental needs in Kingston, as a tool to rethinking the Green New Deal as a middle ground —top down/ grassroots— initiative that motivates partnerships across disciplines and existing boundaries.

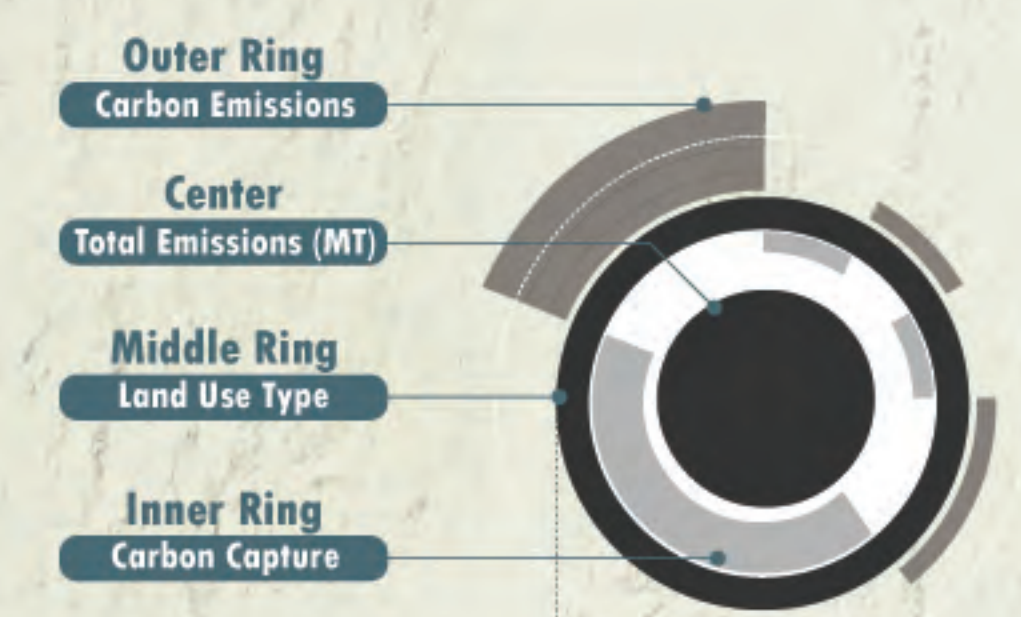
LAND USE PATTERNS AND CARBON EMISSIONS IN THE HUDSON VALLEY



Kingston Carbon Exchange

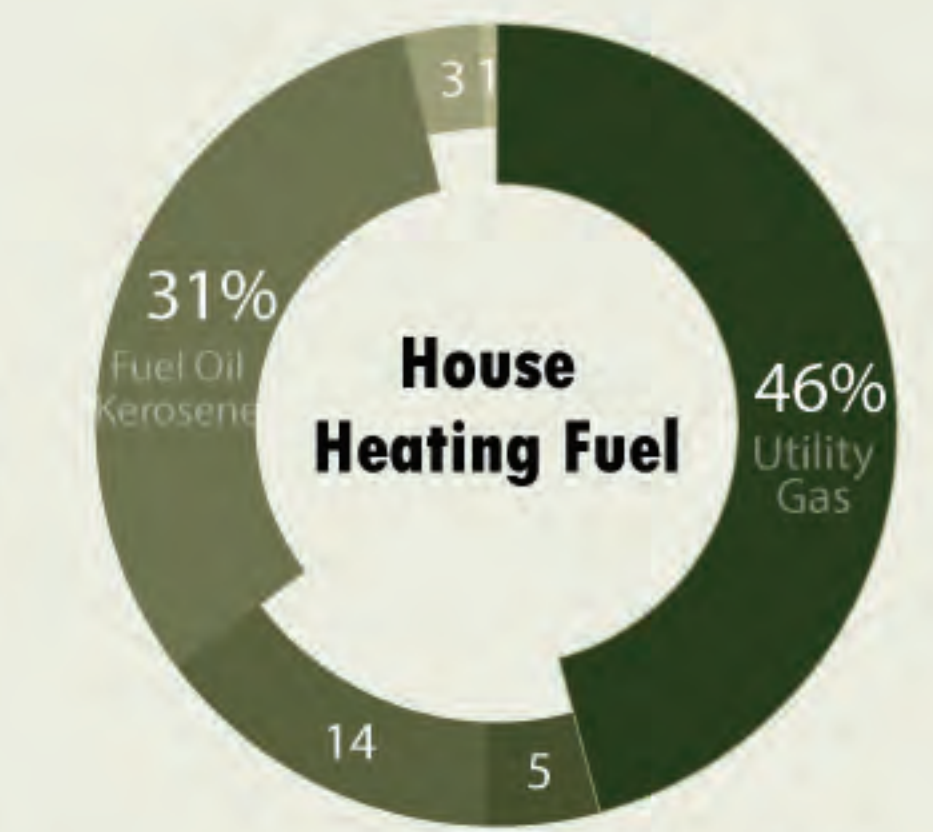
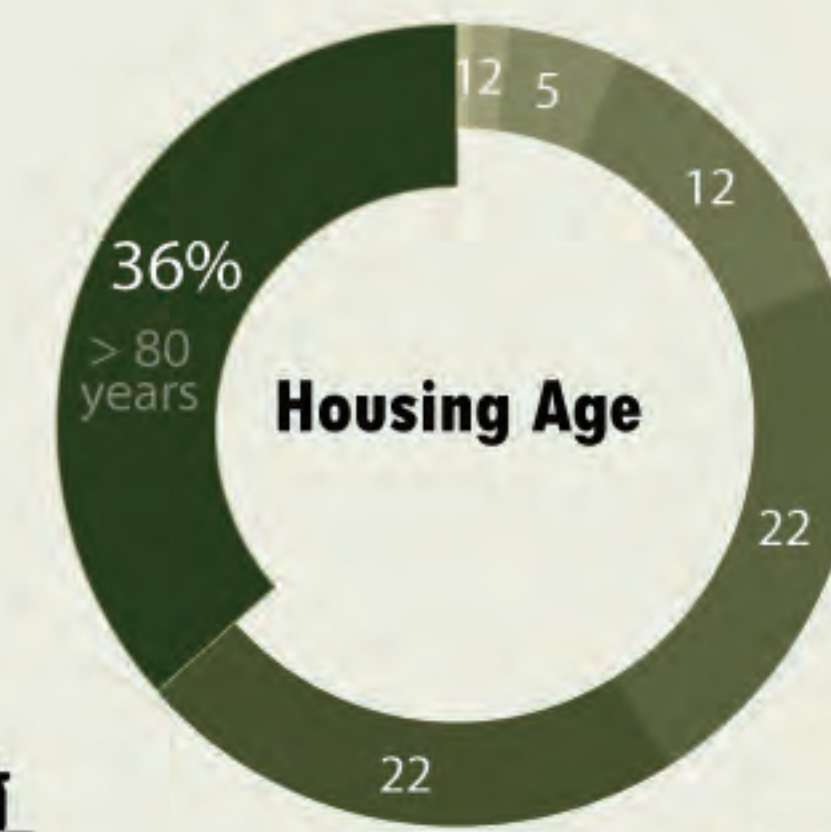
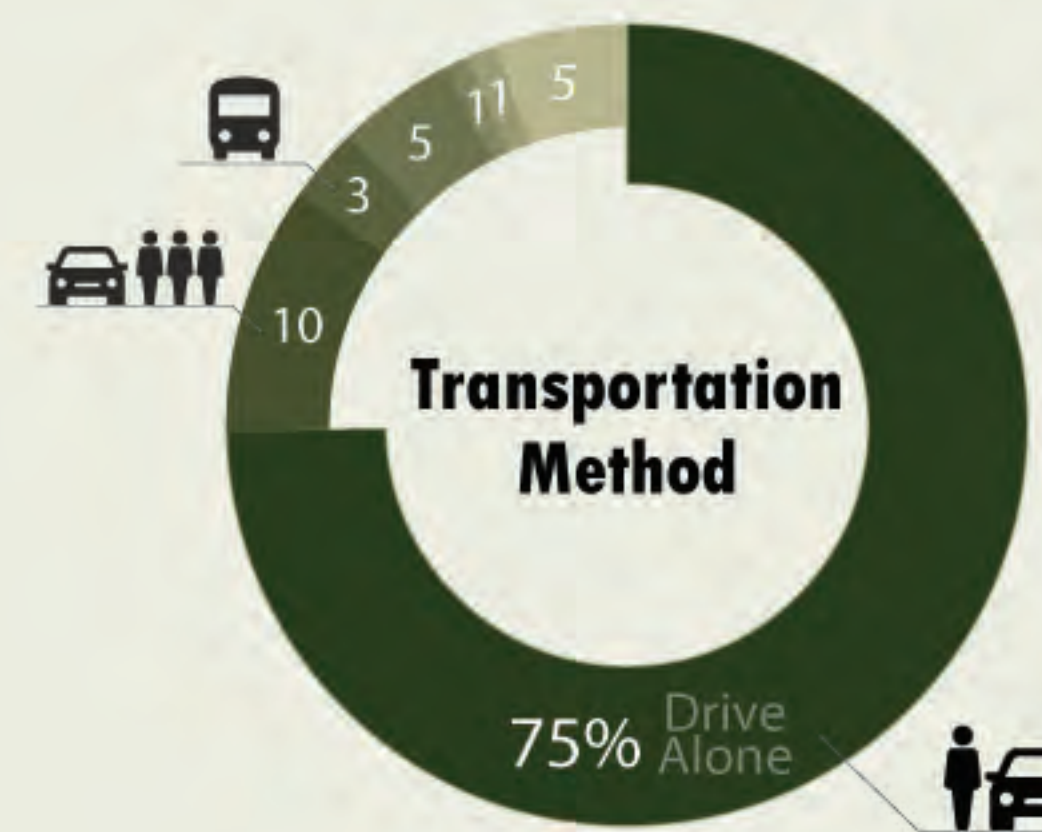
