OXFORD 2021

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Graduate Regional Design Studio
Fall 2021

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Landscape Architecture
DEPARTMENT OF PLANT SCIENCE AND LANDSCAPE ARCHITECTURE

PALS
Partnership for Action Learning in Sustainability

ACKNOWLEDGEMENTS

Town of Oxford, MD
Cheryl Lewis | for the opportunity to work in your community on issues it finds important

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Associate Professor, Agroecology, Department of Plant Sciences and Landscape Architecture | Saltwater Intrusion Guest Lecture

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Cathy Madsen, PALS Photographer

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Booklet Graphics Team
Micaela Ada and Erin Callahan, Master of Landscape Architecture Candidates 2023

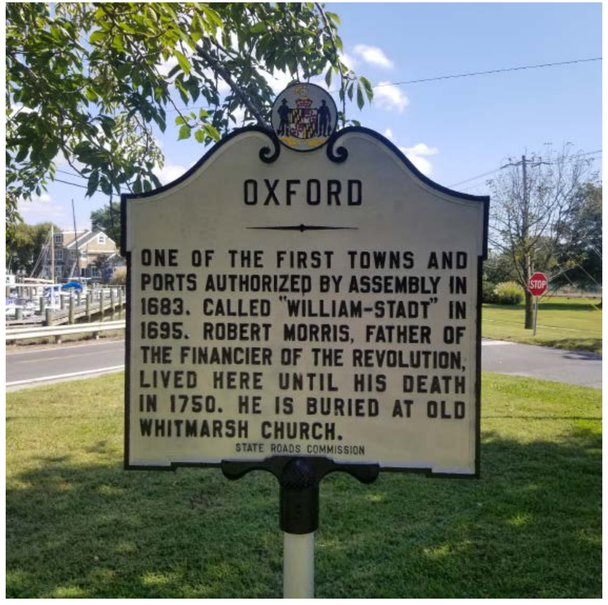


TABLE OF CONTENTS

EXECUTIVE SUMMARY

This project, supported by the National Center for Smarth Growth's Partnership for Action Learning in Sustainability (PALS), provides the Oxford community with a visual glimpse of their newly-imagined port town in the year 2100. Students responded to projected sea level rise of 3.5 feet as identified by the Town of Oxford and the Department of Natural Resources (DNR) Coastal Planners. In addition to a change in mean sea level, students considered mean higher high water (MHHW) above sea level to explore planning and design-scale interventions to inform Oxford's strategies on climate-sensitive development. The design of this hypothetical intervention focused on sea level rise, as well related factors such as pluvial hydrology, saltwater intrusion, and storm surge.

Students collected and analyzed data on Oxford, MD and its place within the broader context of Talbot County. This process consisted of a regional site inventory and analysis of digital materials and archives, analyzing geographic information system (GIS) data and producing graphic maps, and a two-day site visit to Oxford. In addition to site-specific research, the studio looked at traditional and emerging design responses to climate change in the landscape architecture field. Strategies of interest included floating homes, wetland restoration, living breakwaters, coastal reinforcement, earthwork berms, choreographed intrusion, and tide gates.

Grounded in research, students began ideating strategies the town could employ in its efforts to successfully adapt-in-place by 2100. Each student focused on a defined region in Oxford and applied their interventions within that scope.The final package comprises ten optimistic solutions for the town to draw inspiration from as it plans for the projected environmental changes to come in the next 80 years.

