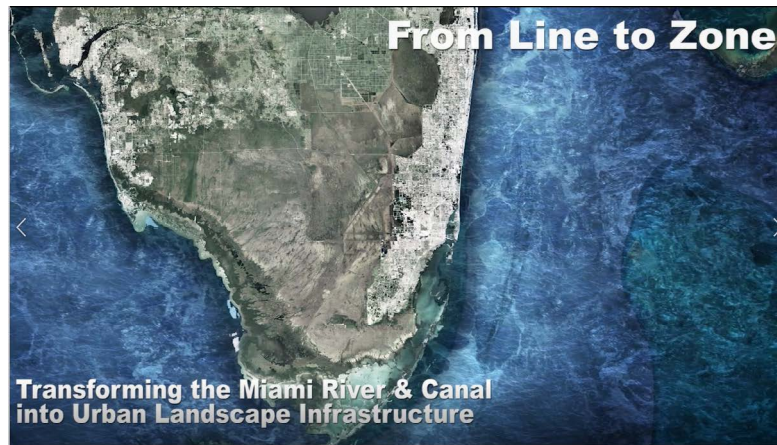


From Line to Zone:

Transforming the Miami River & Canal into Urban Landscape Infrastructure

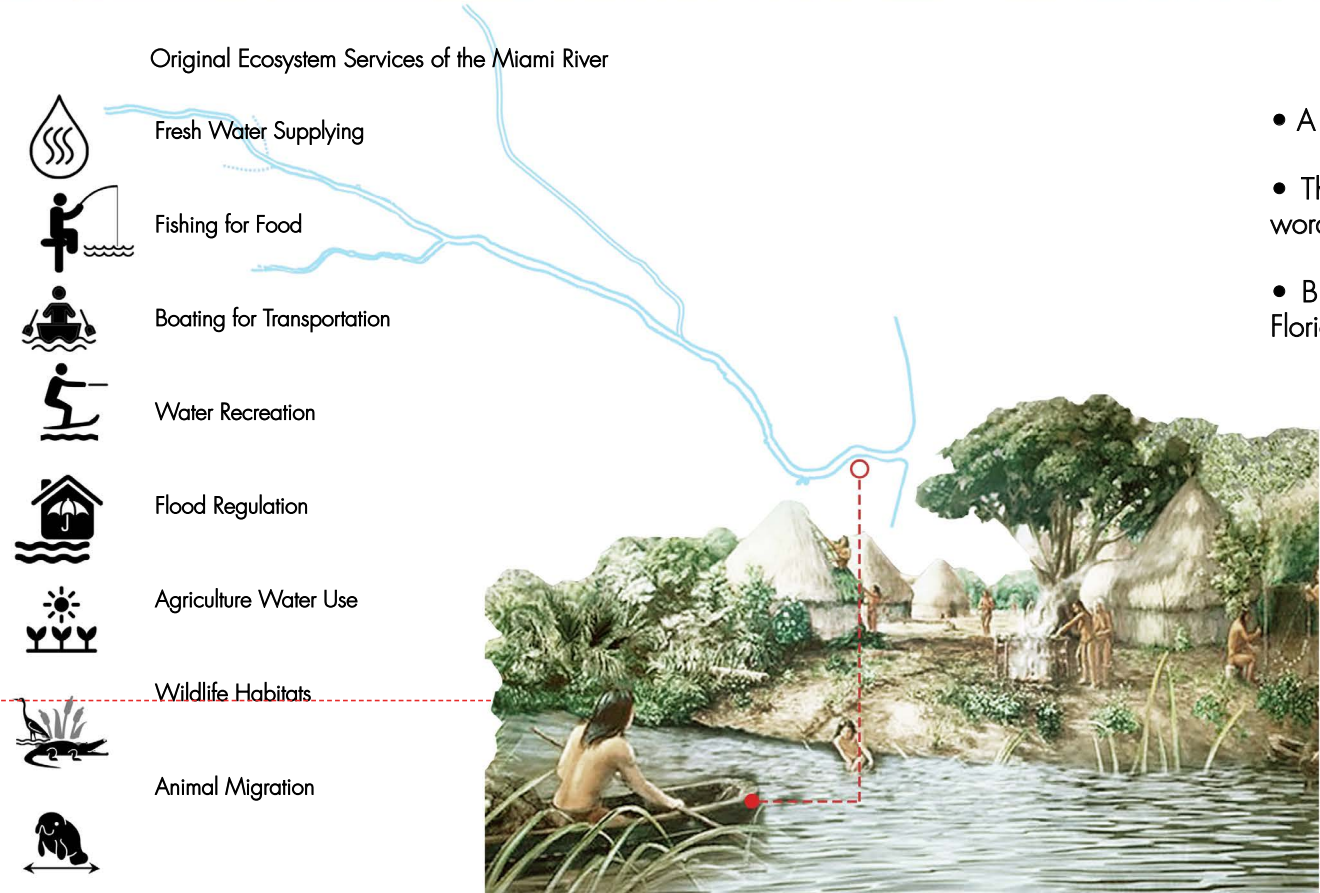
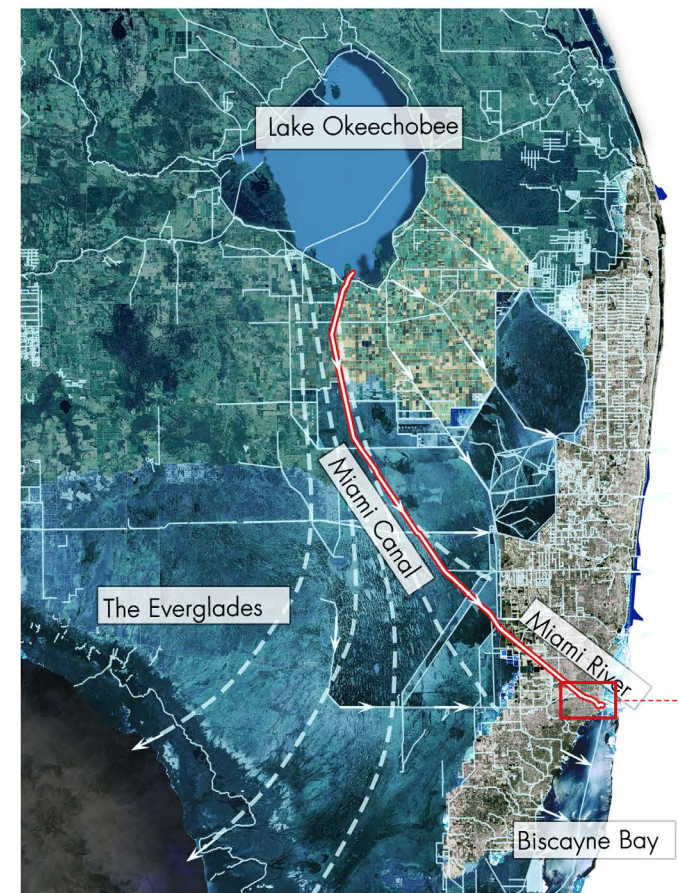




From Line to Zone

**Transforming the Miami River & Canal
into Urban Landscape Infrastructure**

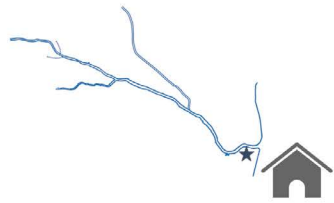
Section 1
Context



- A freshwater stream
- The word "Miami" comes from an Indian word meaning "sweet water."
- Birthplace of the Settlement in Southeast Florida

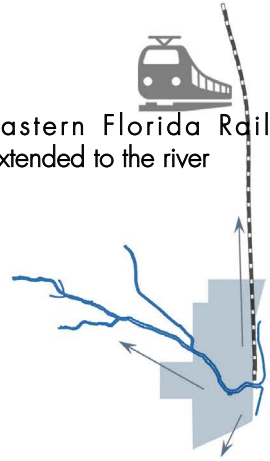
Introduction: Historical Change of Miami River

Native Indians settled in south of river



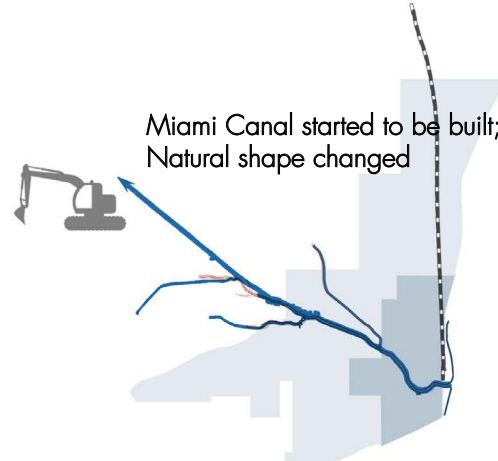
Earliest Settlement

Eastern Florida Railway extended to the river



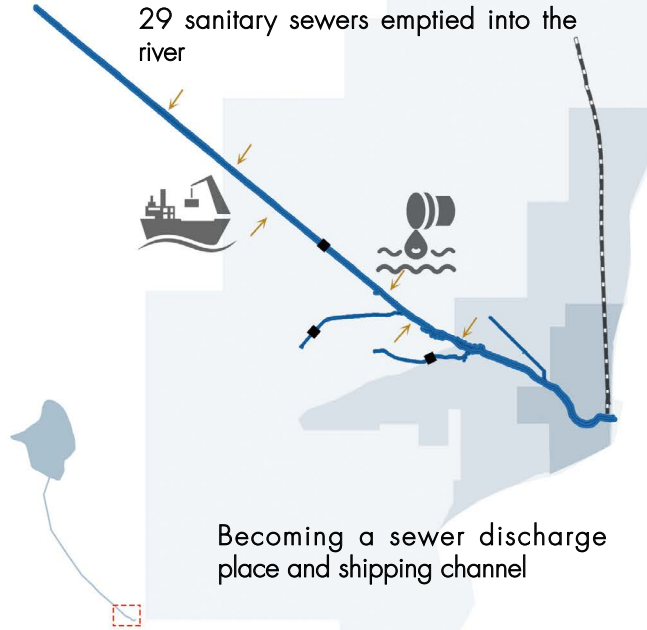
Rapid City Growth

Miami Canal started to be built; Natural shape changed

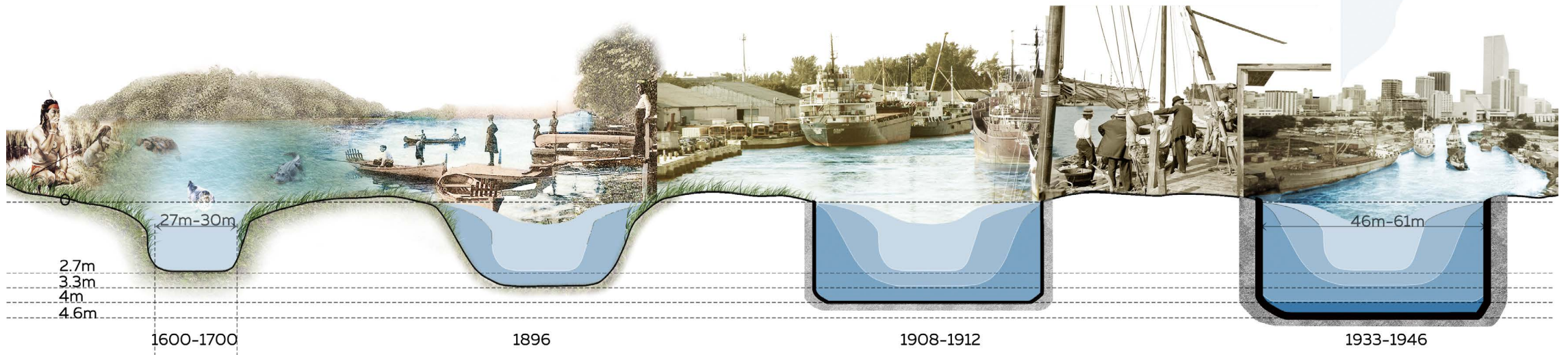


Turning to a working river

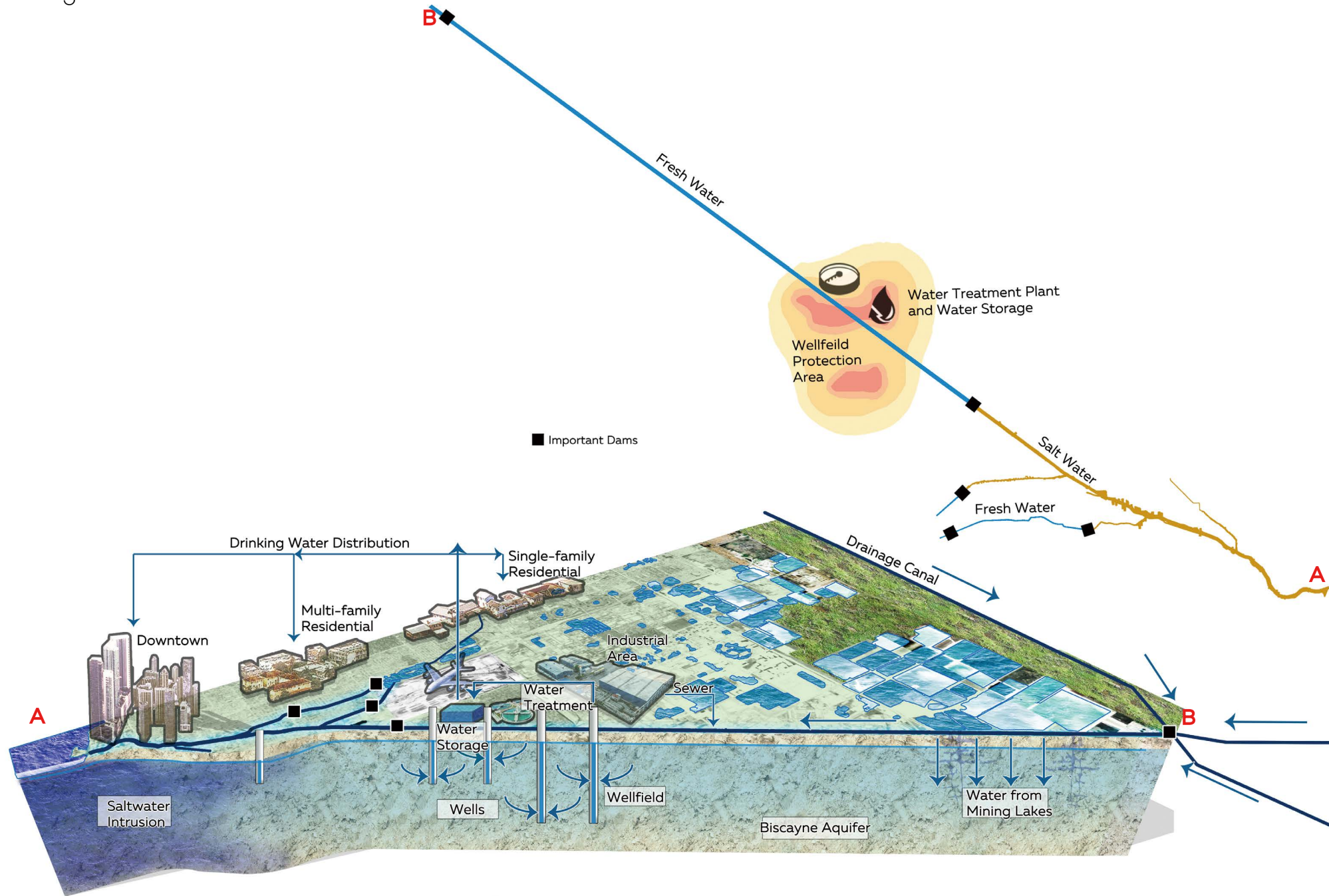
29 sanitary sewers emptied into the river