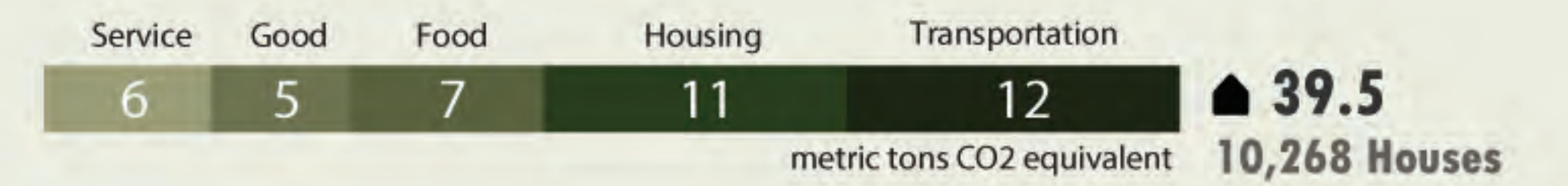
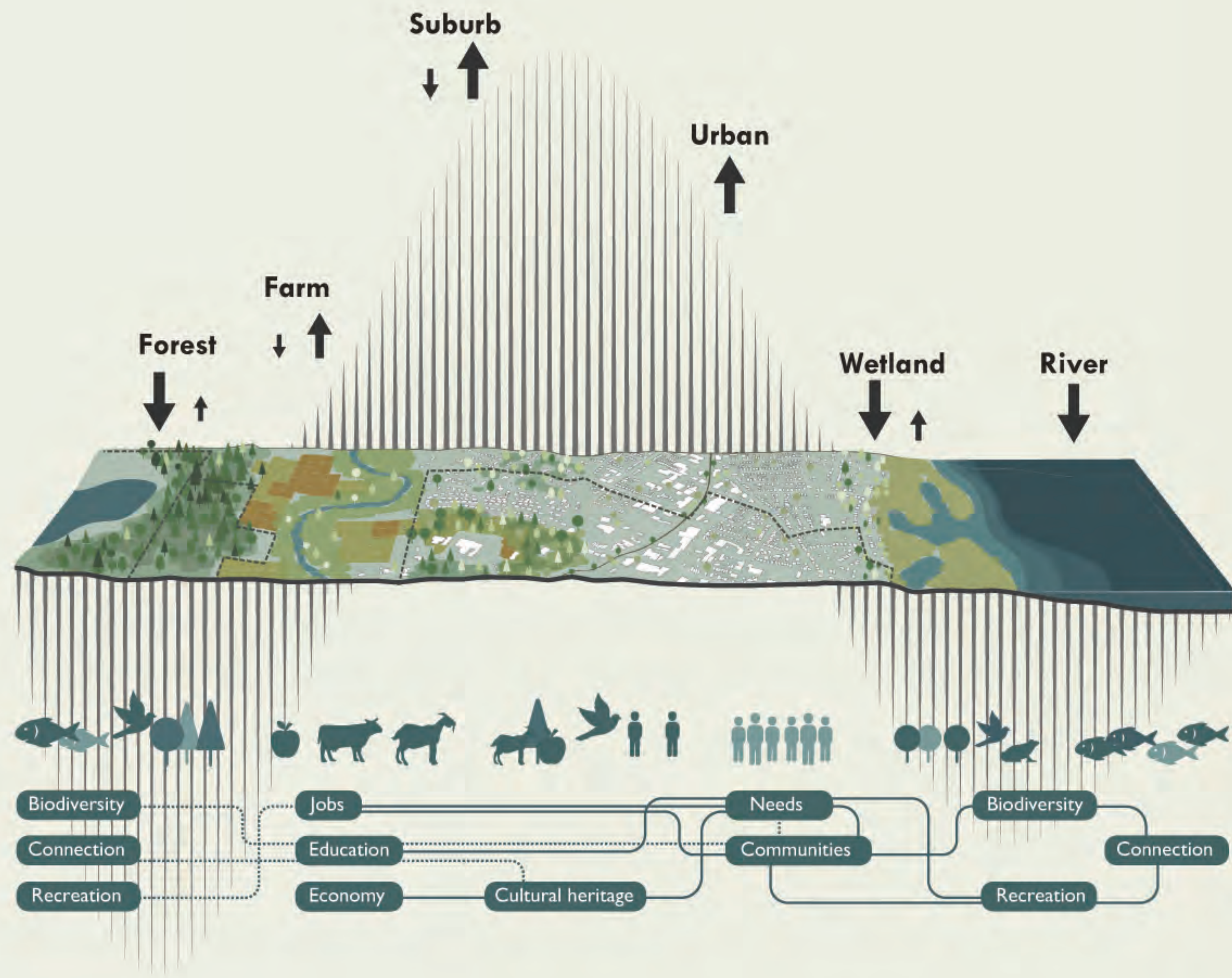


How to read this chart?



- △ Carbon Negative
- Carbon Positive
- Forest
- Wetland
- Agricultural Land
- Urban Area
- Open Water
- Open Areas

CARBON EMISSION at KINGSTON



- <5 years
- 5 years
- 10 years
- 20 years
- 40 years
- 60 years
- 80 years
- Utility gas
- Bottled, tank, LP gas
- Electricity
- Fuel oil, kerosene
- Coal
- All other fuels
- No fuel used