STUDIO GOALS & OBJECTIVES

This report compiles the project materials of LARC 642 Regional Design Studio. The goals of the studio were to:

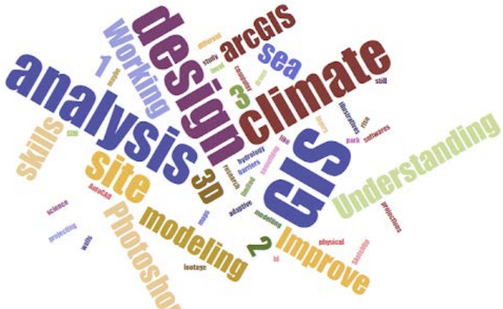
1. **Gain intermediate proficiency in Geospatial Information Systems as a tool for analysis and data visualization**

2. **Create effective design and planning deliverables to assist the future planning efforts of Oxford, MD**

3. **Develop students' project development, stakeholder management, and presentation skills**

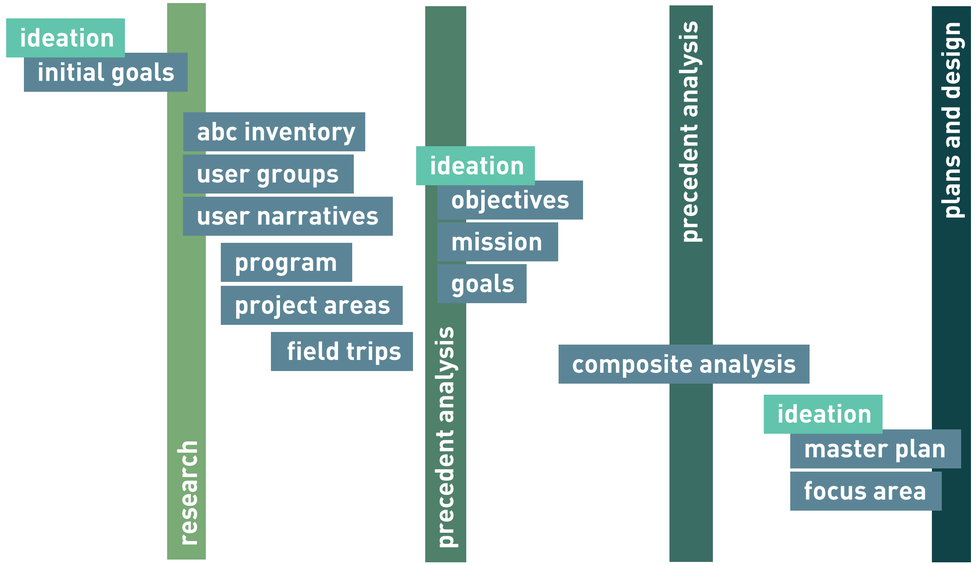
To this end, the studio's goals fell under three broad phases, respectively: research, design development, and final presentations. Before initiating the research phase, students developed the following word clouds to visualize their intentions for the project:

PROJECT FOCUS



SKILL DEVELOPMENT

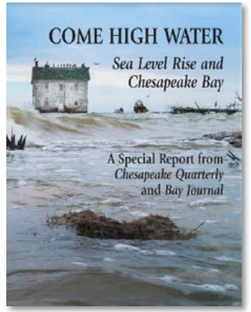
ITERATIVE METHODOLOGY



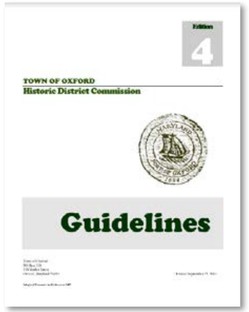
BEGINNING THE DESIGN PROCESS

REGIONAL SITE INVENTORY & ANALYSIS

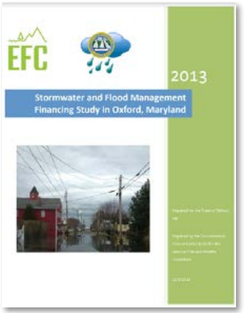
LITERATURE



Come High Water: Sea Level Rise and Chesapeake Bay



Town of Oxford Guidelines



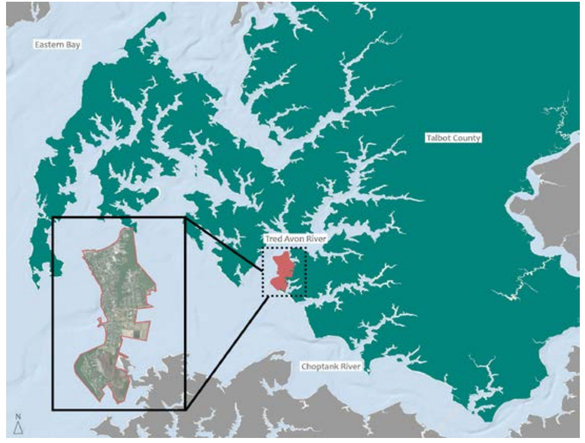
Stormwater and Flood Management Financing Study in Oxford, MD

Students consulted the above resources to initiate their research on contemporary sea level rise and flood management issues and best practices in the Chesapeake Bay. These materials, which reviewed both local and regional climate implications, grounded both the students and clients in a shared understanding of Oxford's unique risks and potential design solutions. This investigation also supported the students' subsequent efforts in producing regional and local maps using GIS data from Maryland's GIS Data Catalogue.

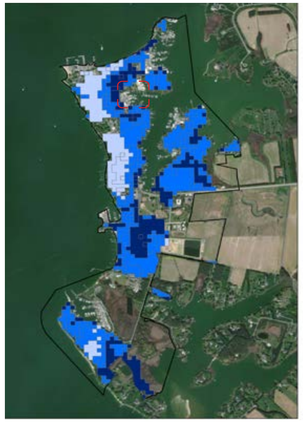
RESEARCH

REGIONAL SITE INVENTORY & ANALYSIS

GIS MAPPING



Students produced inventory maps at various scales (regional, local, and site) to analyze relevant biotic, abiotic, and cultural systems.



Flood Risk Areas

Medium Risk
High Risk
Focus Area
Boundary

The majority of Oxford's land area experiences flooding. However, most flooding and damage occurs along Banks St and Causway Park.

Local Roads and State Route

Local Roads
State Highway 333

Oxford has one major highway (State Highway 333) that leads to the entrance and the rest are local roads.

Source: Roads.Maryland.gov

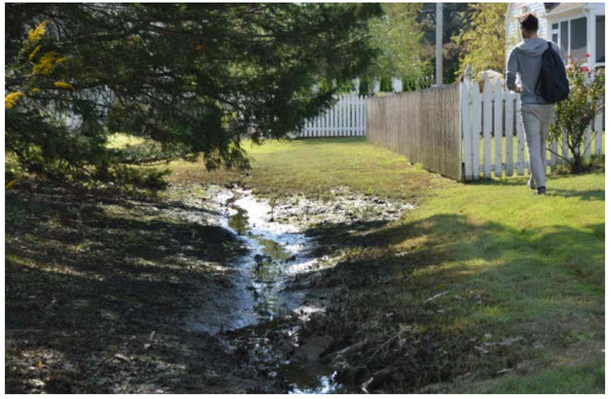
Property & Zoning

Transportation

REGIONAL **LOCAL**

DESIGN IDEATION

SITE VISIT AND COMPOSITE ANALYSIS

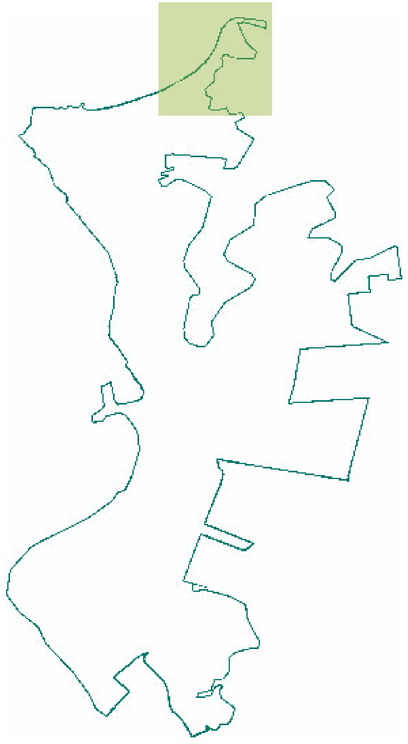


Students translated their site visit reflections and site inventory and analysis, relevant precedent studies, and contemporary literature on regional climate change into design thinking through charetting, sketching, and ideation exercises.