Becoming a sewer discharge place and shipping channel

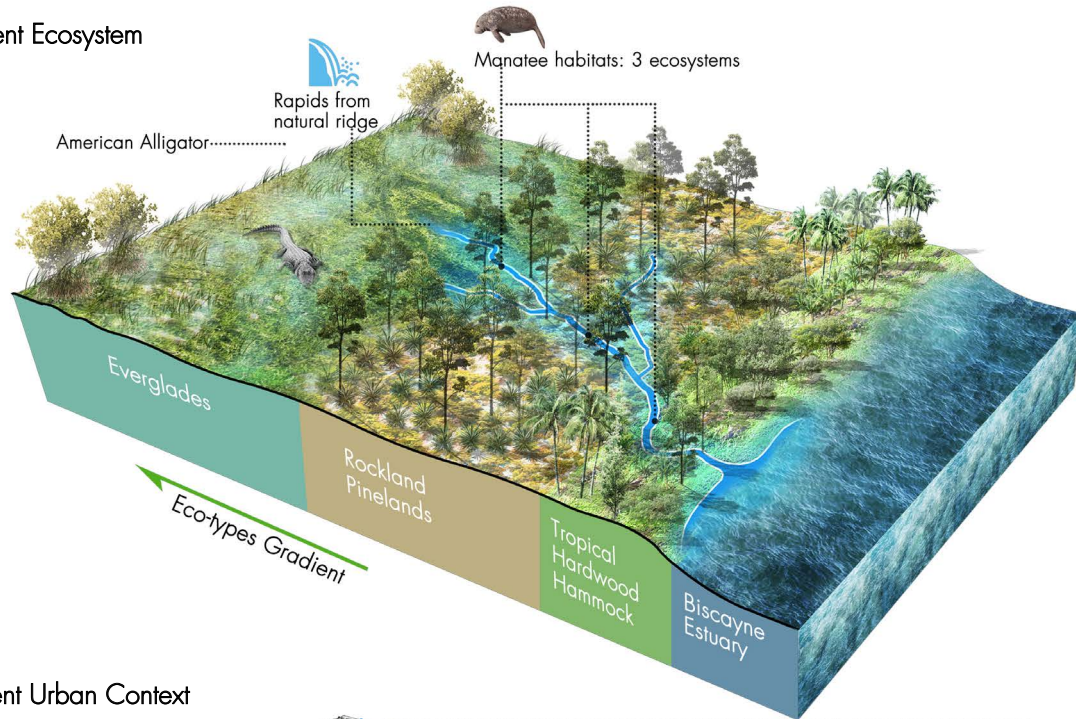


Current Water Management



Environmental Change

Ancient Ecosystem



Current Urban Context



Environmental Issues



Mining Lake Water Pollution



Flooding in Wet Season



Water Pollution from Industry & Residence



Polluted Biscayne Aquifer

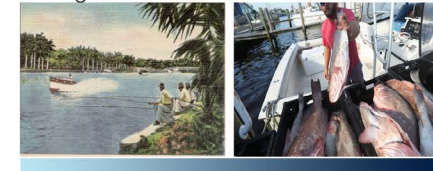


Canal as Sewer Drainage



Not adaptive to seasonal change

fishing



shipping



natural ecosystem



water quality



recreation



Changed urban elements during historical development

Problem Statement

1. The role of the Miami River changed, leading to serious environmental and social-economic issues.
2. The Miami River has changed from an coherent zone to a hardened line losing connection to the surroundings.
4. The ecosystem services are damaged especially the regulating and cultural services.

Section 2
Methodological & Theoretical Framework

Theoretical Background

Urban Landscape Infrastructure

Armature for the development of urban systems and which facilitate social and ecological interactions.

Interdisciplinary design effort to establish a local identity that has tangible relationships to the region.

(Steffen Nijhuis, Daniel Jauslin)



Image of Landscape Infrastructure. Source: European Commission, 2013. Building a Green Infrastructure for Europe.



Highline Park Designed by Field Operations

Ecosystem Services

- Supporting Services;
- Provisioning Services;
- Regulating Services;
- Cultural

Examples of Ecosystem Services in the Netherlands



Source: PBL, WUR, CICES 2014

Research Questions & Methods

Research Objective

The research objective is to retransform the riparian area from an isolated line into a closely connected and systematic urban zone through designing the river & canal as urban landscape infrastructure and improving ecosystem services.

Research Questions

- 1.How does the Miami River & Canal functions in its contemporary urban context? What are the main challenges and potentials?
- 2.What are the possibilities to integrate the river & canal into its urban context from a spatial, ecological and functional perspective?
- 3.How can the river transform from infrastructure to landscape infrastructure?
- 4.What are the lessons learned from the research relevant to similar urban rivers elsewhere?

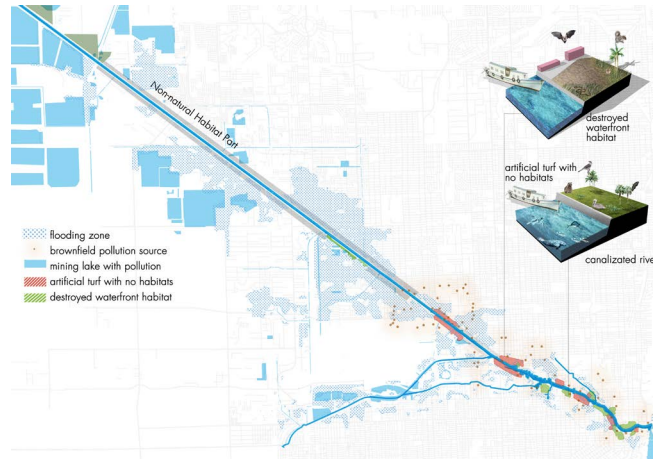
Methods

- 1.Site Analysis
 - Historical Development Analysis
 - Assessment of Current Situations
- 2.Precedent Study of Successful Projects
- 3.Research by Design

Section 3
Miami River & Canal: Challenge & Opportunity

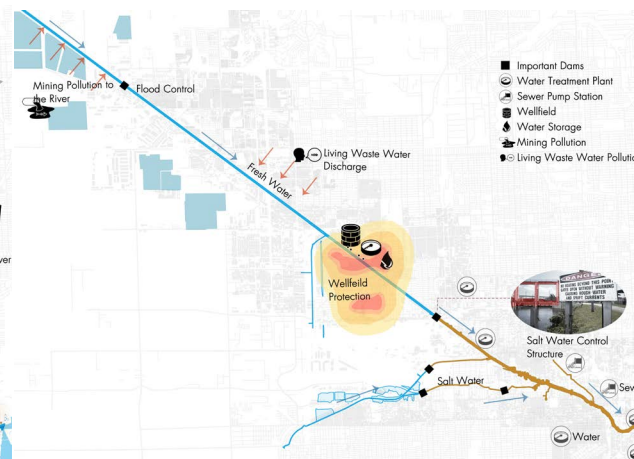
Mapping Analysis of Problems

River and Natural System



1. Disappearance of Ecological Habitats
2. Flooding Issues
3. Brownfield Pollution

River and Water Management



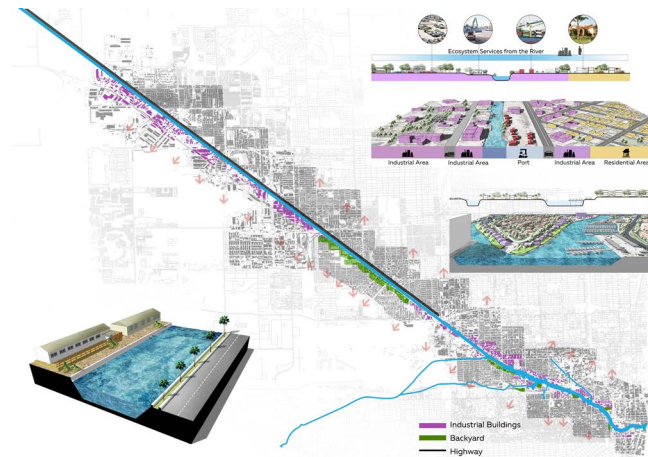
1. Completely Controlled Artificial River
2. Threatened Fresh Water Resource

Map of River and Infrastructure



1. Redundant Grey Infrastructure
2. Losing Resilient Space

River and Space



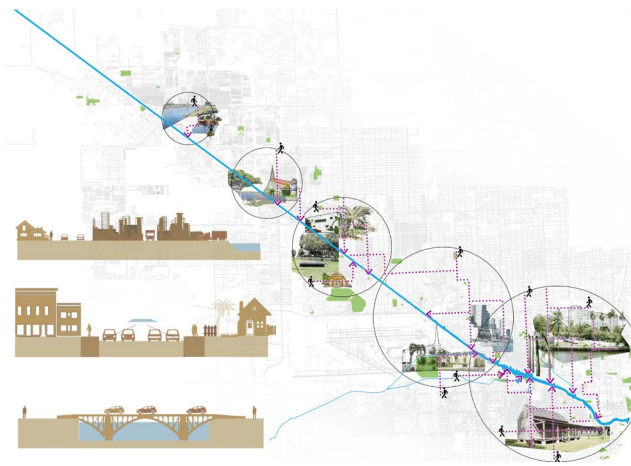
- Low Spatial Quality with Waterfront Space Taken up by Freight Storage

River and Urban Structure



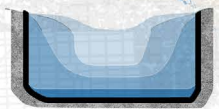
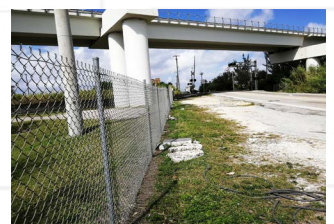
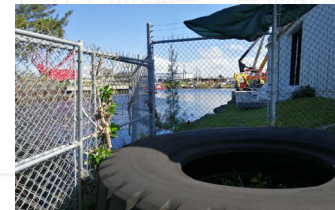
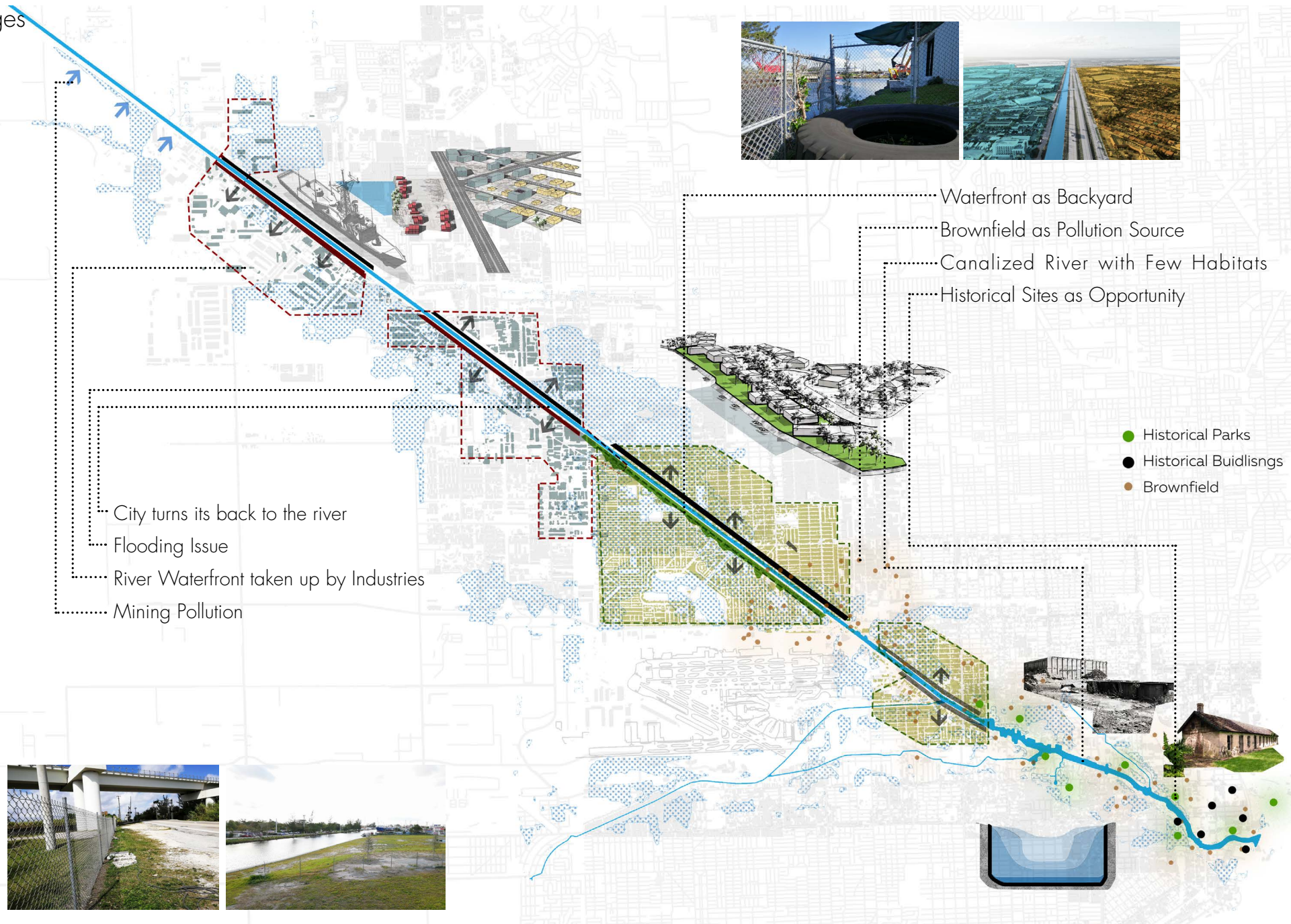
1. Losing Urban Connection with the River
2. Lack of Waterfront Public Space

River and Accessibility

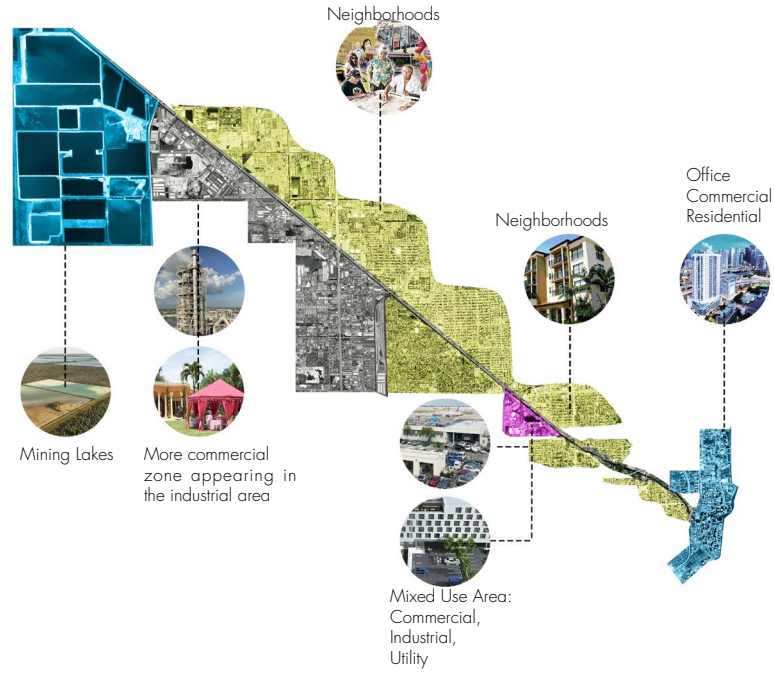


1. Lower Accessibility in Inland Area
2. Not Friendly to Pedestrian
3. Lack of Bike Lanes

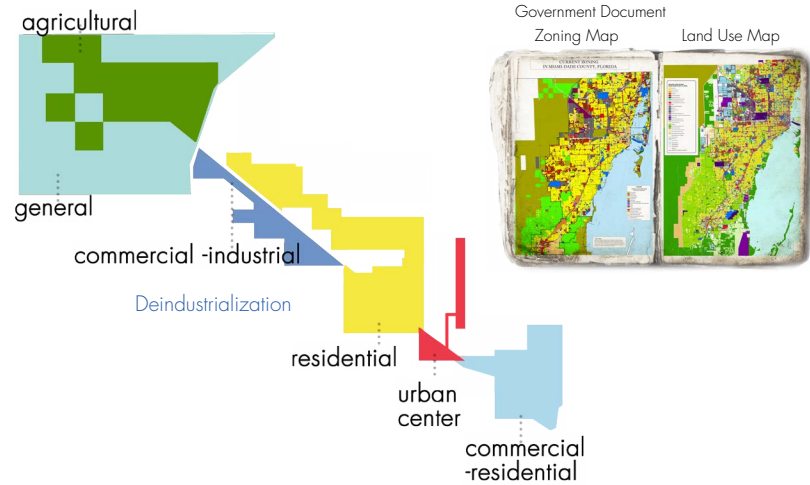
Conclusion of Challenges



Potentials



General Zoning Information Around the River



Section 4
Design Strategy & Principles

Precedent Study of Successful Projects with Similar Context



1. Regeneration of a Historical River: Cheonggyecheon Stream (Seoul)

Lessons Learned:

- 1) Waterfront as new public activity space;
- 2) New structure for promoting urban development



2. Industrial Waterfront Transformation : Chicago Riverwalk Project (Chicago)

Lessons Learned:

- 1) Continuous riverfront pedestrian path and activity space;
- 2) Success of industrial identity transformation

3. Overcoming Restriction of Land Utilization: Jardins de la Rambla de Sants Elevated Park (Barcelona)

Lessons Learned:

- 1) Approach of making use of complex situations of urban land;
- 2) Artificial urban ecosystems and efficient ecosystem services.