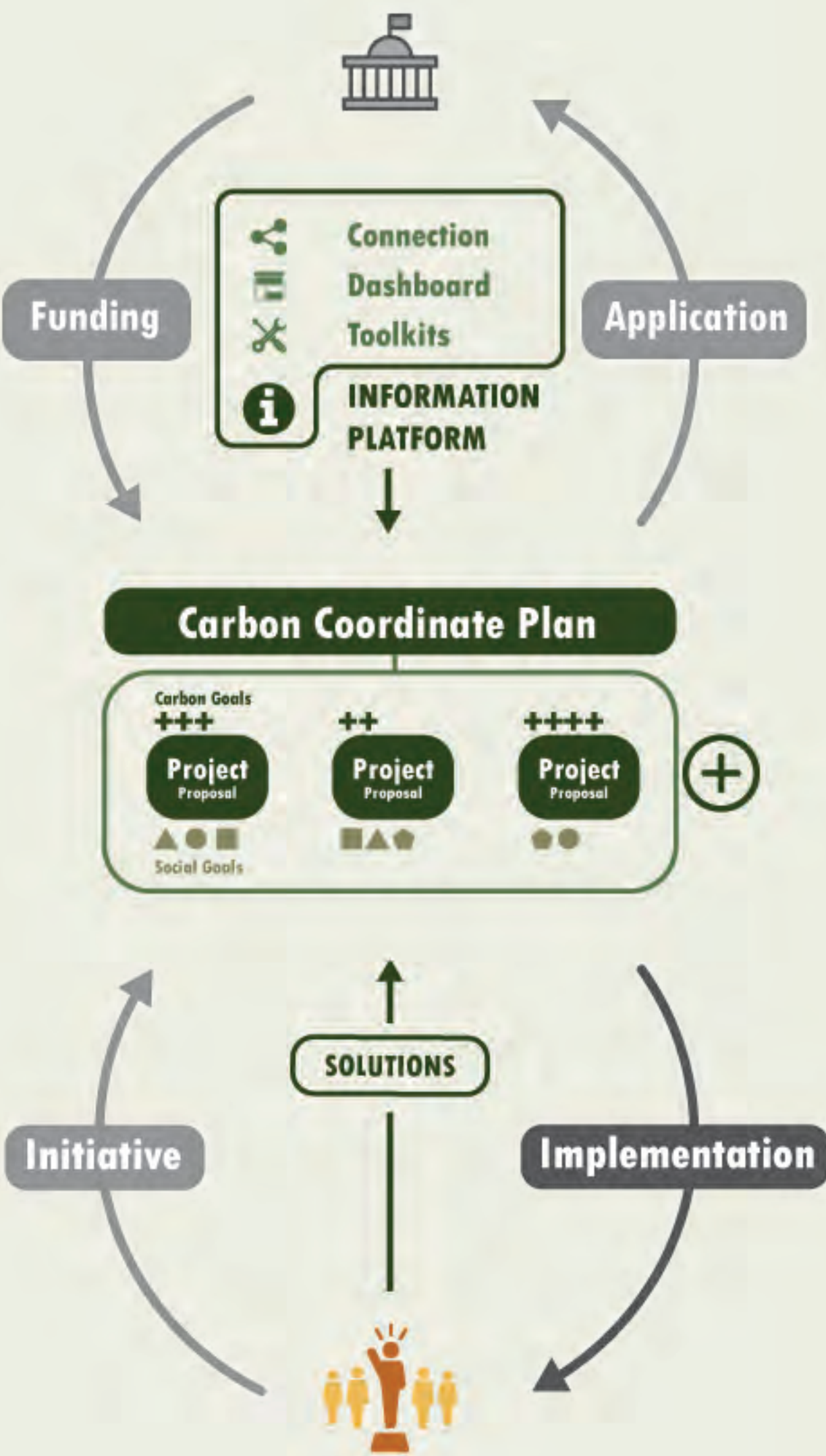
1 Net Zero Districts



2 Collaboration across Political Boundaries



3 Community Led Initiatives



TRANSPORTATION

Rose
Bike Advocate

Elizabeth
Kingston Resident

Bike Accessibility

Make bus possible in Kingston

HOUSING

Susan
Kingston Resident

Nanya
NYC Commuter

Lack of Affordable Housing!

I want to use my VACANT LOTS!

Newly Here Can't Find Contractors!

Ita
Vacant Land Owner

ENERGY

Jopheth
Kingston Resident

Housing Retrofit Guideline

EDUCATION

Peter
Land Owner + Farmer

Share My Knowledge About The Land But How?

After School Program & Volunteers!

"The younger generation needs help to connect with the nature in their backyard."

Educators / Concerned Parents

Stakeholders and Social Needs

Commercial & Cultural Center

Farmers Market
Restaurants
Shopping Mall
Museums
Schools

Green Line

M TREE NURSERY

FOREST

M SUSTAINABLE AGRICULTURE

AGRICULTURE BELT

COMMUNITY CENTER

S A X VULNERABILITY

VULNERABLE COMMUNITY

ADMINISTRATIVE CENTER

M SYSTEMATIC CONNECTION

S AREA COMMUNITY HUB

X S BLOCK SCALE INTERVENTION

Vulnerable Area

S V I Social Vulnerability Index

Aging Housing

36% >yrs

S X S NEIGHBORHOOD REGENERATION

Private Owner

Pilot Projects

Vacant Lots

Extend Green Line
Main Street & Vulnerable Area

S RECHARGE HUB

Municipality

VULNERABILITY

VULNERABILITY

M LINEAR PARK & TRAIL

CURRENT GREEN LINE

GREEN LINE TRAIL

Abandoned Cement Quarry
Scenic Hudson

Wild Species Habitats
Lakes
Woodlands
Wetland waterfront

M WETLAND GENERATOR

Community Base Organization

WETLAND PARKS

S **NET ZERO AFFORDABLE HOUSING** 



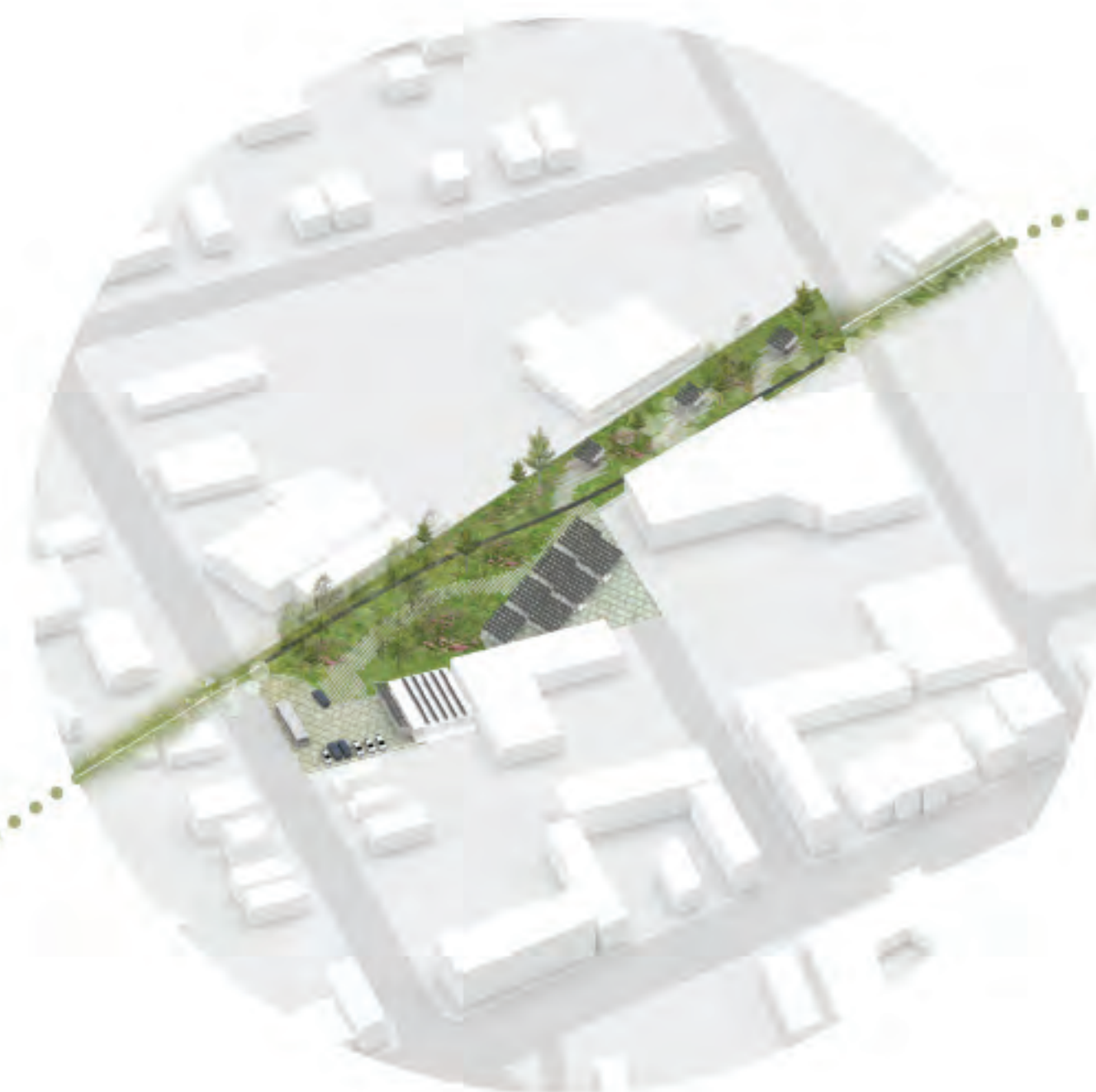
“...providing all people of the United States with affordable, safe, and adequate housing”