PROJECT AREA 1: NORTHERN STRAND

Critical Issues

- Vulnerable to complete inundation
- 50 percent of buildings (residential, commercial) at risk of flooding
- Northernmost tip becomes inaccessible
- All roads partially flooded
- 45 percent of entire surface area at risk of flooding



SITE INVENTORY & ANALYSIS

Today

2100

Total area of Strand Cove is 28 acres

New acreage of Strand Cove is 15.4 acres with 3.5' of sea level rise

Tree Canopy

Existing

4.4 acres of canopy coverage

2100

1.1 acres of tree canopy lost

Buildings

Existing

16 commercial building and **62** residential buildings

2100

7 commercial buildings and **25** residential buildings partially to fully flooded

Roads

Existing

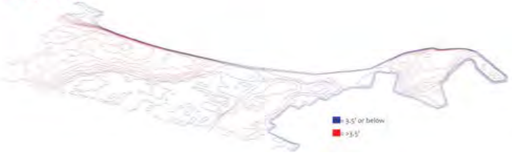
1 major road (N. Morris St.)- **0.6** acres

6 minor roads- **8.7** acres

2100

All roads partially flooded

Topography



Existing

28 acres ranging from 0-11' in elevation

2100

45% of Stand Cove flooded

LIVING WITH THE WATER
A SOLUTION FOR OXFORD

Audrey Seiz

Design Strategies & Precedents

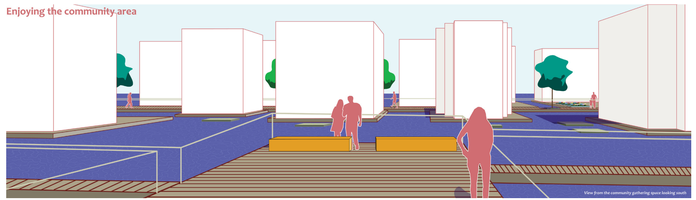
Embrace Water
- Floating homes
- Buoyant foundations
- Public access boardwalks
- Water taxi

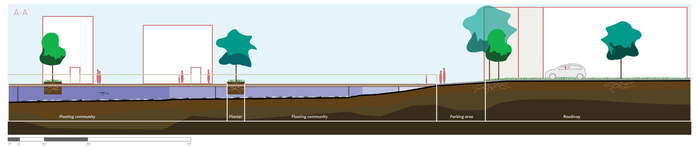
Adapt Through Ecology
- Constructed/ floating wetlands
- Living breakwaters
- Green piers
- Bioretention

Maintain Historic Character
- Access to homes via the water
- Durable, sustainable, weathered wooden docks
- Salt-tolerant plantings
- Pervious brick paving