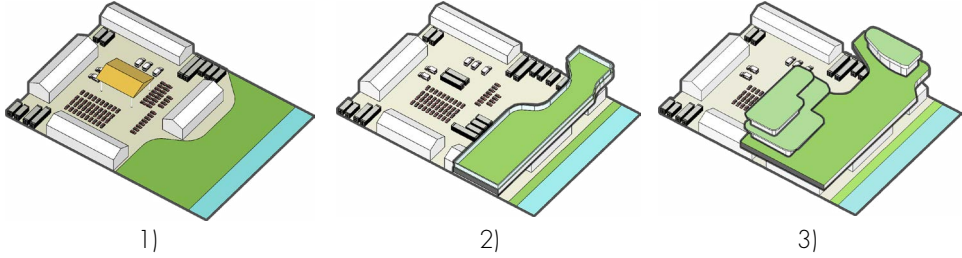


- 1) Healthy water system
- 2) Integration of urban green space
- 3) Spatial quality improvement as the basis for urbanization
- 4) Temporal and dynamic interactions between ecosystem restoration and public space improvement
- 5) Public environmental engagement with the long-term processes

Design Principles

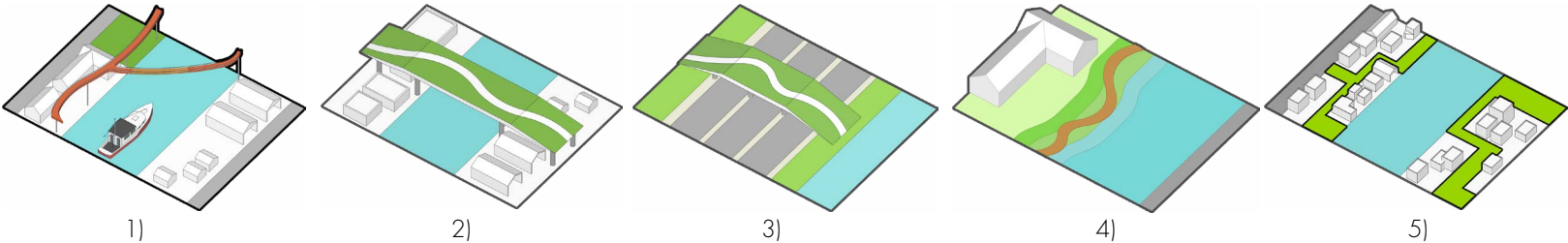
1) Intensified Land Use of Green Space

- 1) Replanning of the industrial and waterfront land use
- 2) Elevated park upon the industrial area
- 3) Urban green complex upon the industrial area



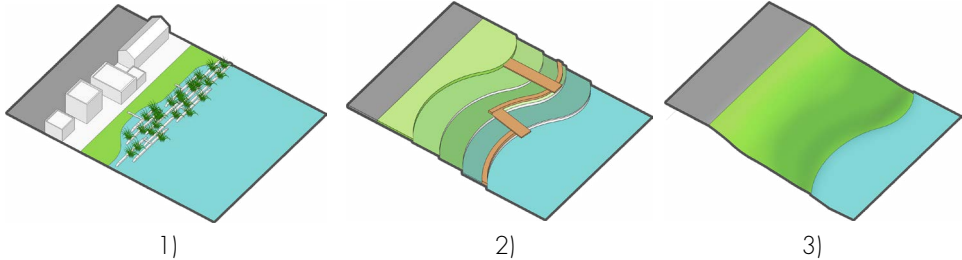
2) Improved River Connection Network

- 1) Elevated bicycle lane
- 2) River bridge park
- 3) Highway bridge park
- 4) Riparian boardwalk
- 5) Pedestrian parkway system



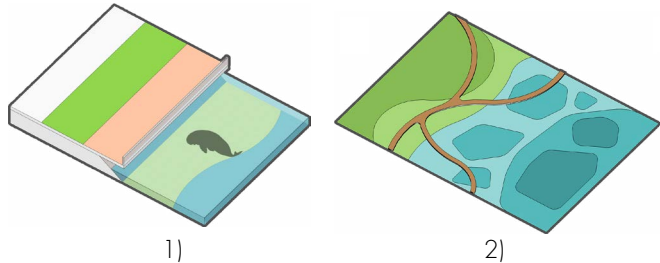
3) Creation of River Buffer Zone

- 1) Water purification infrastructure; wildlife protection habitat
- 2) Ecological terraced-form riverbank
- 3) Natural-form riverbank



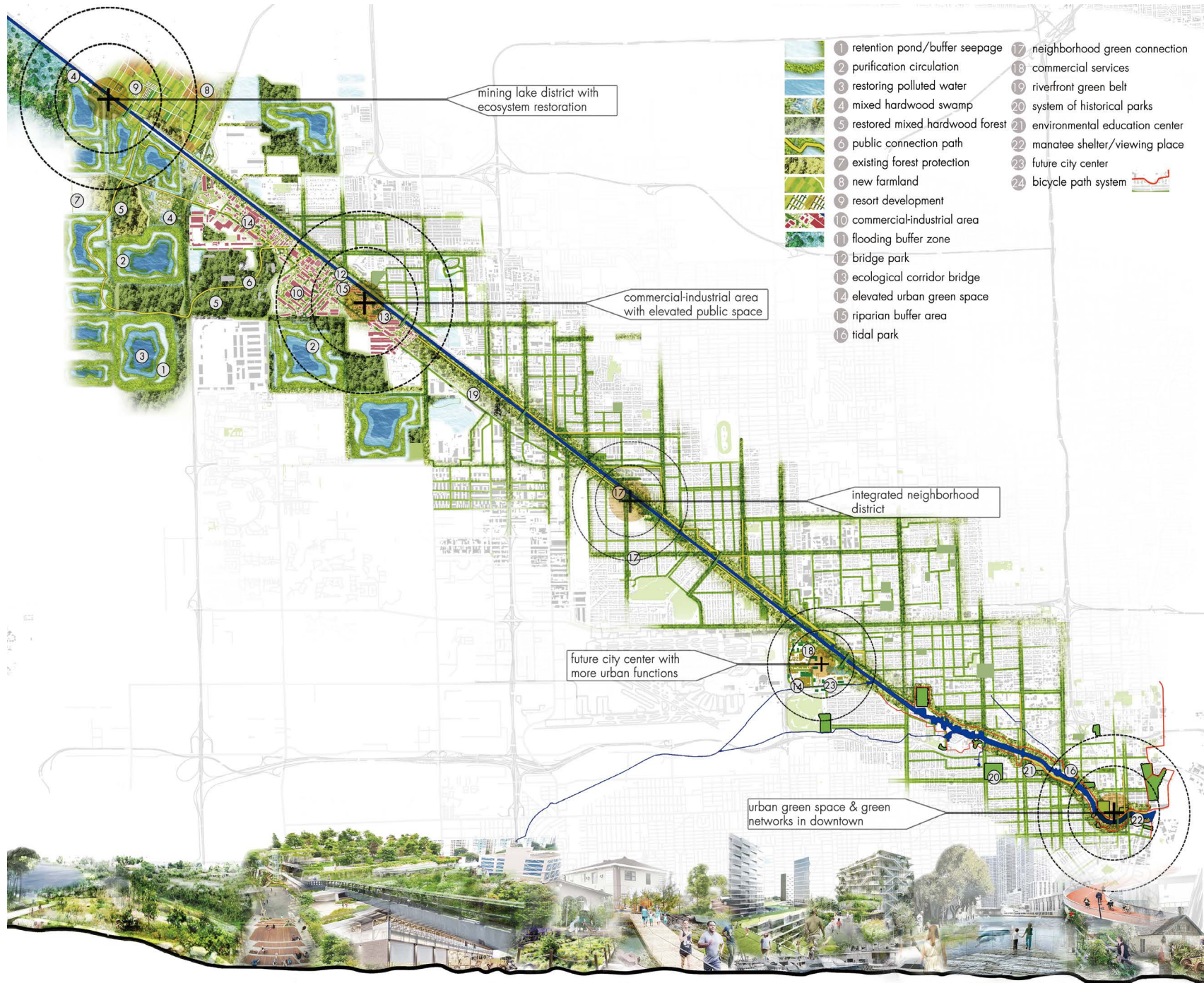
4) Restoration of Riparian Ecosystem

- 1) Aquatic wildlife habitat restoration
- 2) Riparian brownfield restoration
- 3) Mining lake restoration

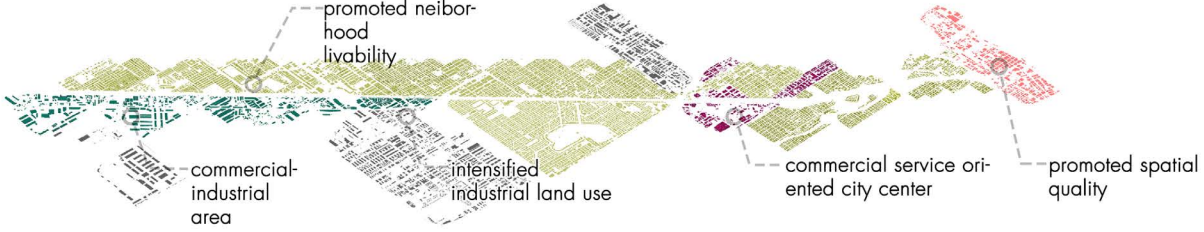


Section 5
Explorations: New Urban Landscape Infrastructure

Strategic Plan



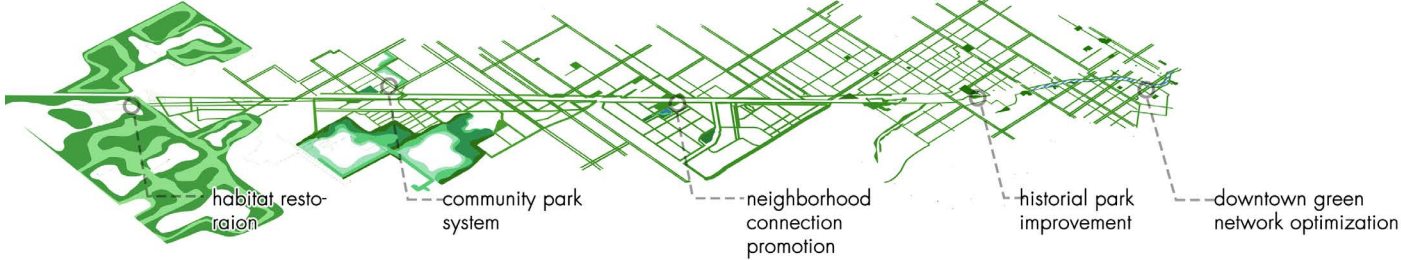
Systemic Design



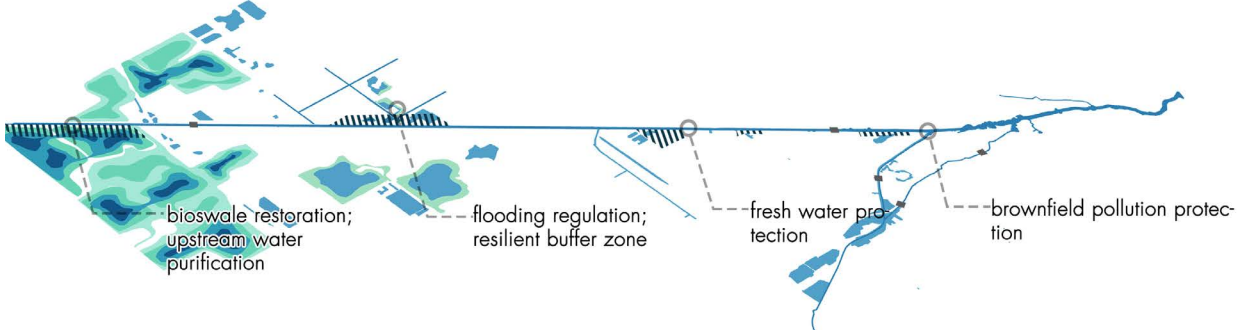
Urban Composition



Transportation System

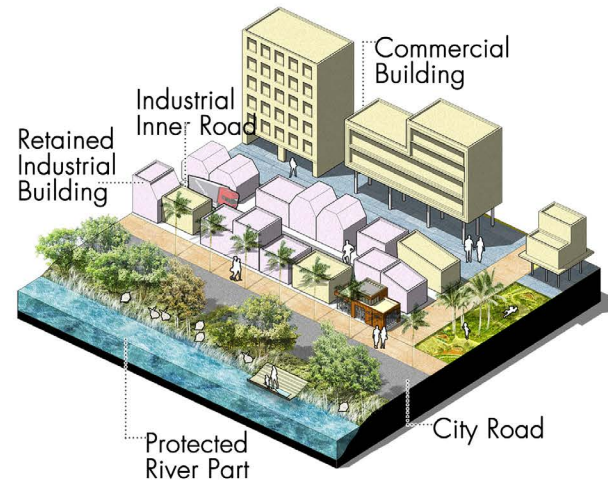
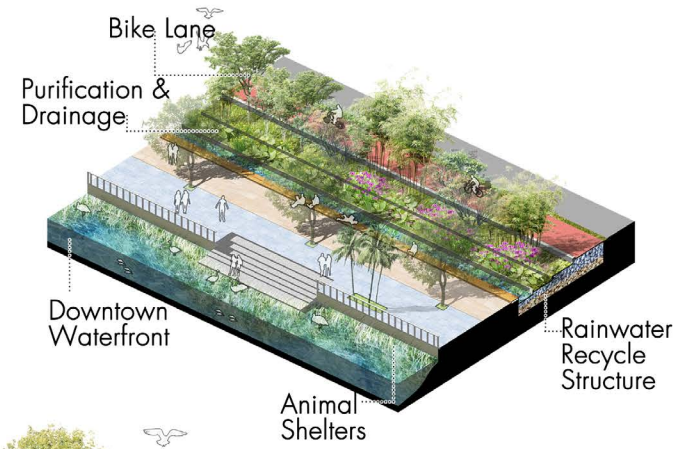
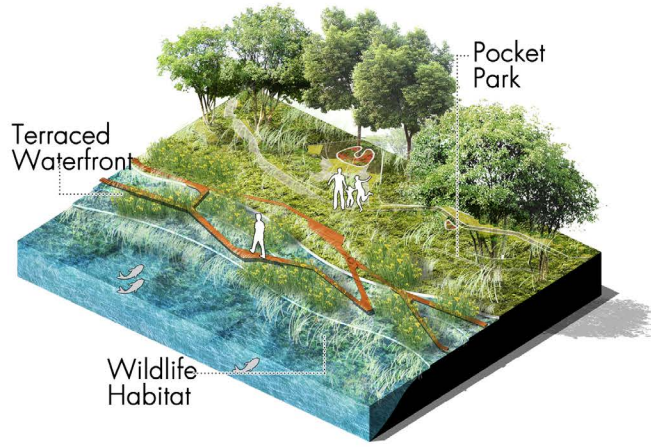