S XS **NEIGHBORHOOD REGENERATION** 



“... to create millions of good, high-wage jobs”
“... upgrading all existing buildings”

S **RECHARGE HUB**  



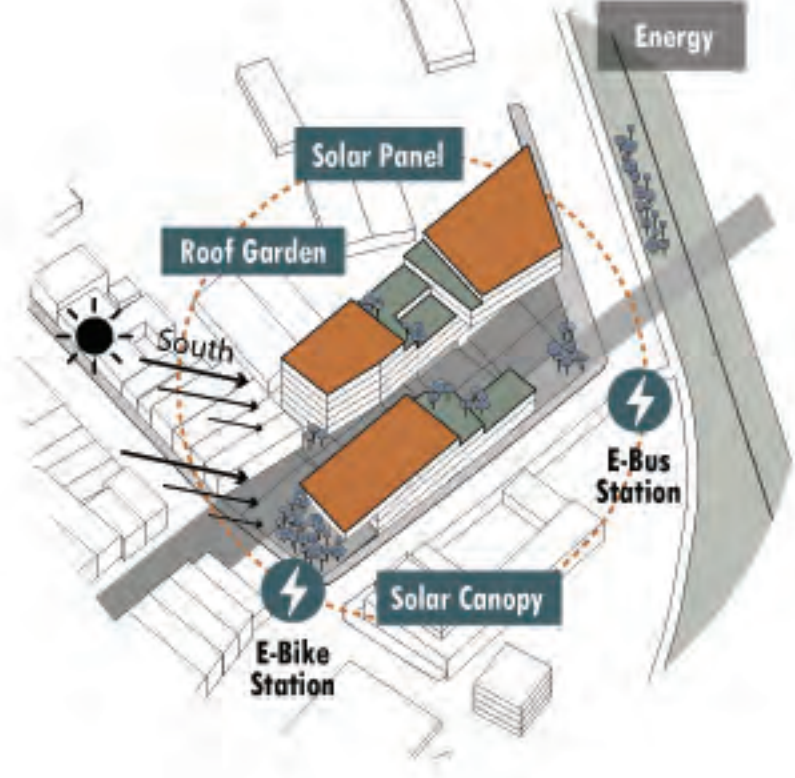
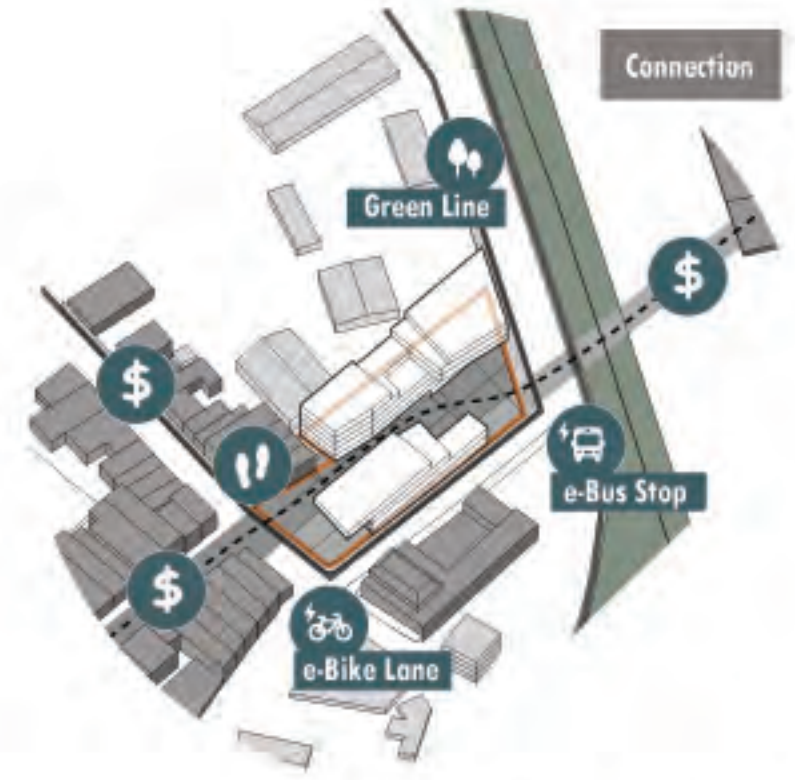
“... Overhauling transportation systems in the United States to remove pollution and greenhouse gas emissions from the transportation sector”

M **WETLAND GENERATOR**   

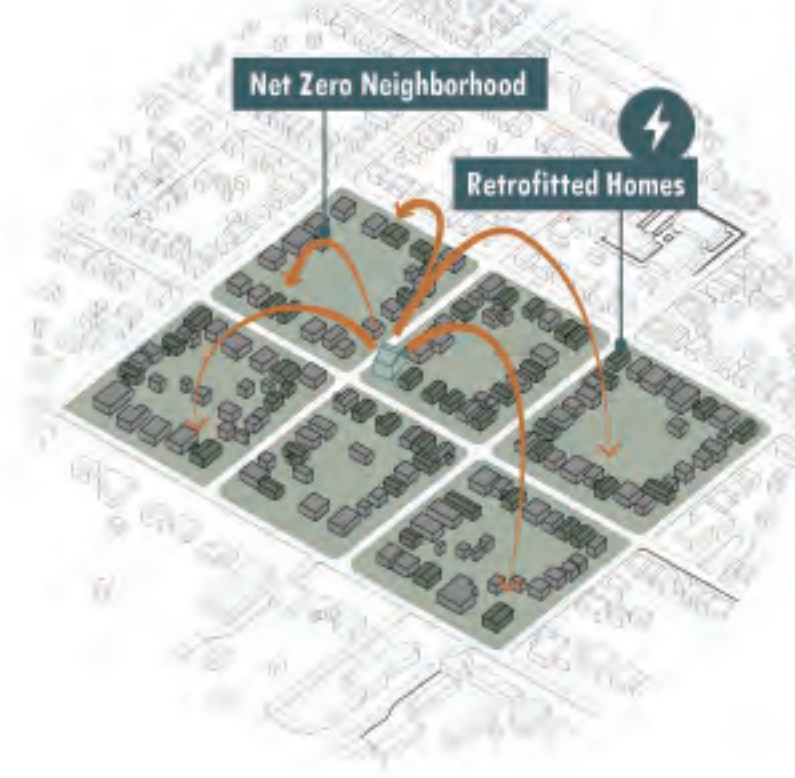
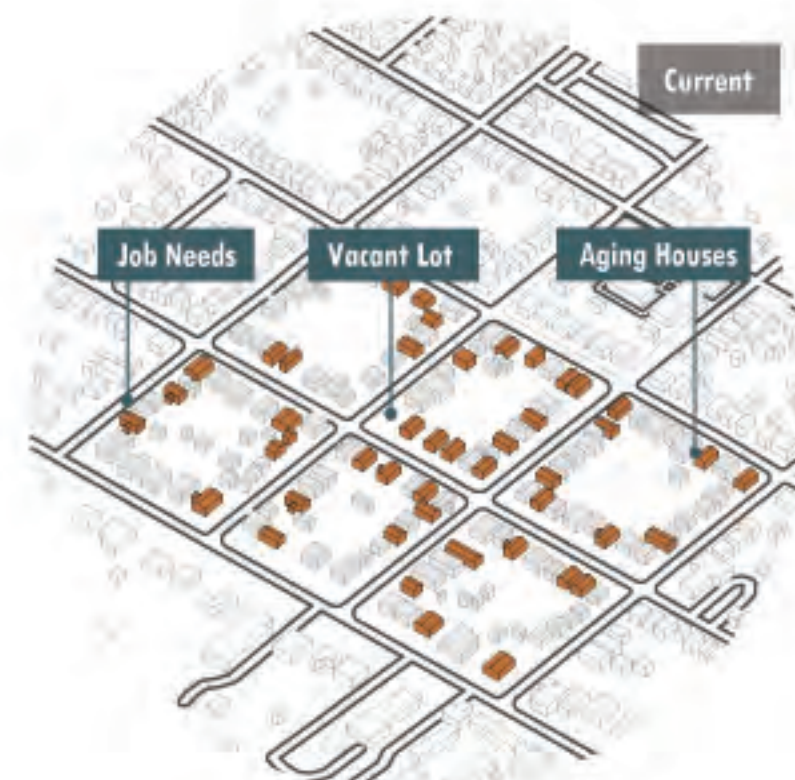


“... meet 100 percent of the power demand through clean, renewable and zero emission energy sources”
“... removing greenhouse gases from the atmosphere by restoring natural ecosystems...”