Strand Cove Floating Community

Enjoying the community area





Strand Cove Master Plan

98 new trees planted

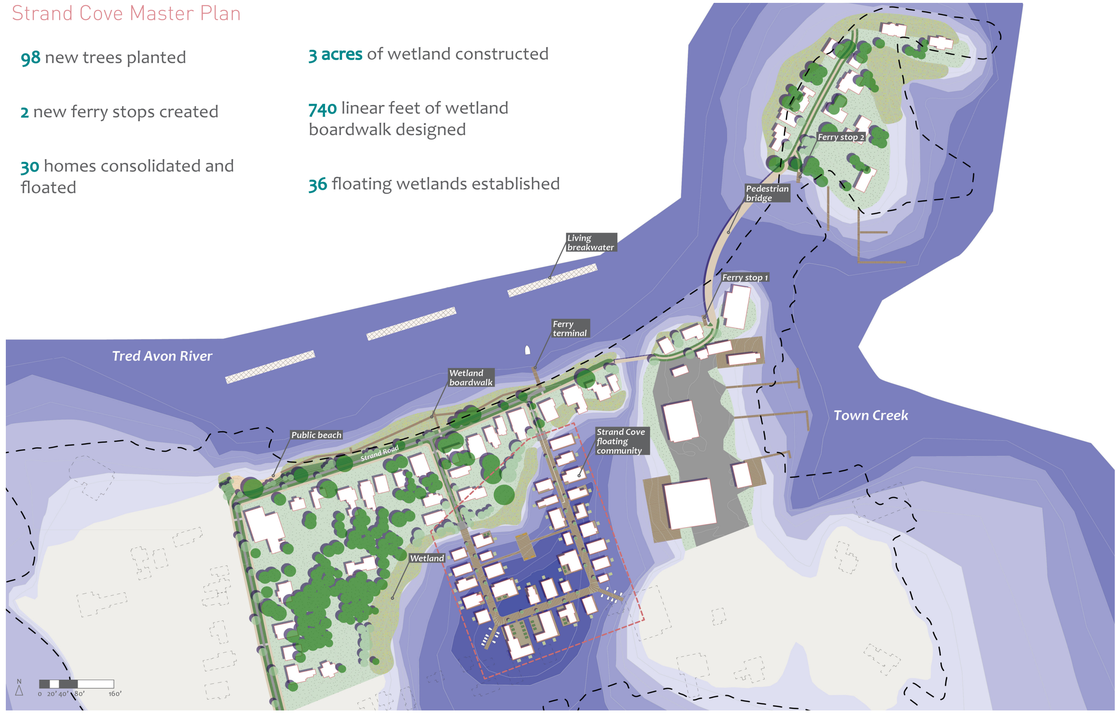
2 new ferry stops created

30 homes consolidated and floated

3 acres of wetland constructed

740 linear feet of wetland boardwalk designed

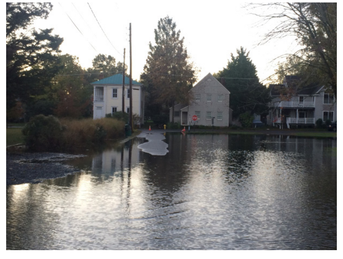
36 floating wetlands established

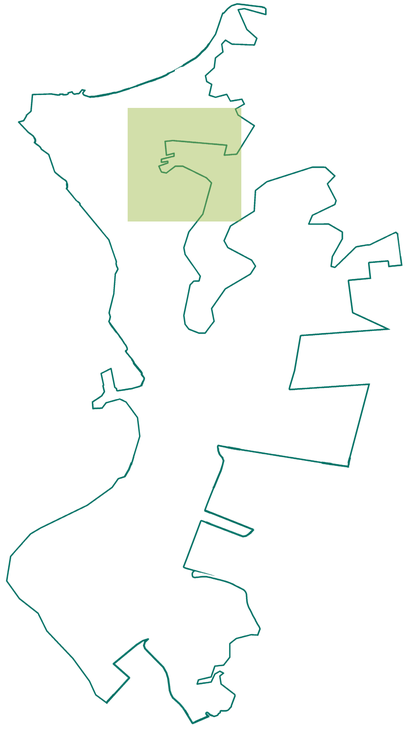


PROJECT AREA 2: HISTORIC HARBOR

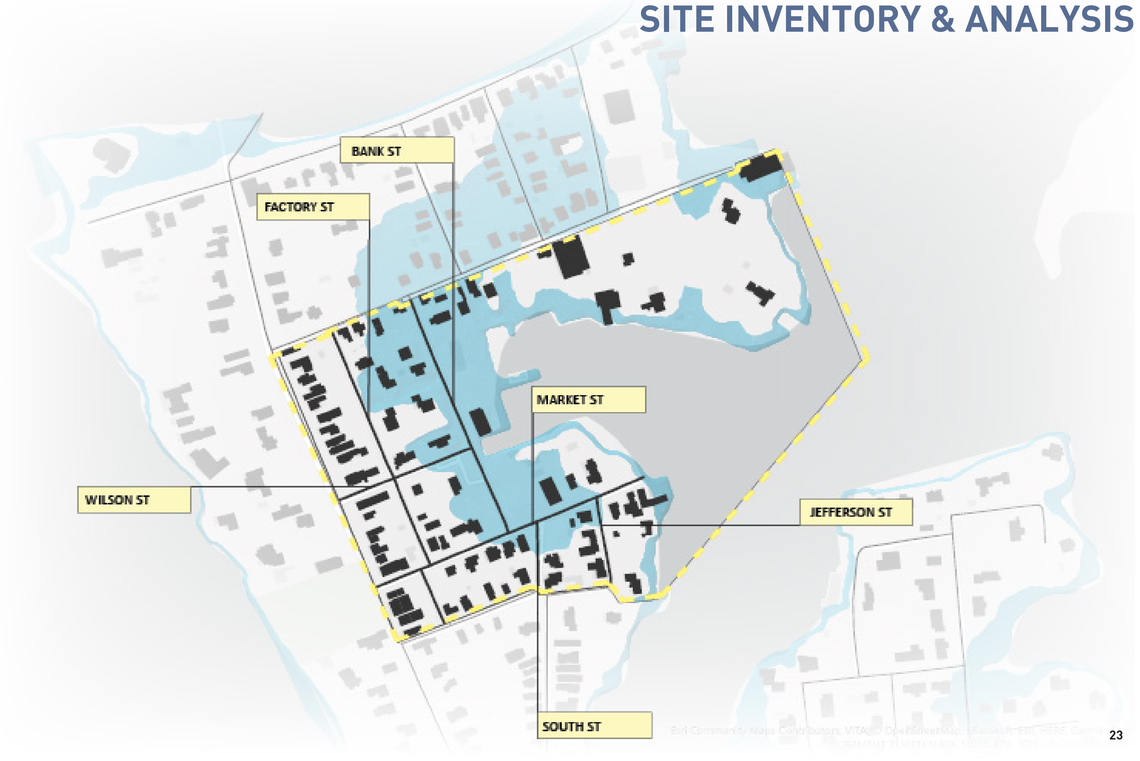
Critical Issues

- Most frequent and severe flooding due to low elevation
- Severe plivial flooding
- Low points act as natural collection basin for stormwater
- Portions of waterfront serve as a natural channel for stormwater entry during particularly high tides





SITE INVENTORY & ANALYSIS



INNOVATE | RESTORE | FORTIFY
OXFORD OF THE NEW CENTURY

Deb Shteinberg

Design Strategies & Precedents

Innovate

Immortalize Oxford as a coastal town on the cutting edge of climate change intervention by conceiving a new and innovative harbor in Oxford's north district, while maintaining its vibrant historic legacy.

Restore

Bring back tidal marshlands that once occupied Oxford's land. Restore these wetlands to capitalize natural flood control that would otherwise require dredging and levees.