Green Network

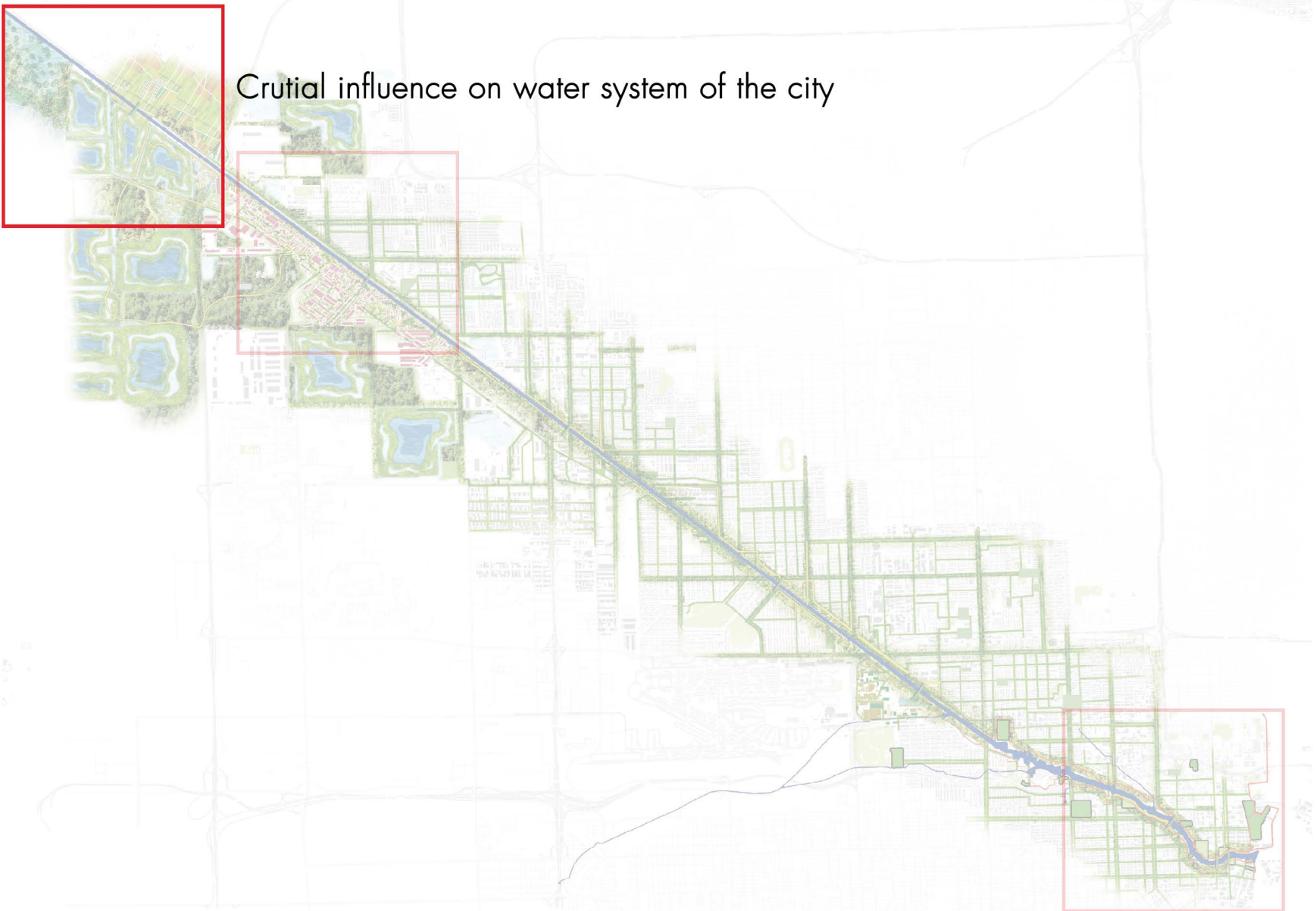


Water System

Design Toolbox



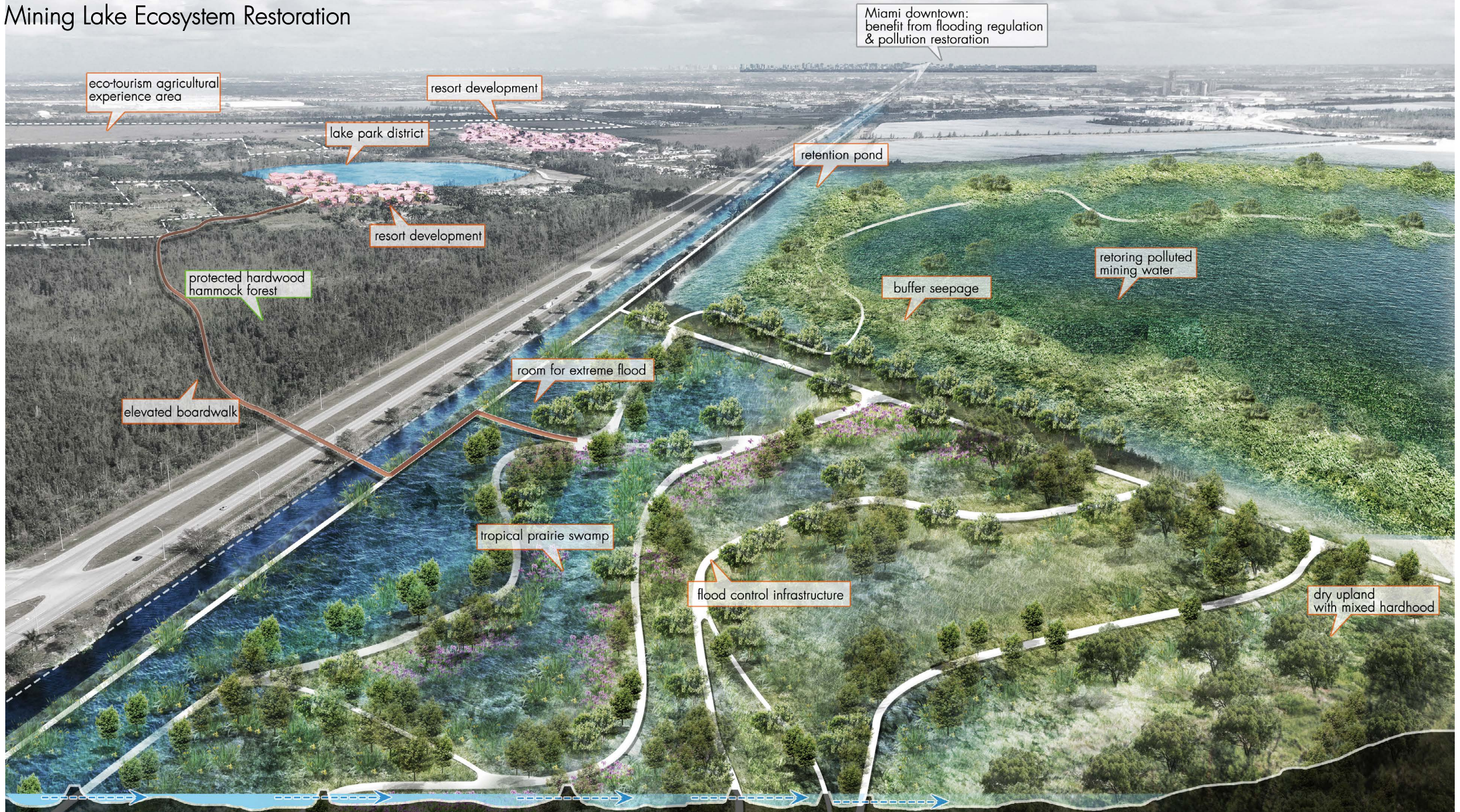
Strategic Area 1: Mining Lake Area



Mining Lake Ecosystem Restoration



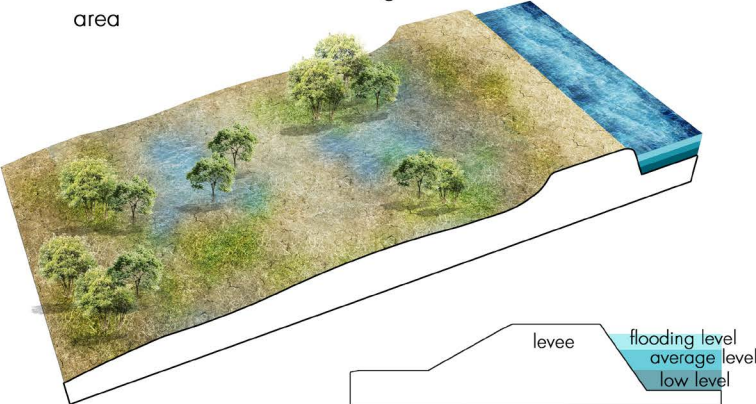
Mining Lake Ecosystem Restoration



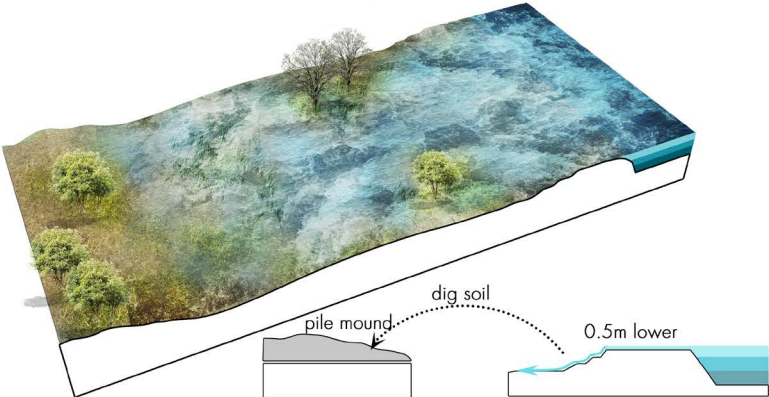
Utilization of Wasteland as Flooding Buffer Zone

Ecological Succession

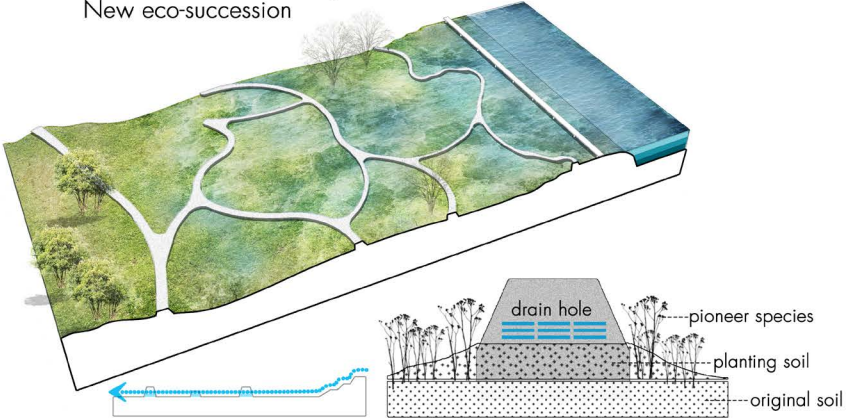
Low wasteland near the mining area



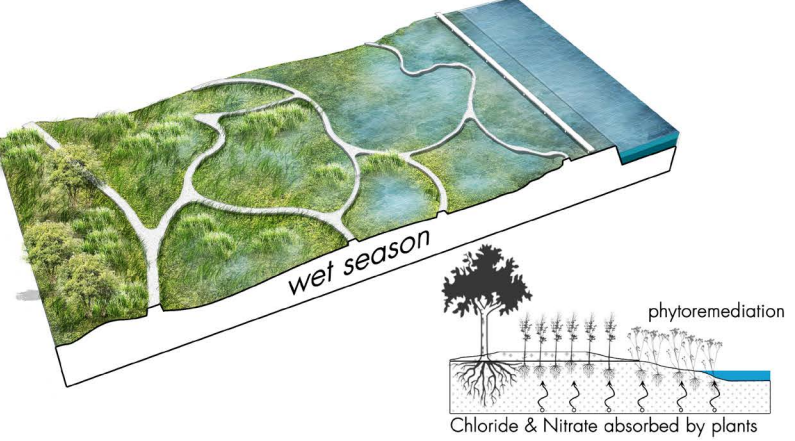
New room for extreme flood;



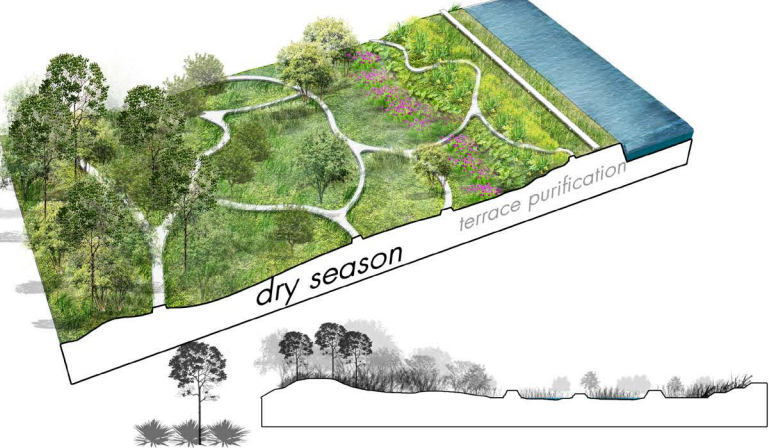
Structure with drain hole; New eco-succession



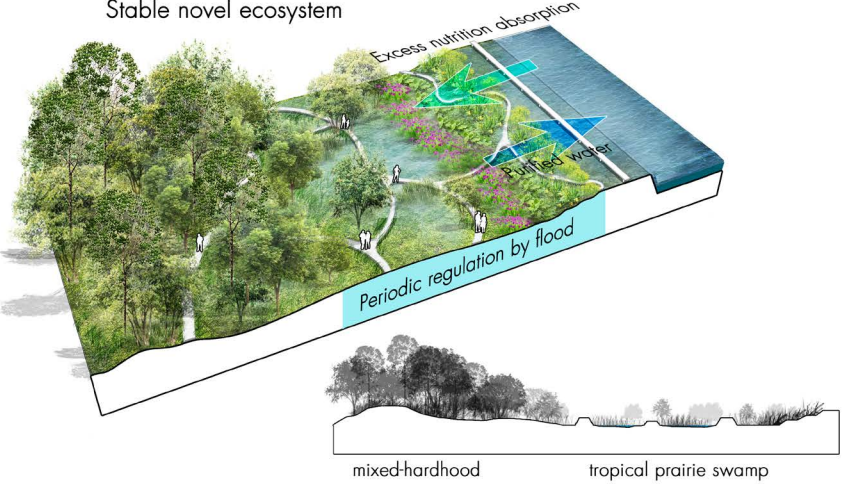
Purification plant introduced;



Hardhood introduced;