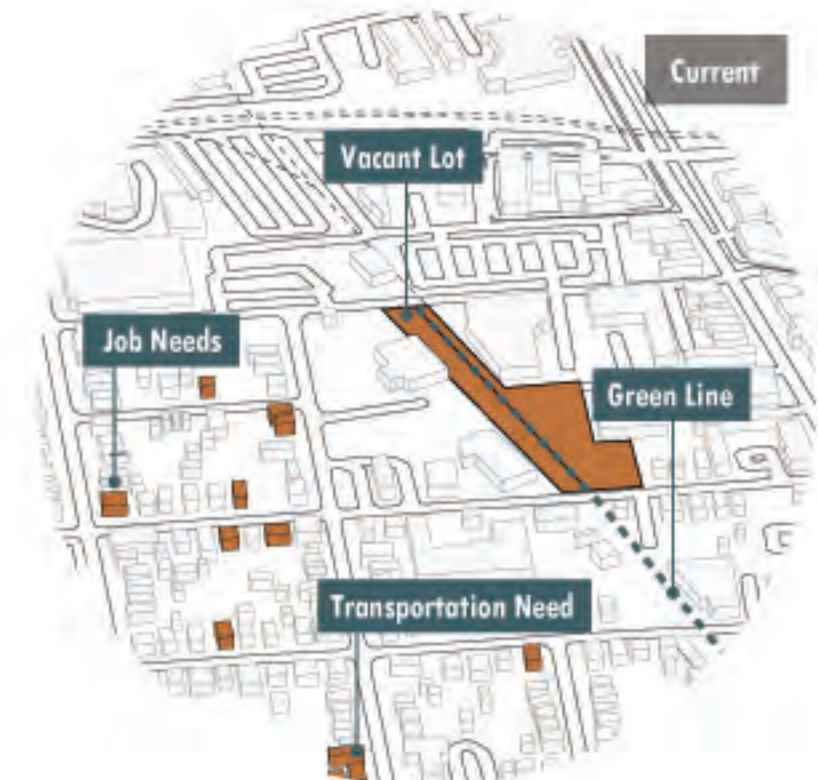
S **NET ZERO AFFORDABLE HOUSING**



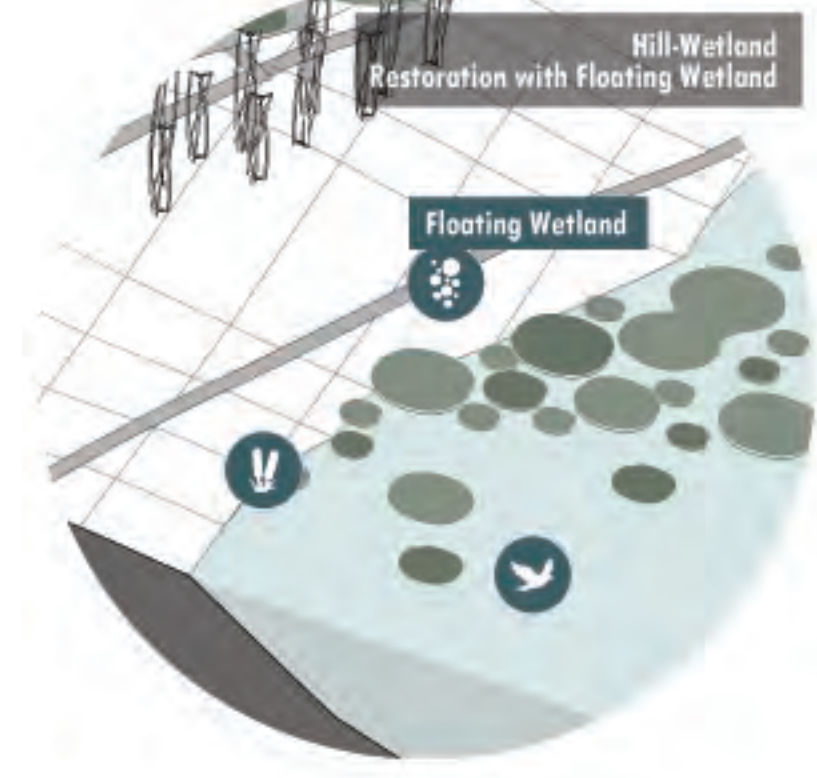
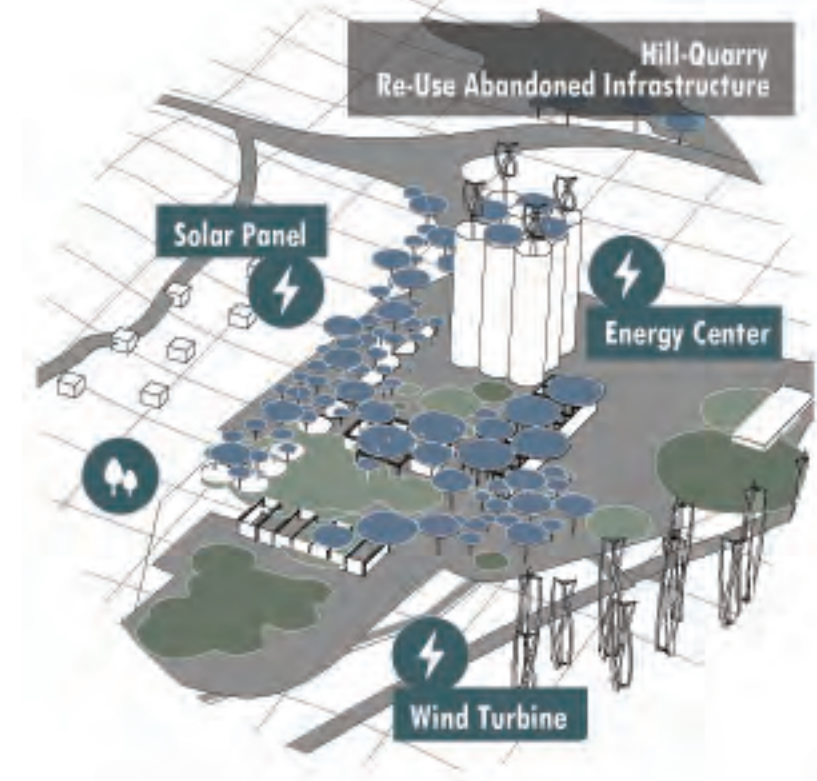
S XS **NEIGHBORHOOD REGENERATION**



S **RECHARGE HUB**



M **WETLAND GENERATOR**





Net Zero Affordable Housing



Neighborhood Regeneration



Connection to Nature

Community Greenspace

Community Marketplace

Electric Transportation Access



Wetland Generator



Present



2030 Social Carbon Scenario



SP2020
AKAKI LOWLAND TRUST
Rift valley Initiative
Akaki, Addis Ababa, Ethiopia

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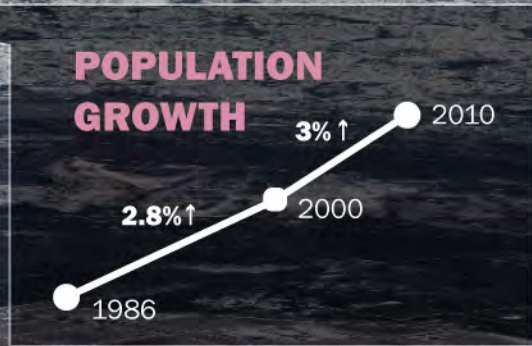
Professor
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Geeta Mehta
Thad Pawlowski
Julia Watson
Adriana Chavez
Dilip Da Cunha
Lee Altman
Fitse Gelaye

Our project challenges the existing master plan which is based only on land use, neglecting ecology and hydrological systems.