Fortify

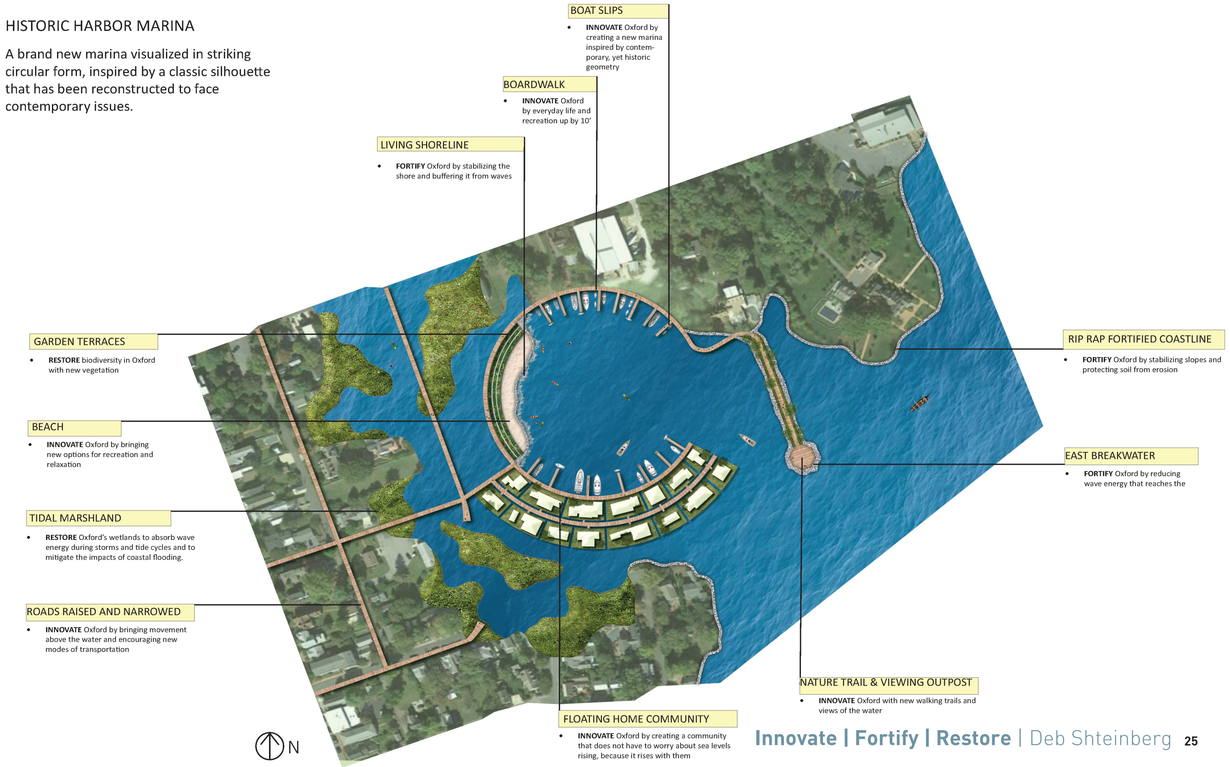
Address sea level rise by providing fortification for the vulnerable areas where elevation is low and severe flooding occurs, particularly Bank St, Market St, and Wilson St.

Floating Community

Breakwater Outlook

HISTORIC HARBOR MARINA

A brand new marina visualized in striking circular form, inspired by a classic silhouette that has been reconstructed to face contemporary issues.



OXFORD 2100
OUR FUTURE HERITAGE

Matthew Reise

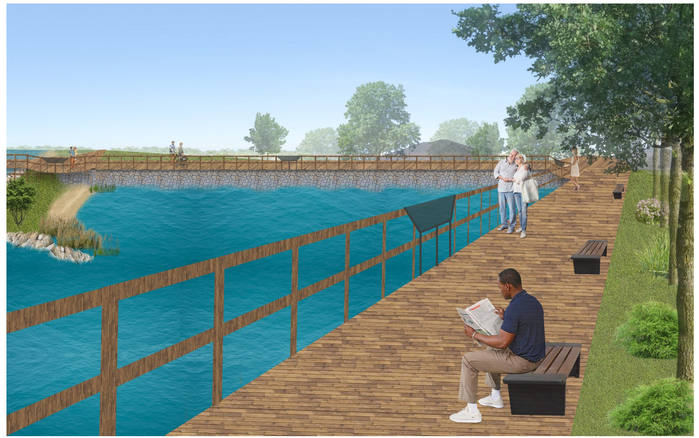
Design Strategies & Precedents

Climate Change Adaptations

- Prevent Sea Level Rise in low-elevation areas
  - Employ embankments to protect existing infrastructure in floodplains
- Address Storm Surge on coastlines most heavily affected (west & north)
  - Utilize living shorelines & constructed wetlands to dissapate wave energy
  - Construct hard edges to break wave momentum
- Prepare for increase in amount & frequency of Pluvial Flooding
  - Build wetlands that absorb water in areas prone to inundation
  - Develop a system of renewable-powered water pumps