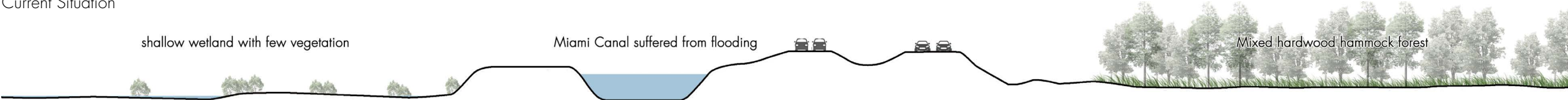


Stable novel ecosystem

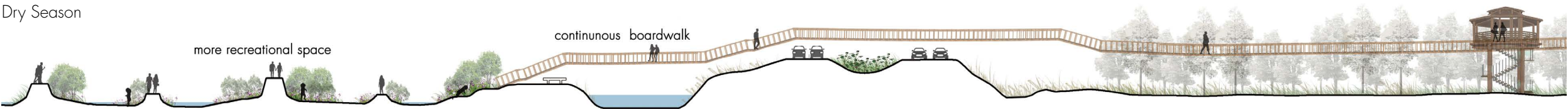


Section of Buffer Zone

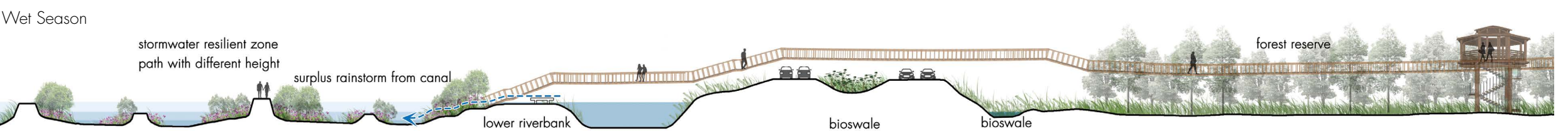
Current Situation



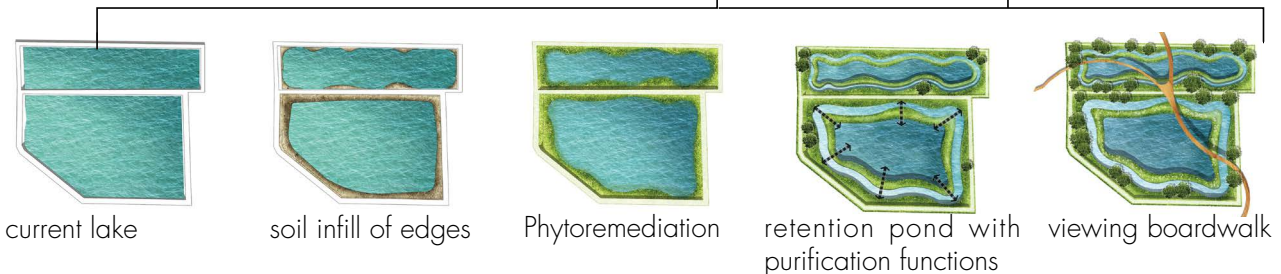
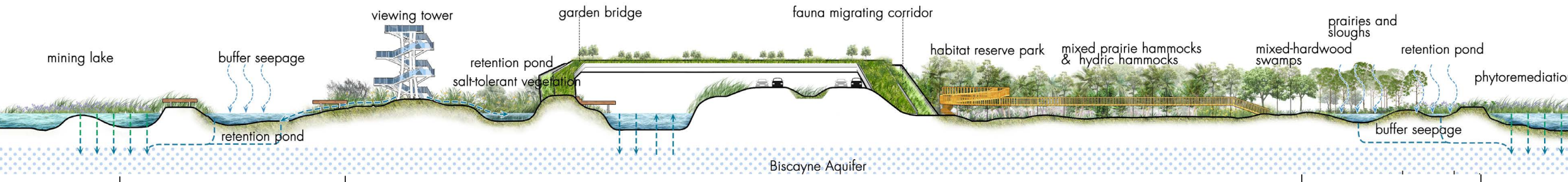
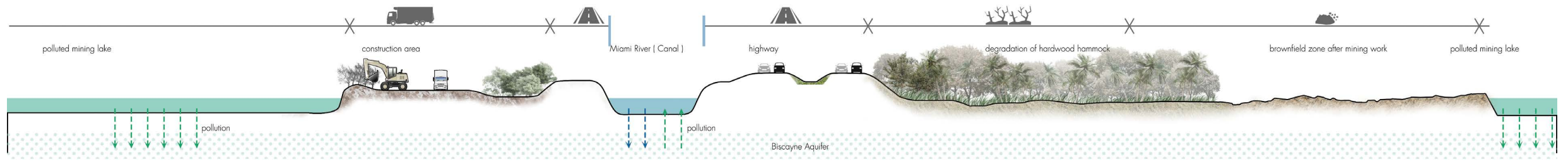
Dry Season



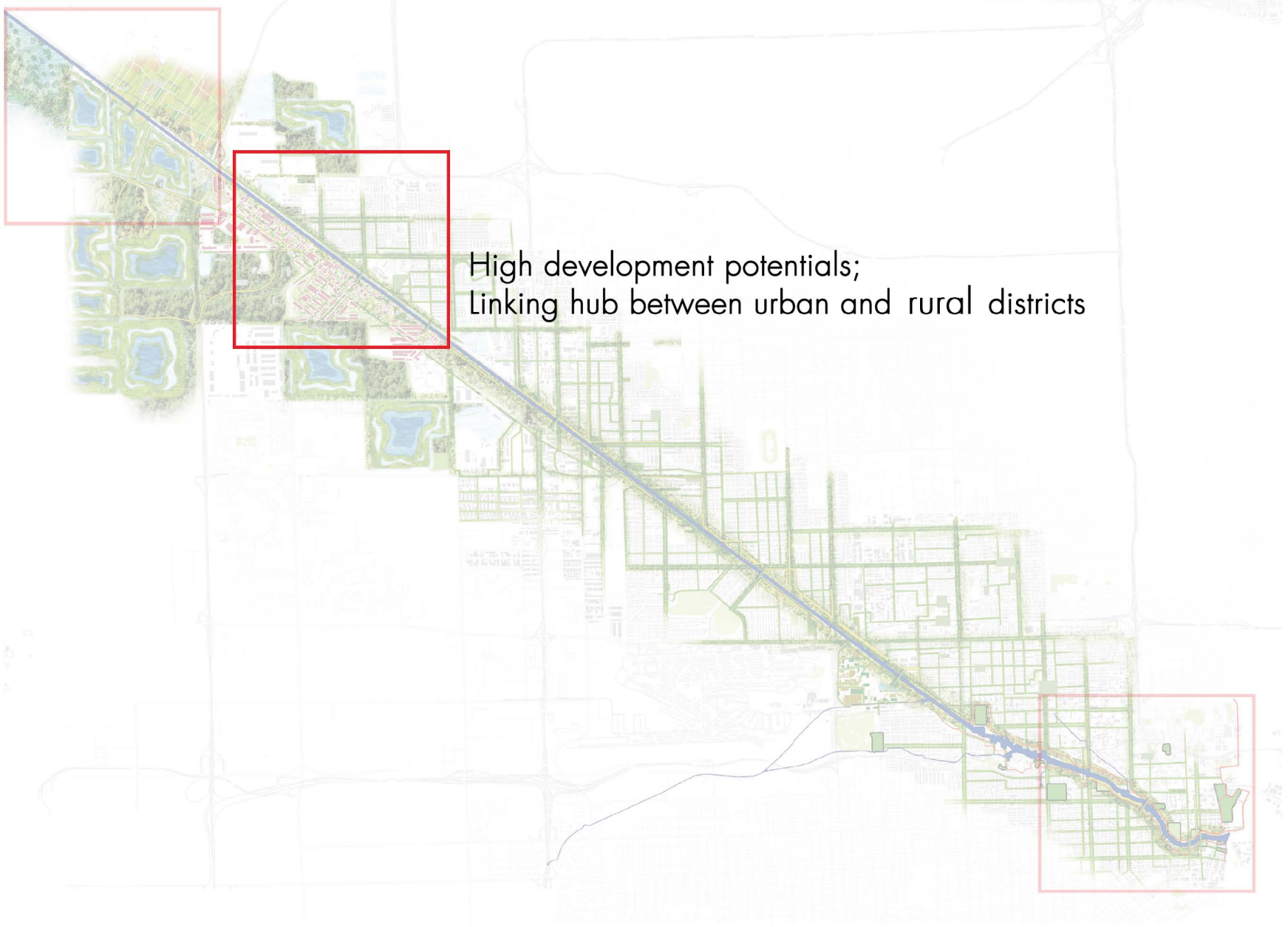
Wet Season



Ecological Restoration of Polluted Mining Lake



Strategic Area 2: Industrial Area



High development potentials;
Linking hub between urban and rural districts

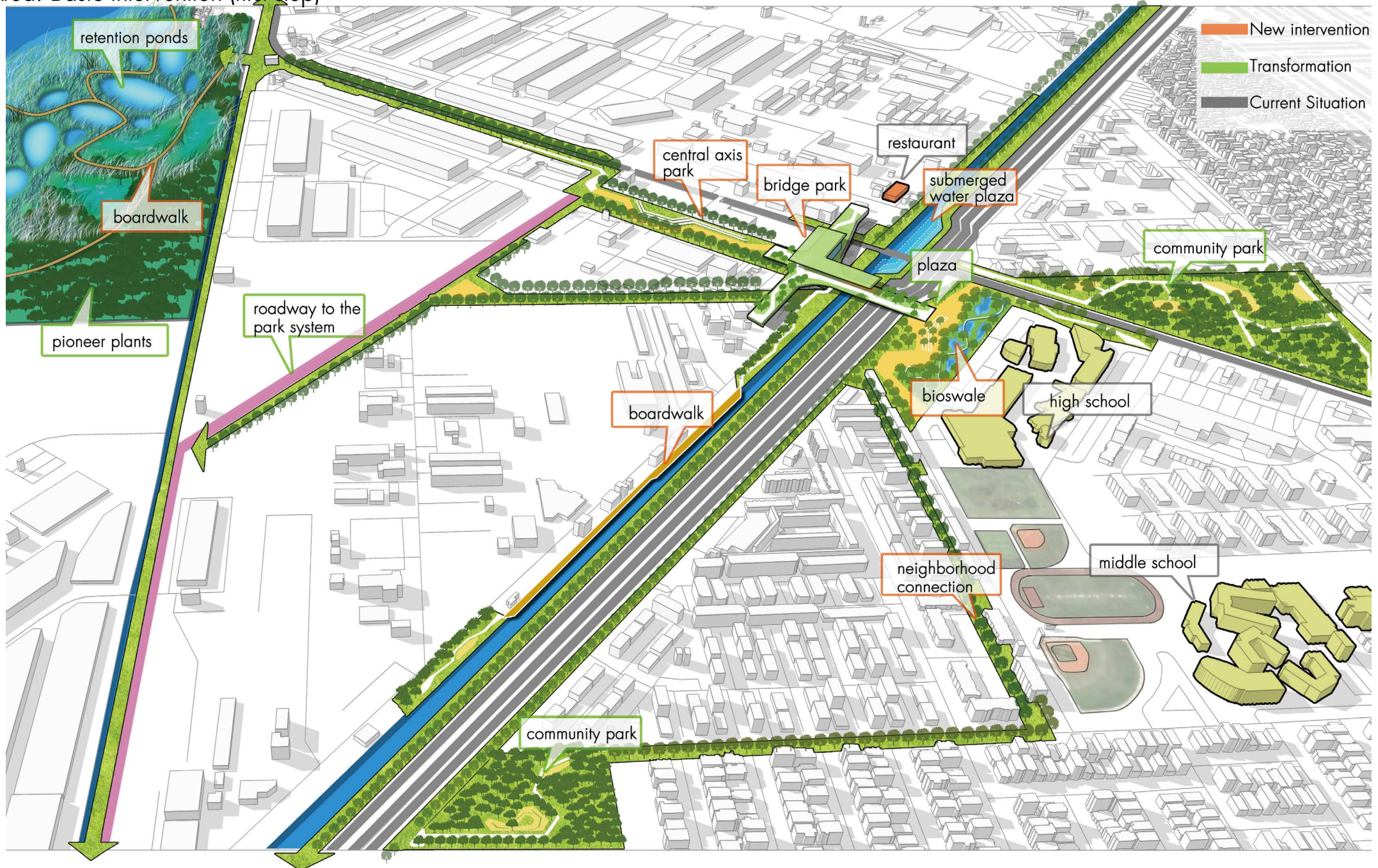
Current Situation of Industrial Area



Industrial Area: Basic intervention (first step)



Industrial Area: Basic intervention (first step)