Our counter proposal to the masterplan is to consider Akaki as an area of high, middle and low grounds, and propose appropriate uses for these topographical conditions that can lead to sustainable development and flood management.

Improving upon the masterplan induced problematic conditions at present, we propose an integrated system which consists of: cleansing and purifying wetland network for wastewater and stream pollution, flexible productive network for agriculture and recreational purposes and resilient and inclusive urban network for both existing and new housing typologies.

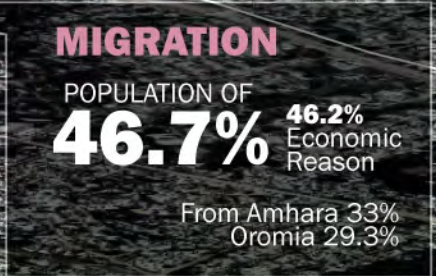
Addis Ababa



FOOD INSECURITY
WATER SCARCITY

Urban Expansion

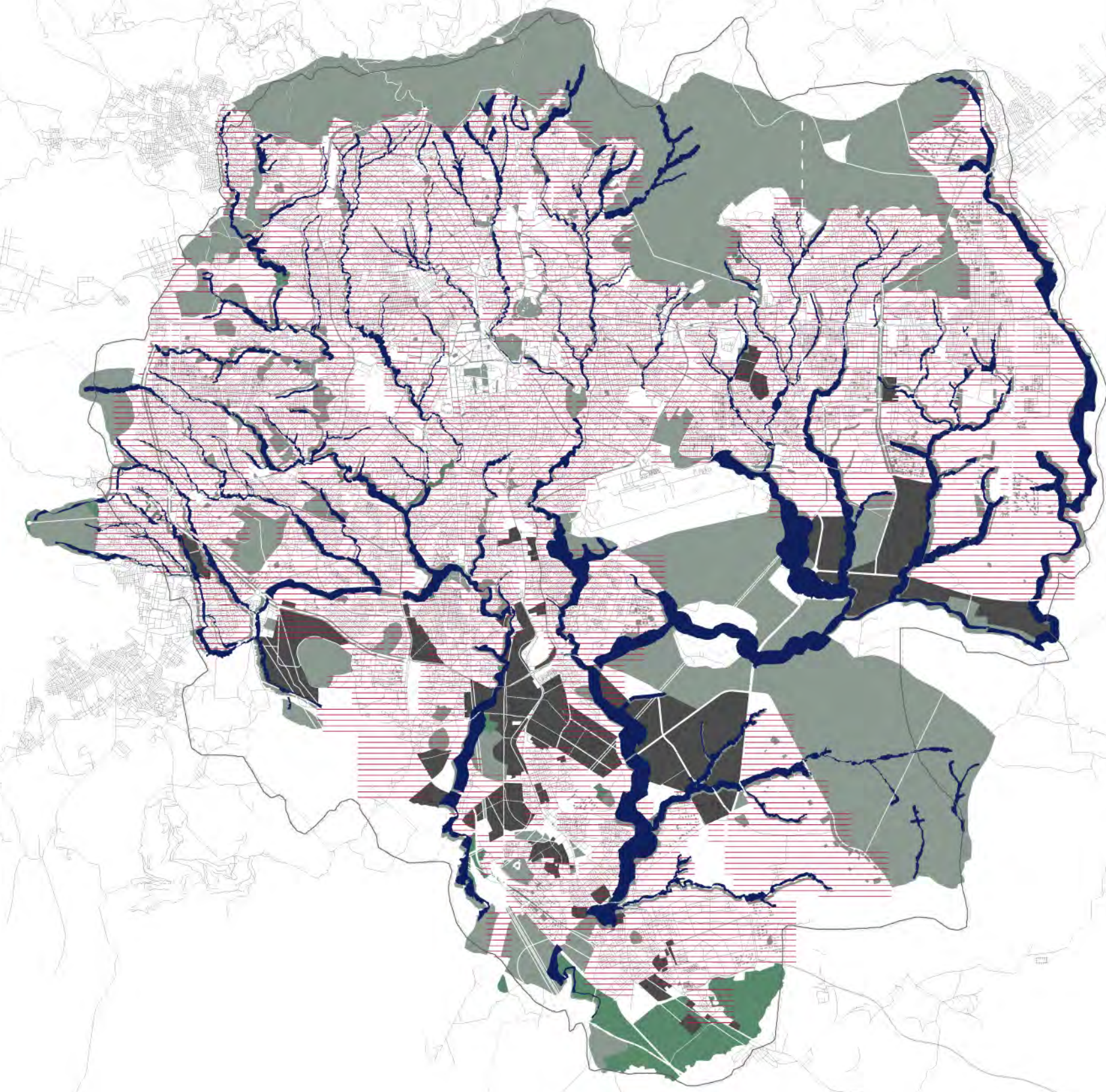
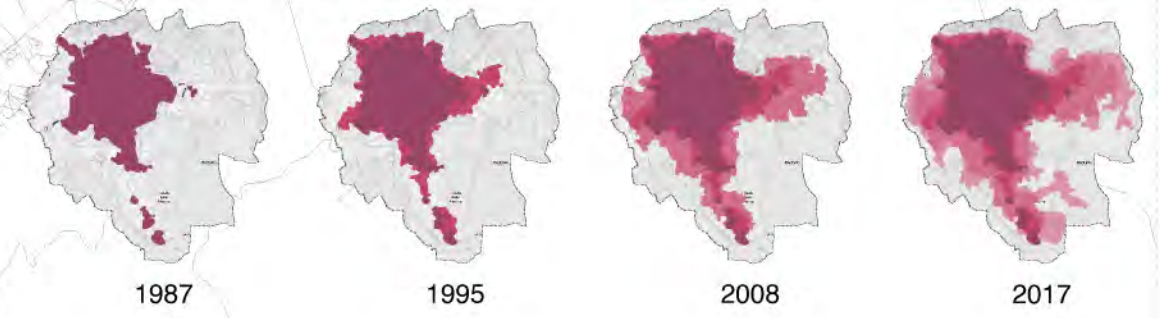
Akaki



Oromia

CHALLENGES ADDIS ABABA, ETHIOPIA

Urban Expansion/ Loss of Agriculture



- Industry
- ▨ Residential
- Green Space
- Urban Agriculture

1 mi

HIGH
Mount Entoto

MIDDLE
Inner Addis Ababa

LOW
Akaki

Kechene
Steep
Informal Housing

Piazza
Commercial
Low-rise Buildings

Ambassador
City Center
High-rise Buildings

Peacock Park
Industry
Agriculture/Park

DESIGN TRIGGER
Formation of the Akaki Regional Trust, an entity to manage the multi-scaler water flows and networks