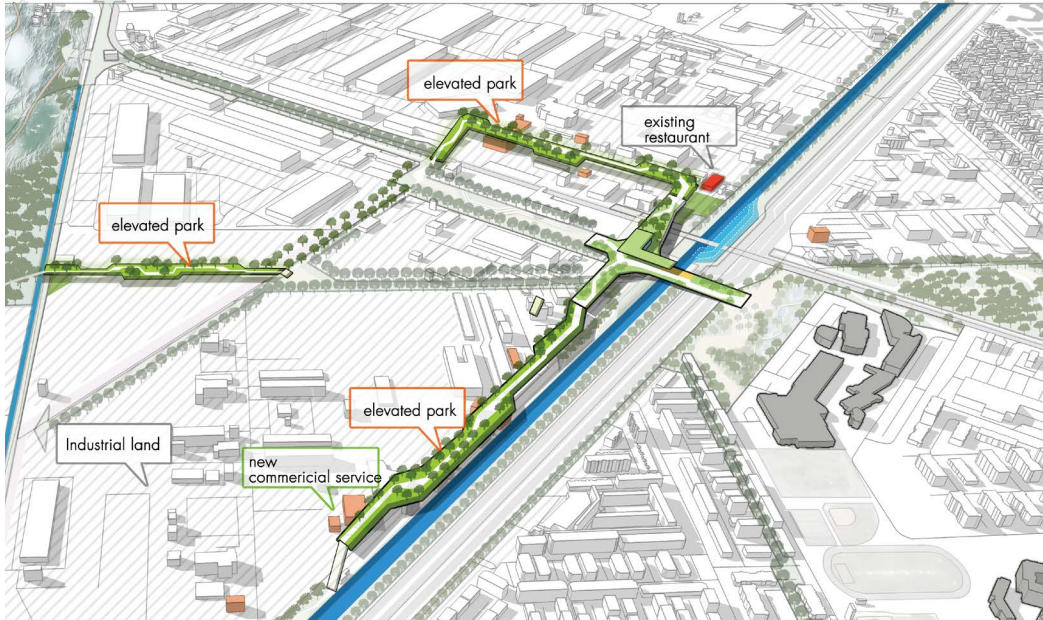


Industrial Area: Development Scenarios

Adjustment of Land Use



Elevated Parks



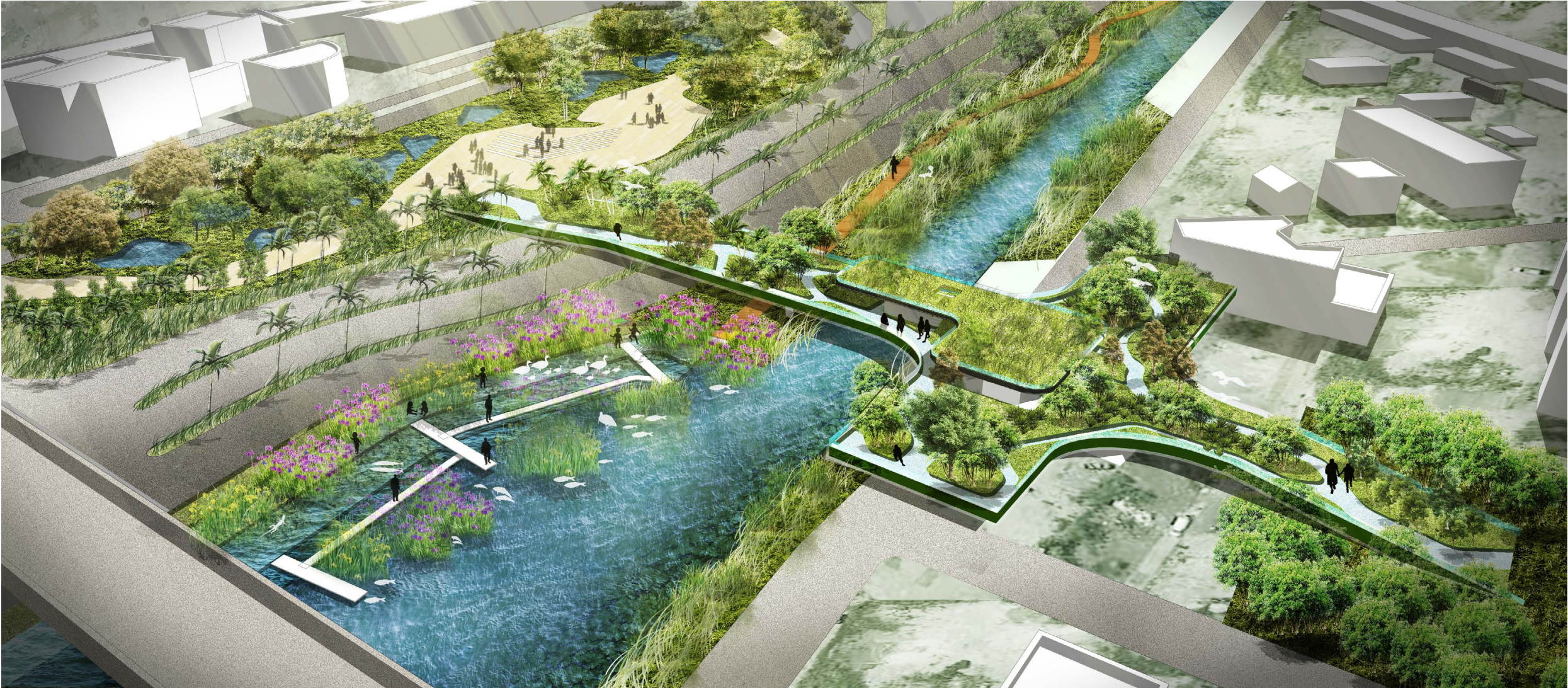
Urban Green Complex



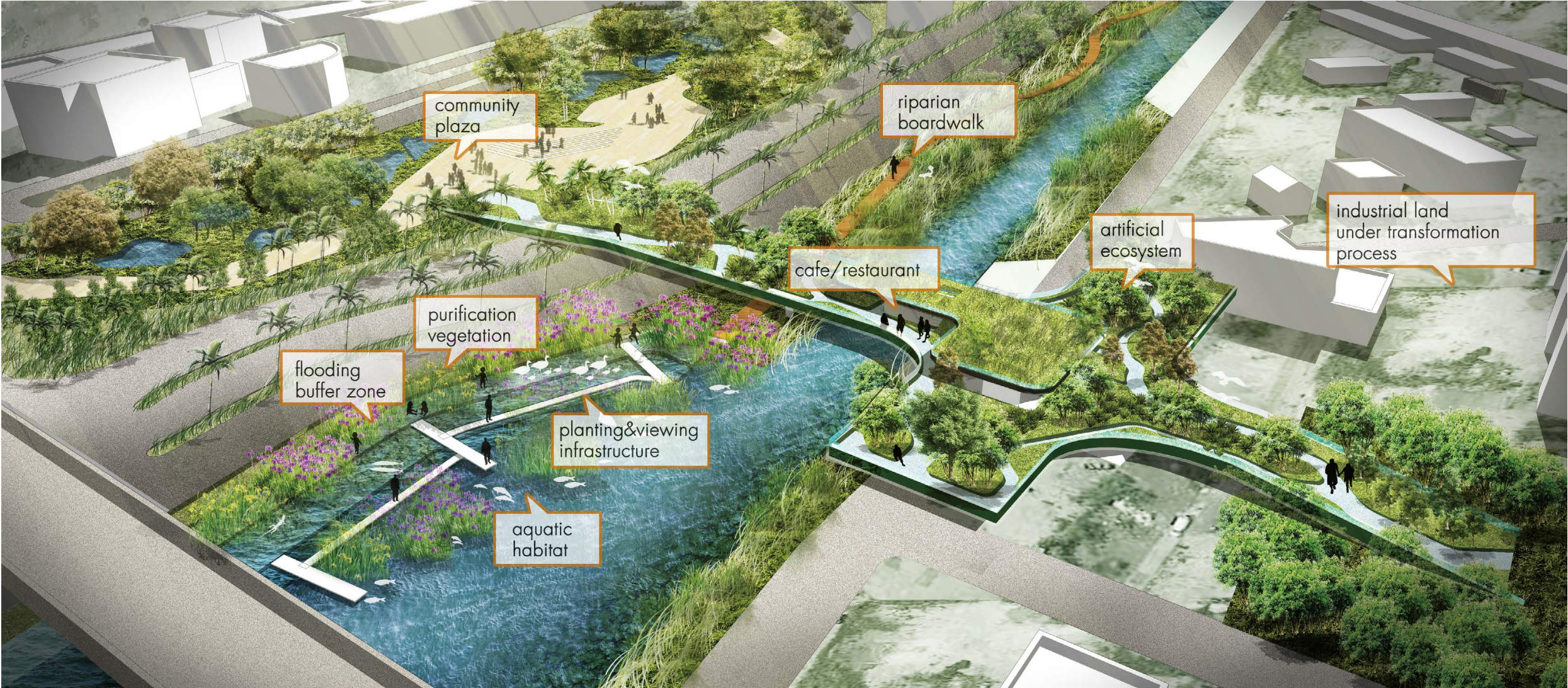
Synthesis: Proposed Design



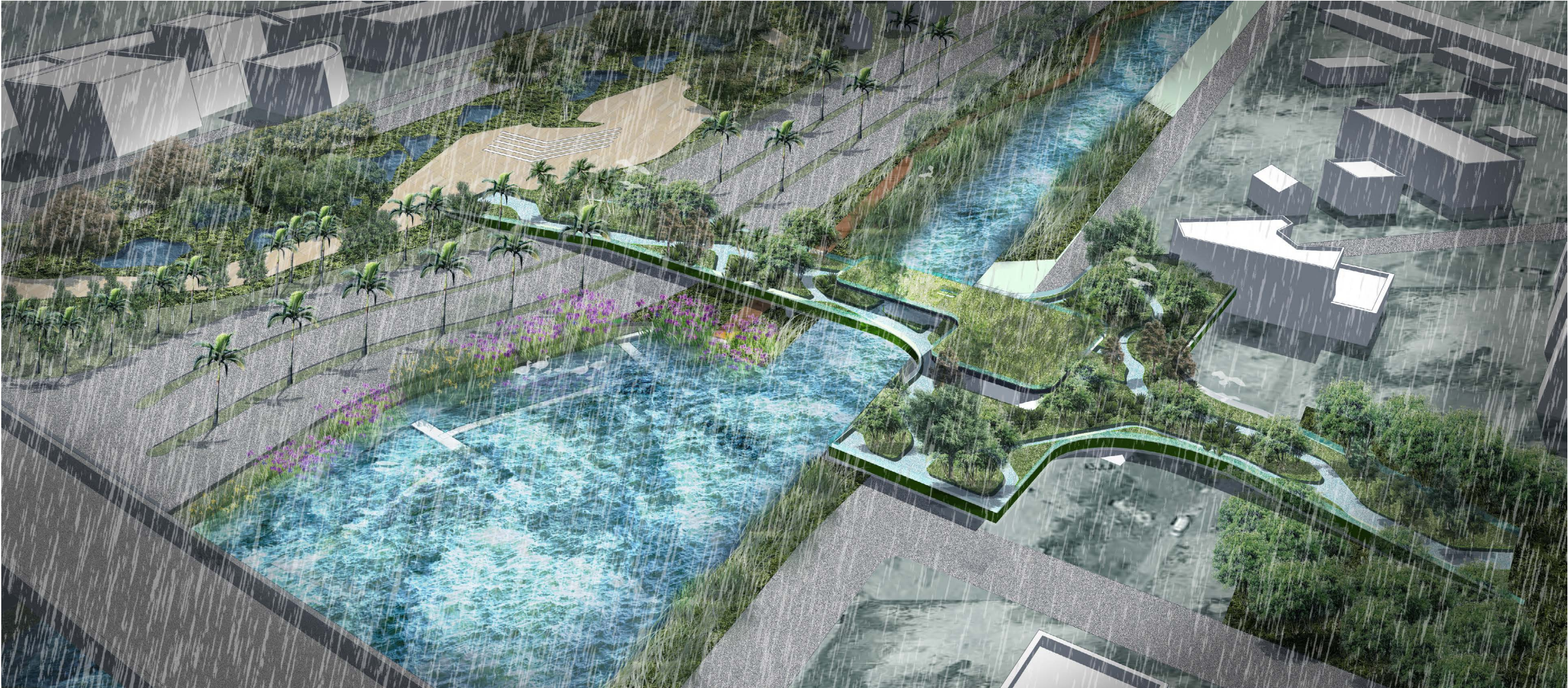
Bridge Park & Seasonal Resilience



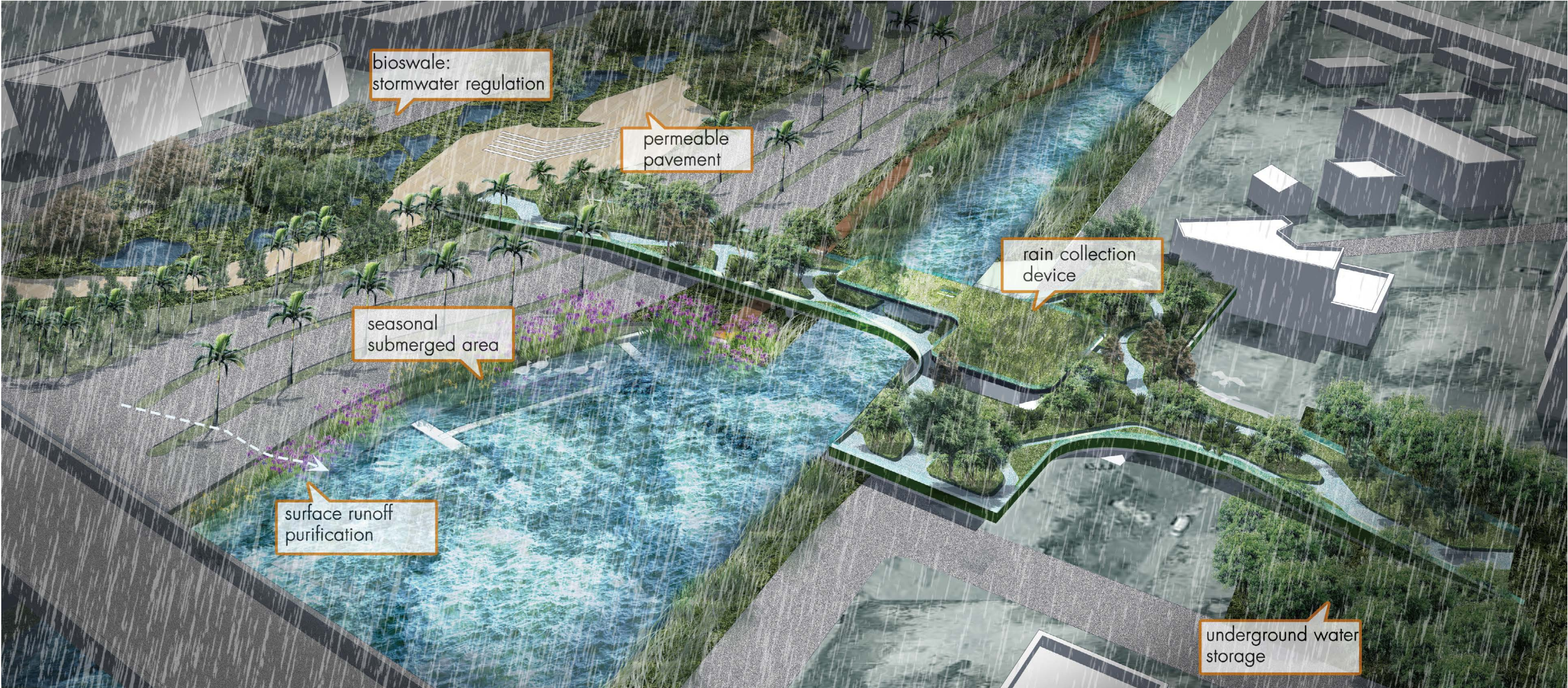
Bridge Park & Seasonal Resilience



Detailed Design: Bridge Park & Plaza

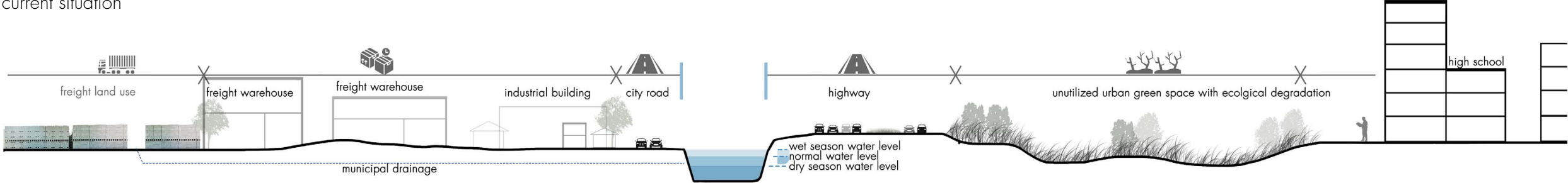


Detailed Design: Bridge Park & Plaza

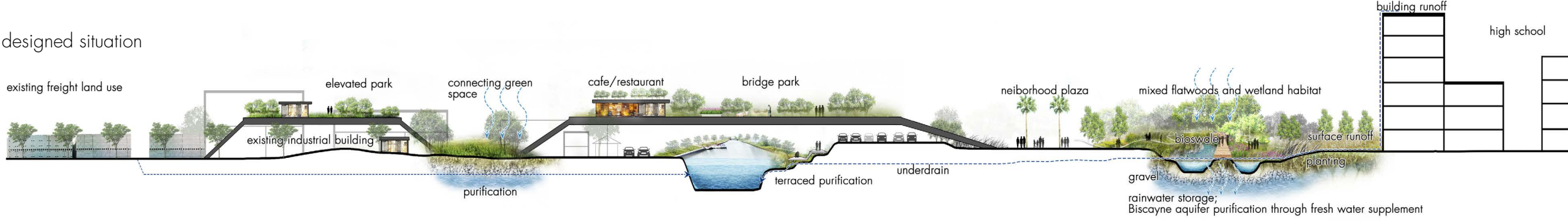


Cross-section of the Industrial Riparian Area

current situation



designed situation

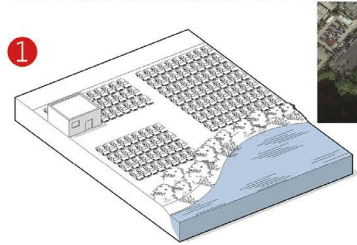


Strategic Area 3: Downtown Area

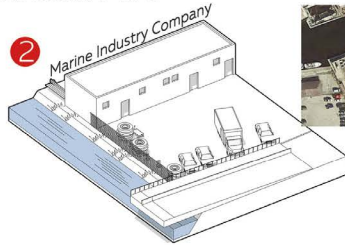


New city identity of Miami

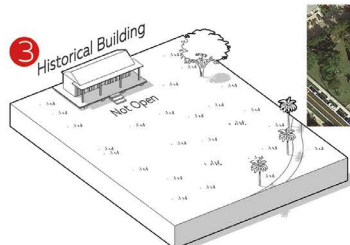
Current Conditions



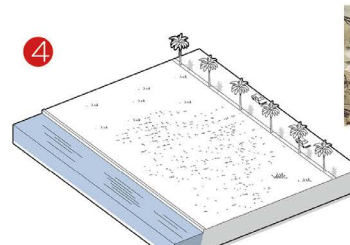
1 Vehicle Storage along the Waterfront;
Palmer Lake with High Landscape Quality