Food Insecurity

Deforestation

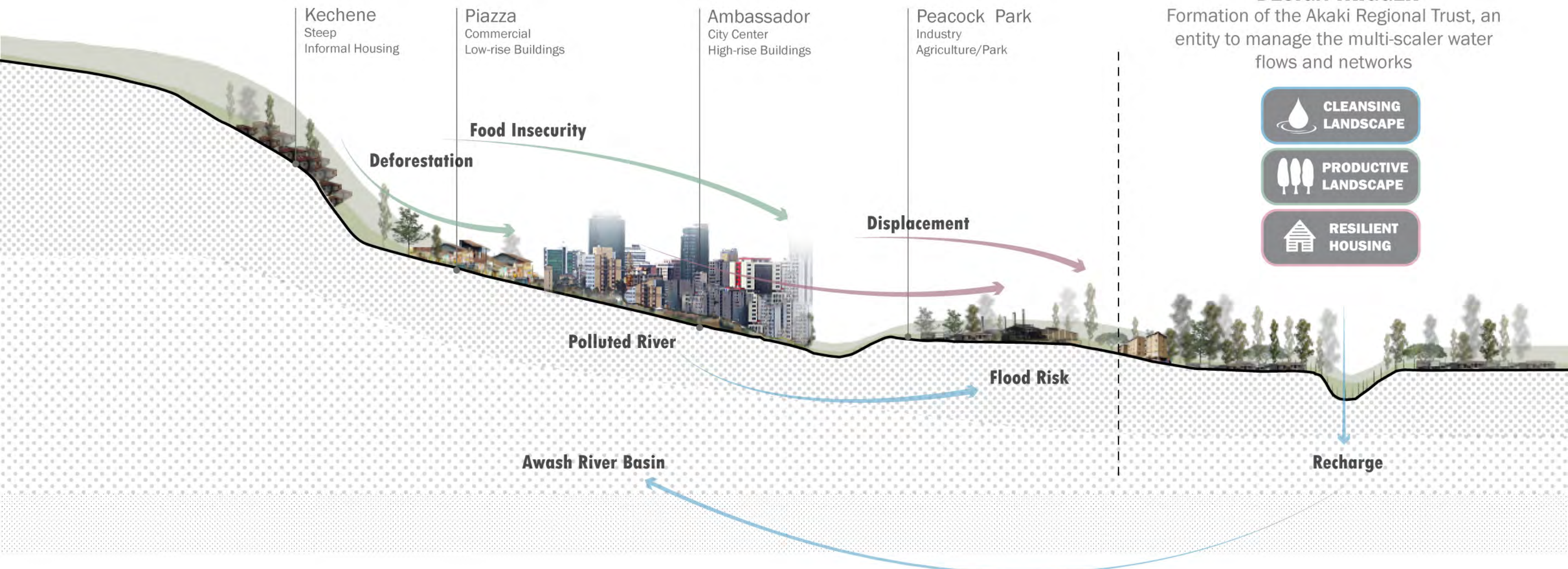
Displacement

Polluted River

Flood Risk

Awash River Basin

Recharge



We were **pushed out** from the city center. We **lost our job**.

JOBS



We **cannot cross the river** to get to the Akaki market in wet season because of the **Flooding**.

FOOD

We are not affected by the flood, thanks to the **agricultural buffer** next to the river.

AGRICULTURE



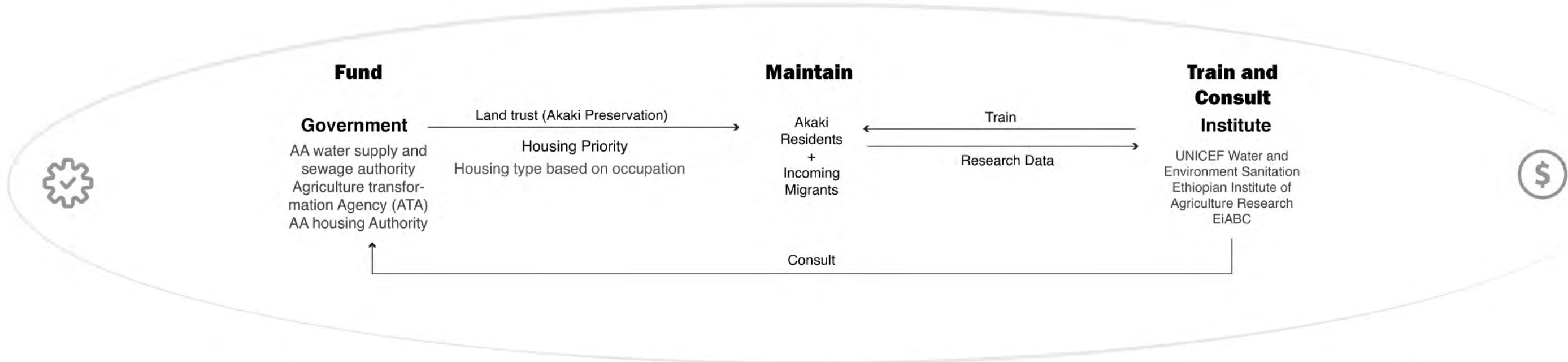
In wet season, **agriculture production stops**. People move out to **safe buildings** in the high-ground.

Flooding is getting **worse**, because of the **new highway construction** next to the river.