2 Enclosed Riverbank;
Unreasonable Use of Public Space;



3 Monotonous Lawn; Joyless Path;
Park without Appealing Conditions
Lack of Public Activities

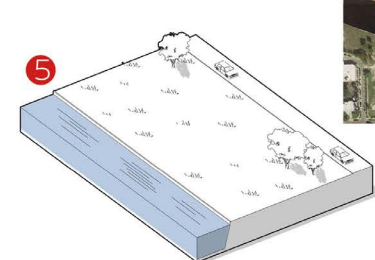
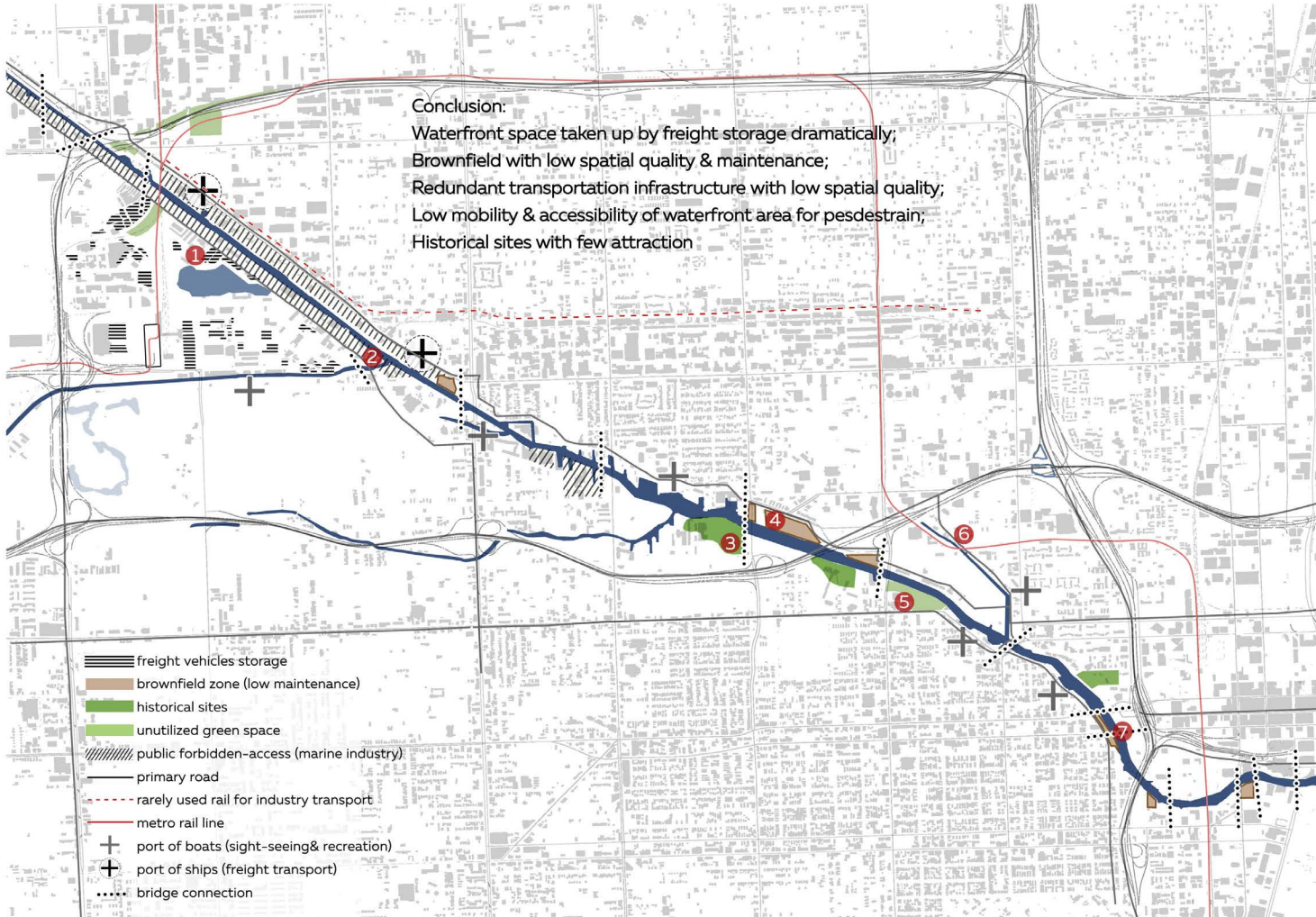


4 Brownfield without Maintenance,
Decorative Street Greening;



4 Historical Building & Park

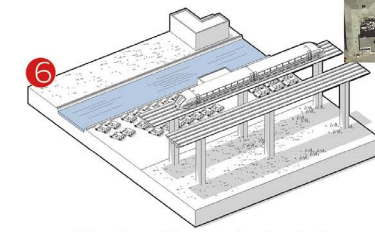
Conclusion:
Waterfront space taken up by freight storage dramatically;
Brownfield with low spatial quality & maintenance;
Redundant transportation infrastructure with low spatial quality;
Low mobility & accessibility of waterfront area for pedestrian;
Historical sites with few attraction



5 Monotonous Lawn



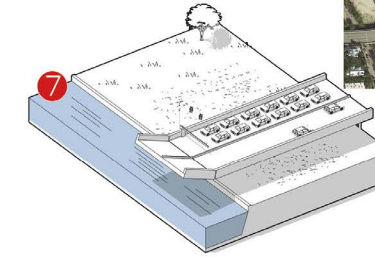
5 Unutilized land to be developed



6 Waterfront Taken up by Freight Storage;
Run-down Space below Metrorail;
Shabby Waterfront Space



6 Good view of the river from bridge



7 Bridge only for Vehicles;
Brownfield without Maintenance;
Lawn with Few Activity & Wildlife

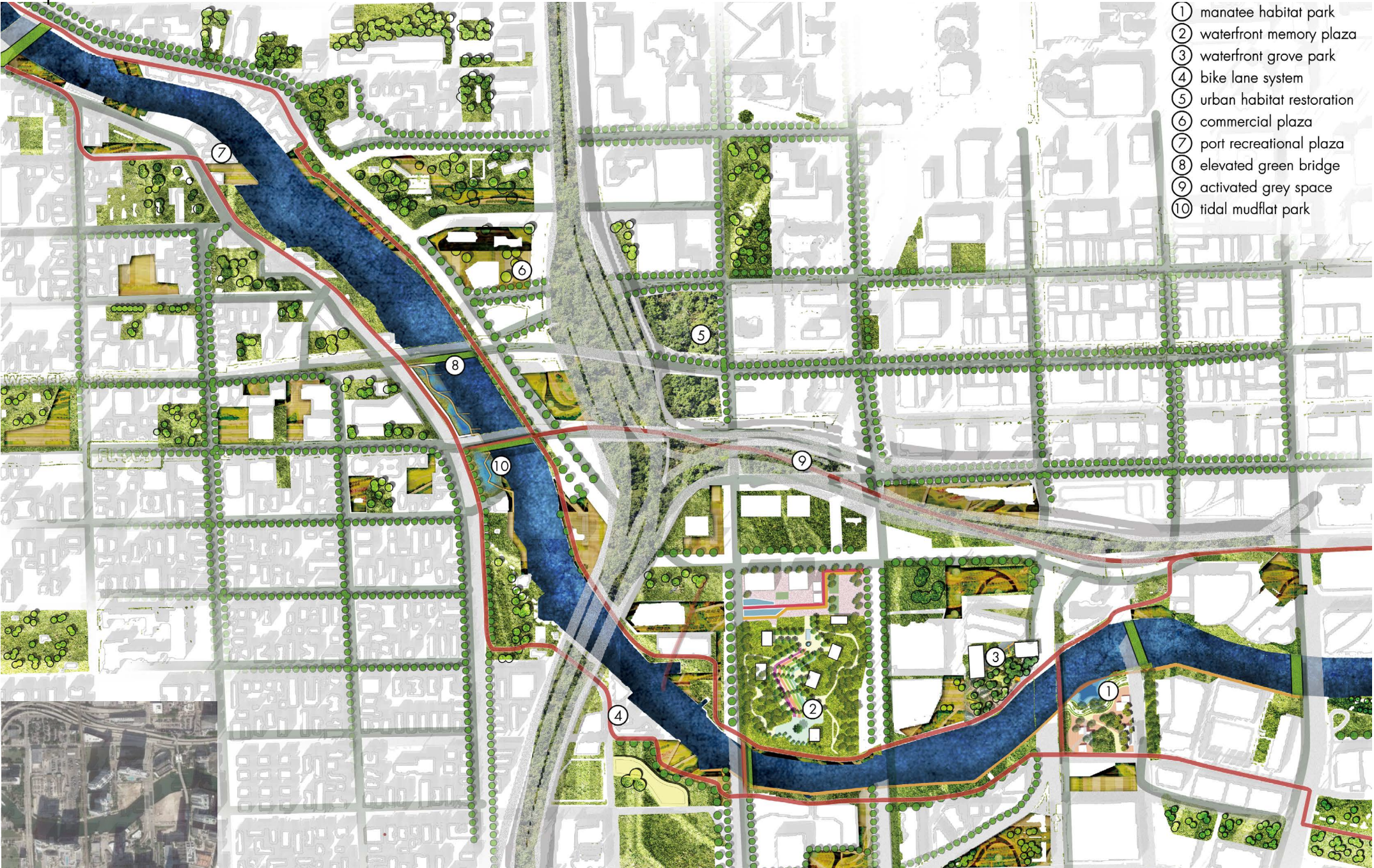


7 Manatee near the estuary

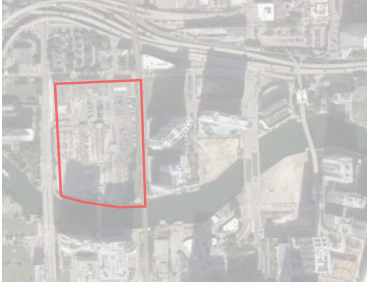
Green Network Design & Urban Park Design



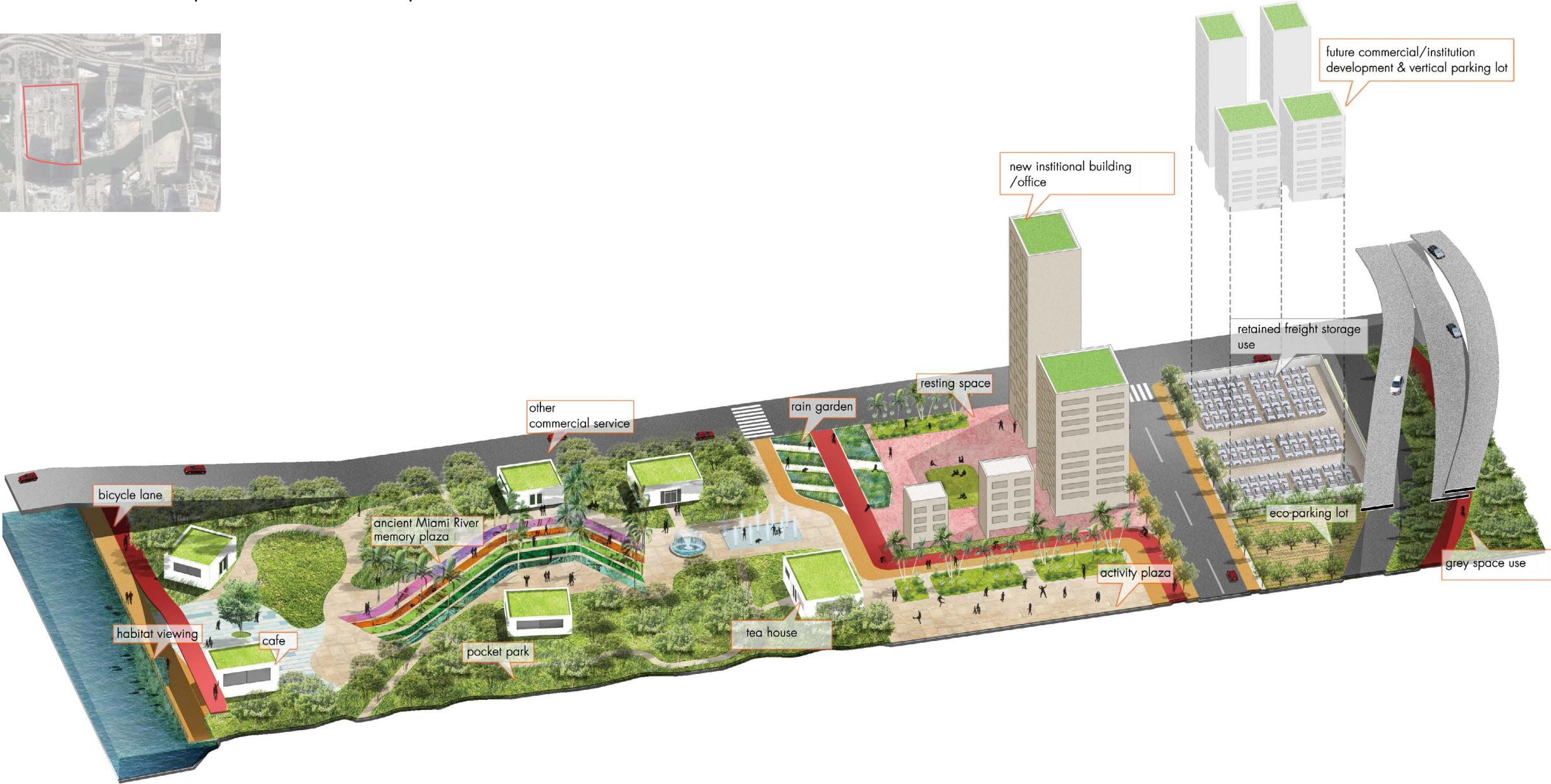
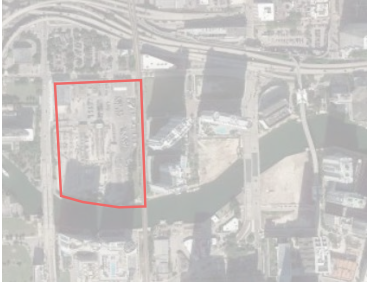
Urban Green Space in Downtown



New Public Green Space & Urban Development



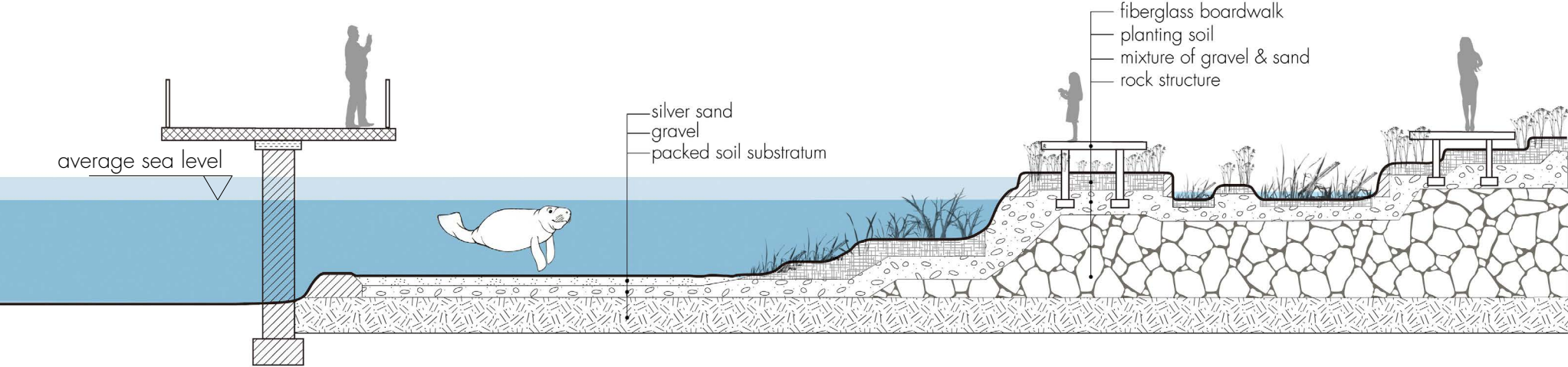
New Public Green Space & Urban Development



Manatee Habitat Park



Technical Section of the Manatee Habitat Park



Boardwalk structure protects the manatee from negative effects of shipping

Silver sand provides a warmer and peaceful circumstance which is manatee's favorite habitat

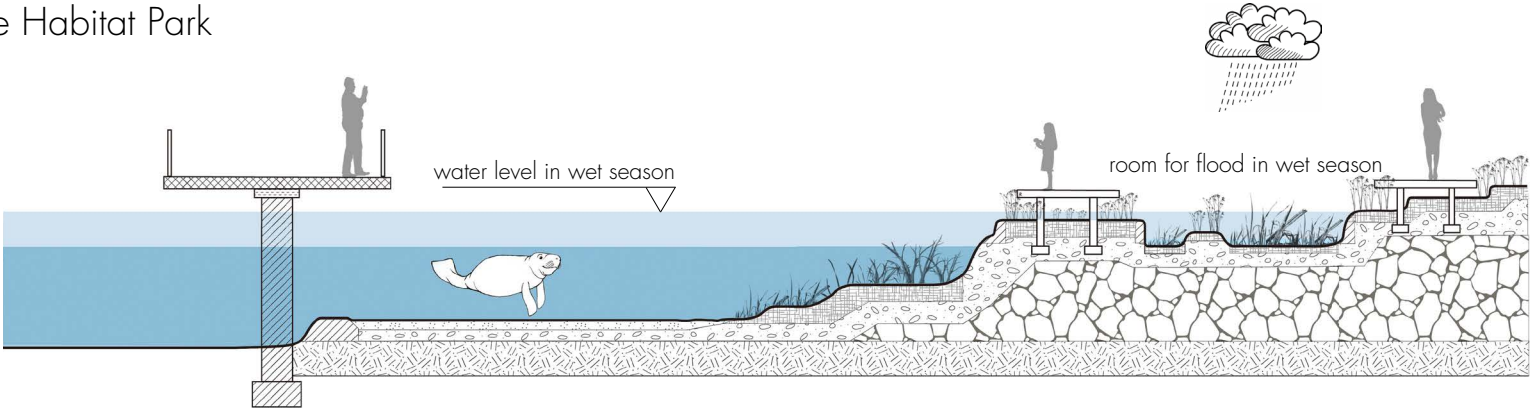
Seagrass planting offers manatee's food

A seasonal bioswale

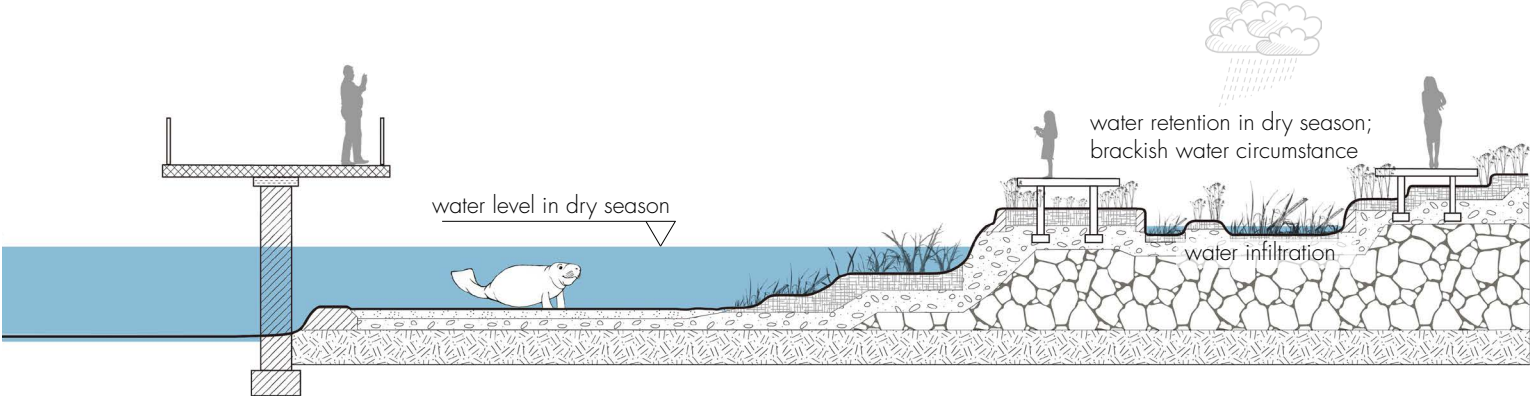
The manatee habitat park does not only serve as home for animals, but also a tidal park dealing with sea level rise problem. The pond of bioswale acts as seasonal dynamic ecosystem. Affected from sea water and rain water, it is in a brackish environment playing a role of sponge land. With sea level rising, the bioswale will change into permanent submerged circumstance. It has different functions in different temporal stages and reserves adaptive space for the future.

Technical Section of the Manatee Habitat Park

Wet Season

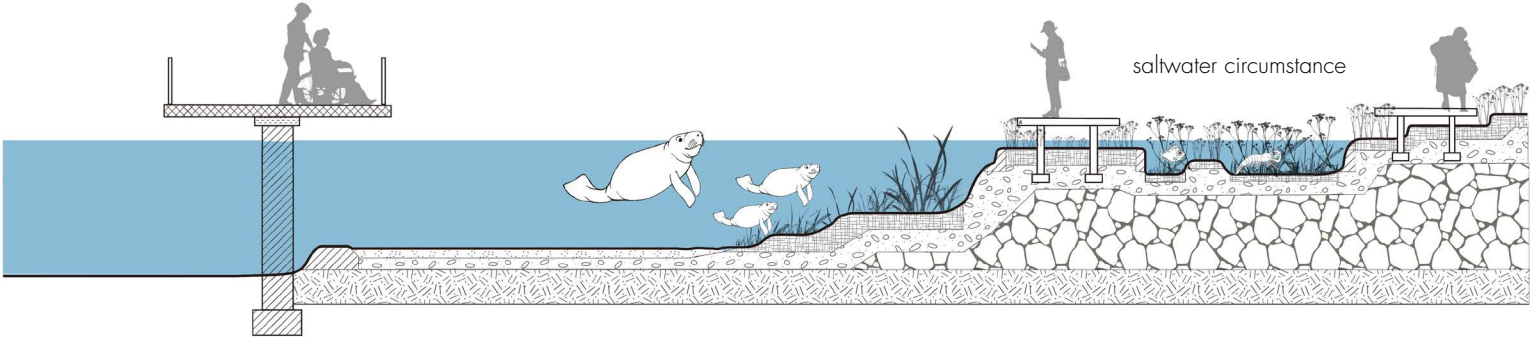


Dry Season

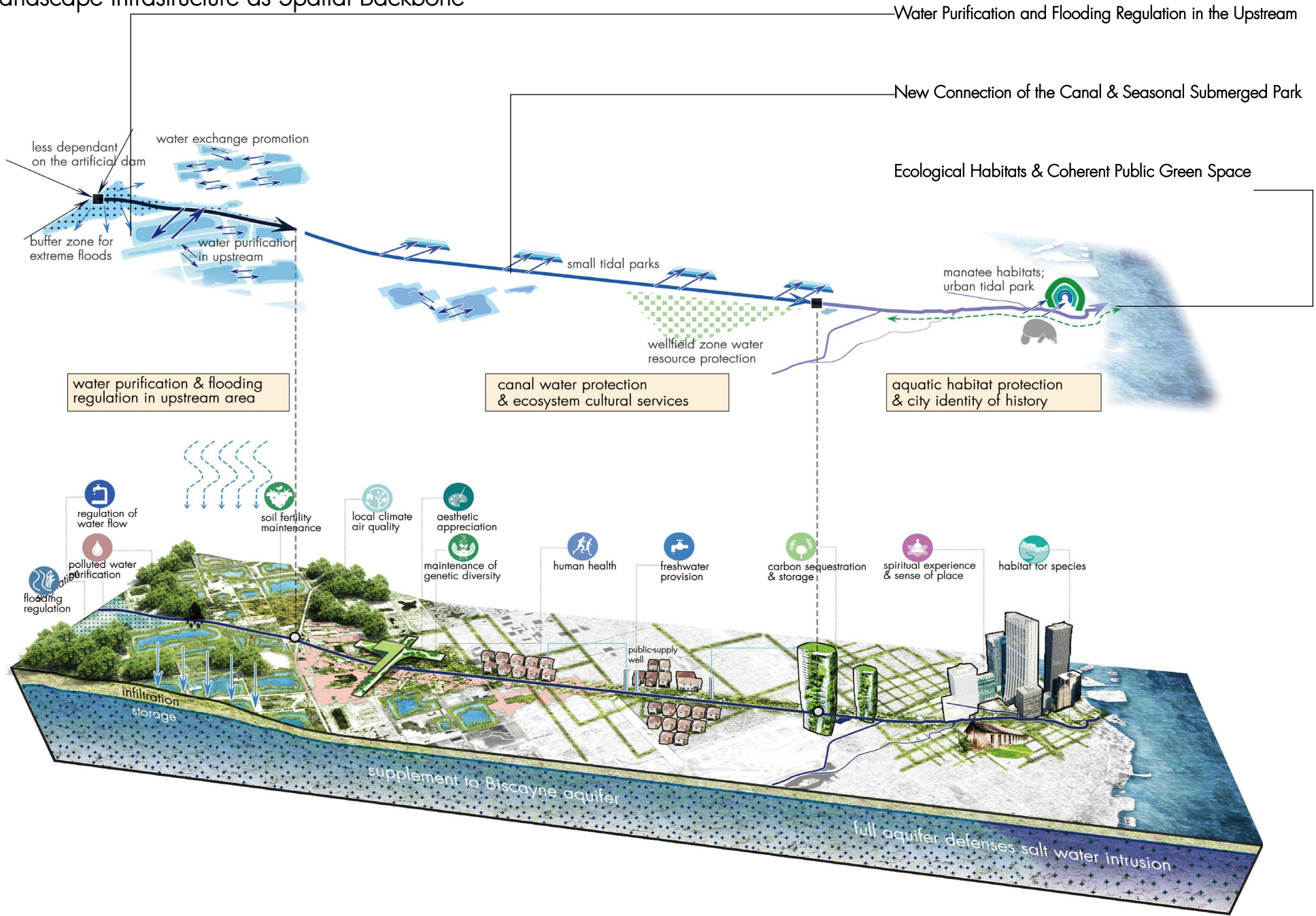


by 2060, sea level rises 60cm

40 years later...



Synthesis: Urban Landscape Infrastructure as Spatial Backbone

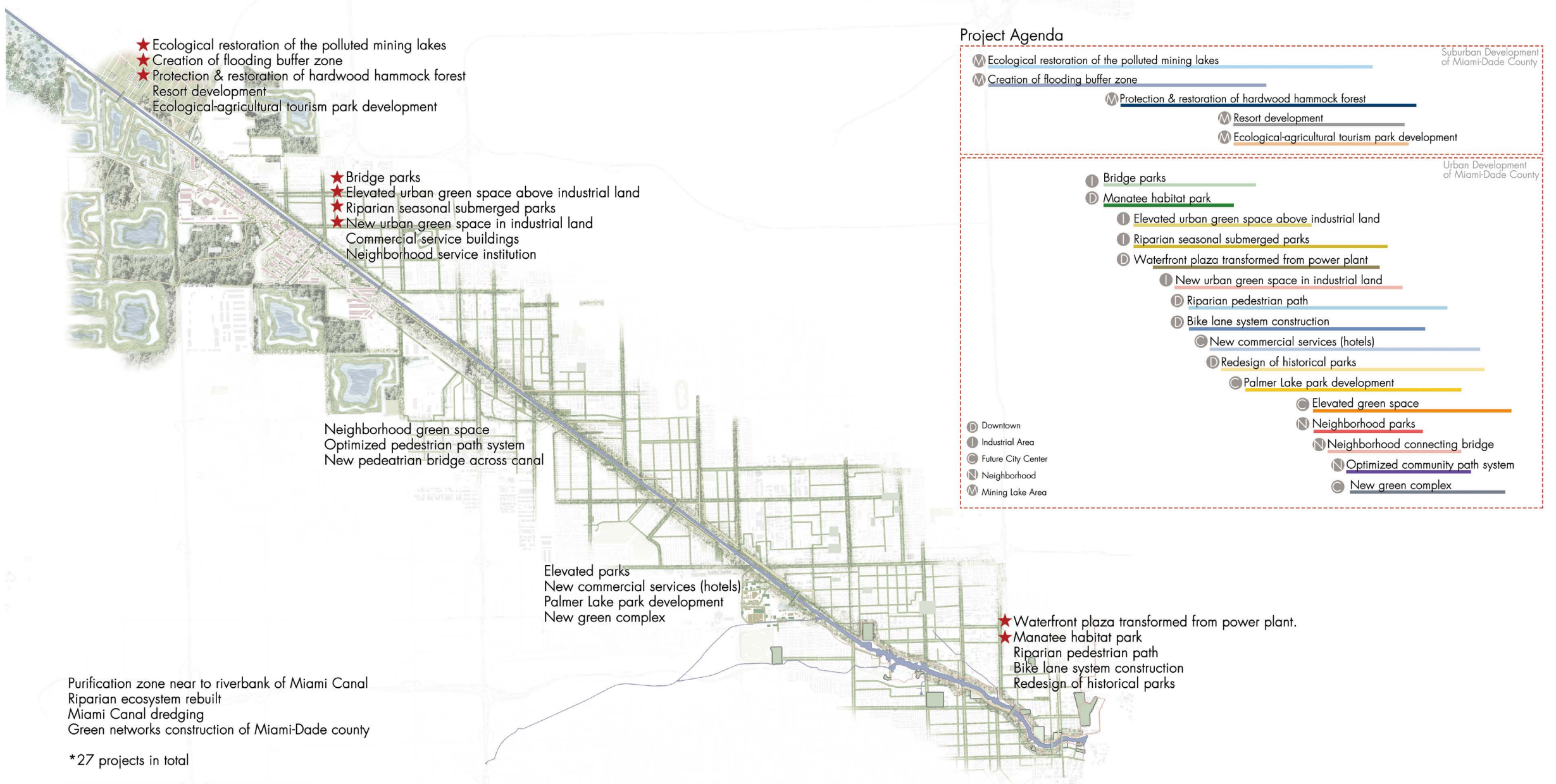


Temporal Development of Riparian Area of Miami River



Restoration Commercial-Industrial Area Livable Community Future City Center Activated Downtown Waterfront

Organization of Projects & Timeline



*27 projects in total

Section 6
Critical Reflections

Critical Reflection on the Study

Generic Value of the Research

1. It provides a new perspective of how the historical (ecosystem) values could be employed for sustainable development of the current rapidly growing cities.
2. Through presenting a more powerful role of landscape infrastructure in integrating urban systems and leading urban development, the research proposes an effective approach of dealing with urbanism issues from landscape perspective.
3. The research interprets how to redefine infrastructural design as an interdisciplinary design effort in a specific and vivid way.
4. It illustrates how ecosystem services are connected with landscape infrastructure, as well as how ES helps to explore infrastructural design orientation.

Relation Between Research & Design

1. Research sets a rigorous theoretical framework to lead the design explorations. The framework promises design exploration are effective to achieve the objective, without lost in scheme designs.
2. Design exploration optimizes the framework continually during the design process. Design makes the research result more understandable, more than only theoretical discussion or conclusion by words.
3. The integration of research and design composes the whole framework which is a tool for promoting a practical negotiation among land owners, government and the public.

Understanding Urban Landscape Infrastructure

The essence of ULI design is redefining all the systems of a city through the perspective of landscape. It is not only about landscape design or urban design, but a synthesis of the built environment of a city towards sustainability.

Reflection on Research Questions

The research questions follow the logic of "Understanding how system functions" — "What are the possible solutions" — "How to achieve" — "What is the relevance". The questions are answered by analysis or design explorations, which are interrelated with each other.

Thanks!