REDUCE FLOOD RISK



AKAKI REGIONAL TRUST CONSORTIUM



Housing



Builders



Wastewater Treatment



Wetlanders



Produce



Farmers



Recyclable Material



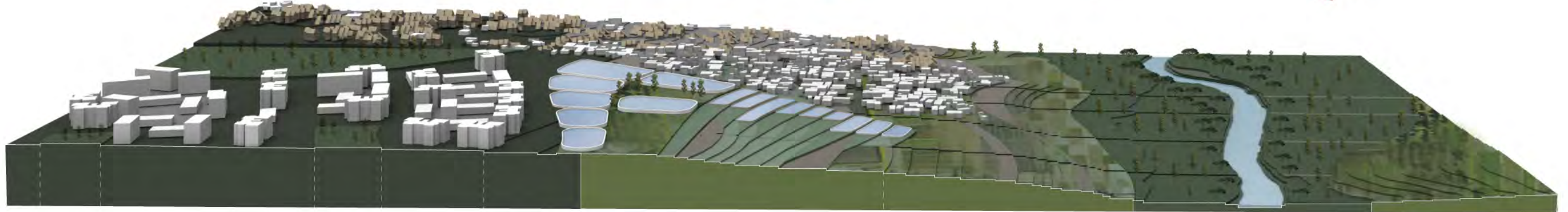
River Kolario Recyclers

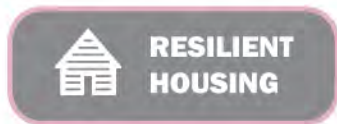


Building Material

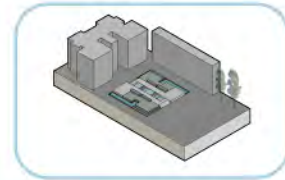


Forester

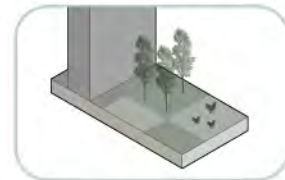




HIGH



Community Wetland

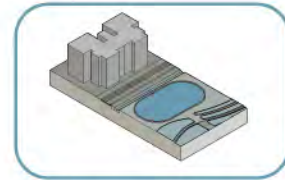


Community Garden

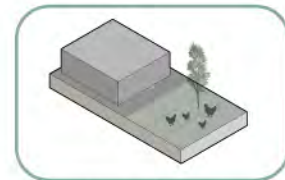


Civic

MIDDLE



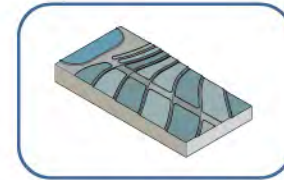
Constructed Wetland



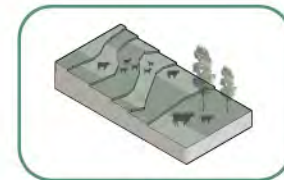
House Garden



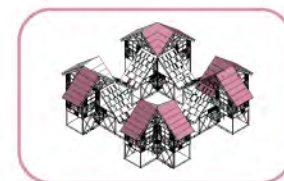
Production



Teffaced Bio-Purification

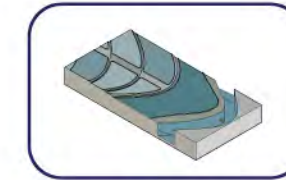


Terracing Agriculture

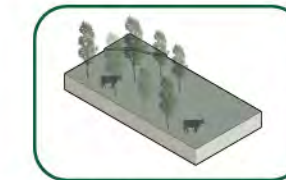


Production

LOW



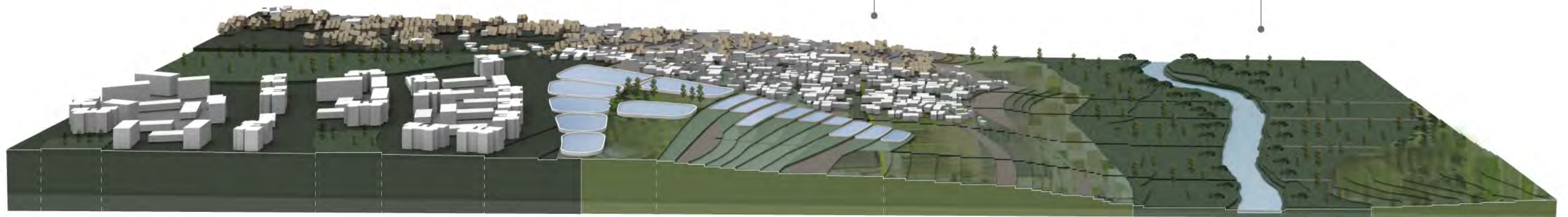
Terraced Aerated Lagoon



Regional Forest



Ecology



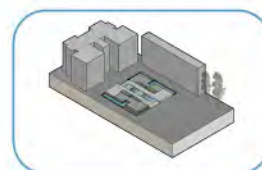
HIGH

Harvest / Re-use

**A. Community Wetland
CONDOMINIUM**



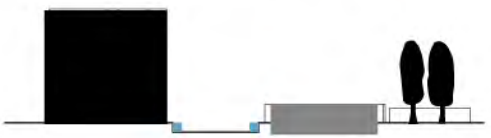
Community Wetland Re-use cistern for condominiums



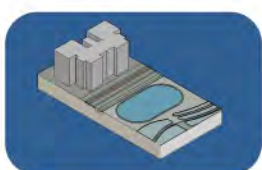
MIDDLE

Cleanse / Recharge / Irrigate

**B. Constructed Wetland
WASTEWATER TREATMENT**



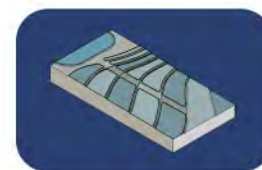
Bioswale paths Constructed wetland



**C. Terraced Bio-purification
TREATMENT / STORMWATER MANAGEMENT**



Filtration + Deposition Sediment Removal Nutrient Removal



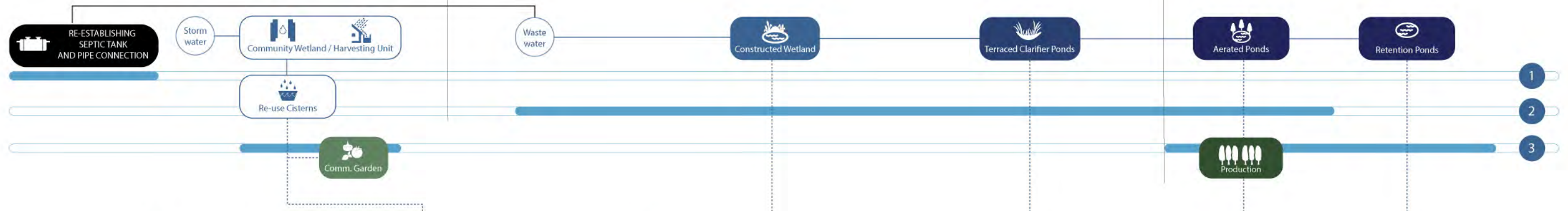
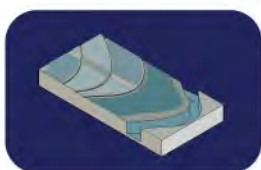
LOW

Cleanse / Filter

D. Aeration Ponds



Aeration Ponds Detention Ponds



**PRODUCTIVE LANDSCAPE
PRODUCE AND RECHARGE**

HIGH

Food/Jobs

**A. Community Garden
CONDOMINIUM**



Community Center Community Garden Poplar Tree Nursery



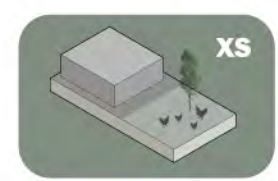
MIDDLE

Production

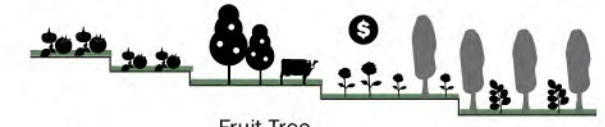
**B. House Garden
ORIGINAL SETTLEMENT**



House Garden



**C. Terracing Farms
AGRICULTURE /AGROFORESTRY/**



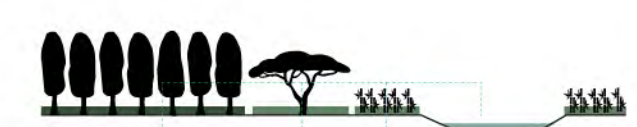
Vegetables Fruit Tree Dairy Animals Flowers Medicinal Plants



LOW

BufferZone

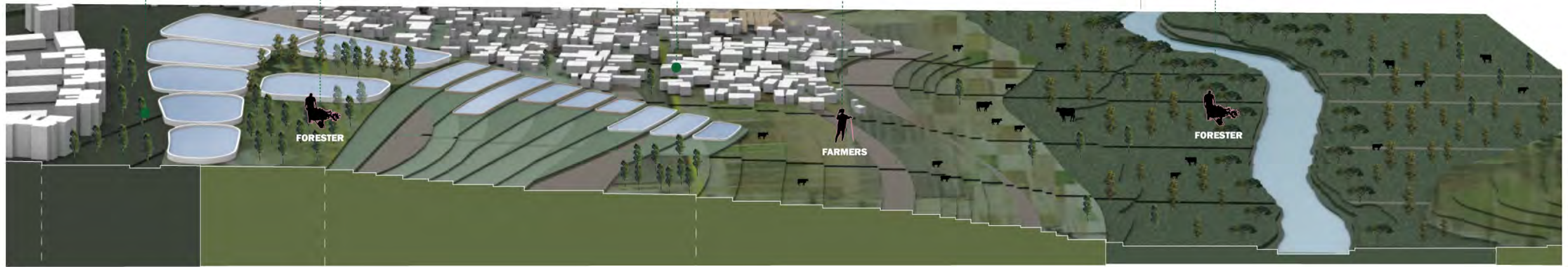
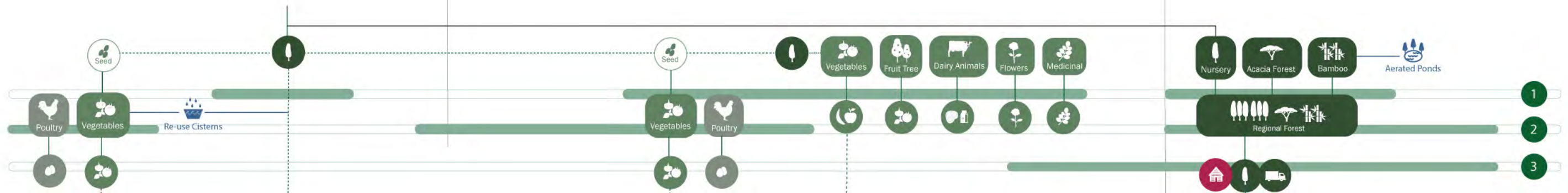
**D. Regional Forest
FORESTRY**



Poplar Forest Acacia Forest Bamboo



- Poplar**
Growing Fast
Alternative Wastewater Treatment
Habitats for Animals
Revenue
- Acacia**
Highly Invasive
Restore Degraded Lands
Tolerates Muddy Soil
Sustaining Forest Productivity
Stabilize the soil threatened by erosion





CONSTRUCTED WETLAND

CONDOMINIUM RESIDENTS + ORIGINAL SETTLERS

WETLAND MAINTENANCE
WETLANDER

TERRACED
BI O-PURIFICATION

AERATION
POND

BUILDER
WETLAND CONSTRUCTION





Resilient Housing
High ground Typology



Resilient Housing
Middle ground Typology



Resilient Housing
Low ground Typology



High Middle Low ground
Scenario