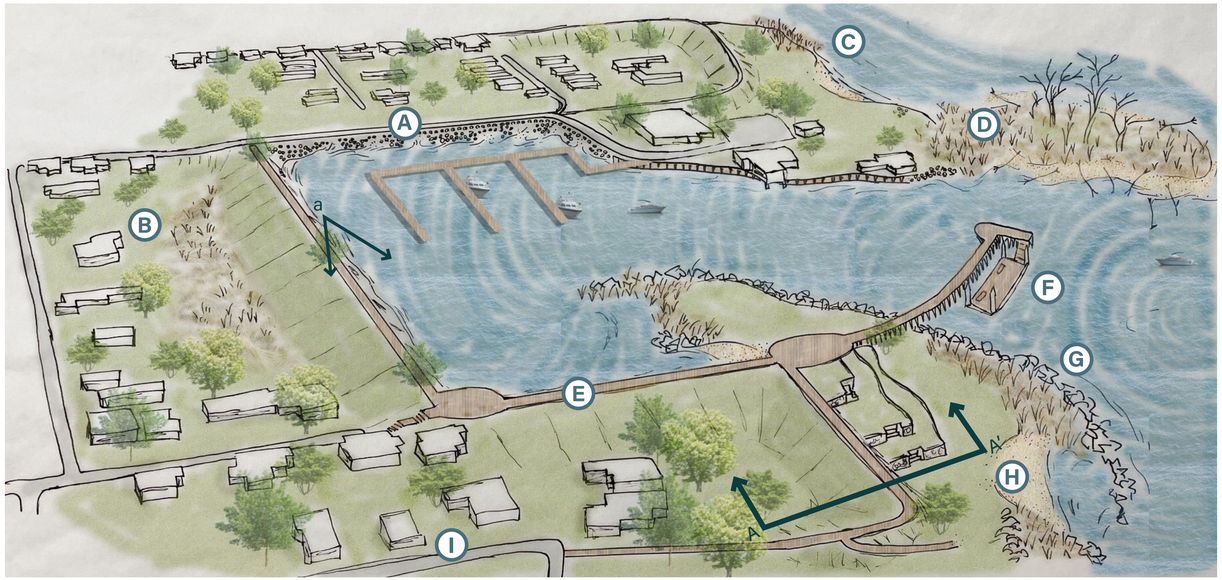
Human Design

- Facilitate recreation, pleasure, and learning
  - Keep sight lines open
  - Celebrate water views & interactive points
  - Allow access to wetland areas
  - Incorporate signage about wetland habitats, SLR, and coastline protection methods
- Continue the story of Oxford
  - Keep traditional materials and architectural forms
  - Embrace the water-centric lifestyle of residents
- Design for the people who live in Oxford
  - Meet with local stakeholders to co-create goals



a. A Walk to Remember | The key component tying this design to the Vision is a guided walk along the harbor ambankment boardwalk through Oxford's memorable history and into its future. Led by a set of informative plaques highlighting Oxford's history, present struggles, and future outlook in a shifting environment are discussed.

A-A' The Southern Embankment | In section elevation view, this portion of the embankment does not border the water. Via terraced stairs, it leads down to a living shoreline



A Main Embankment

B Interior Low-Ground

C Living Beach

D Ghost Island

E Embankment Boardwalk

F Pier & Floating Boardwalk

G Terraced Oyster

H Living Shorelines

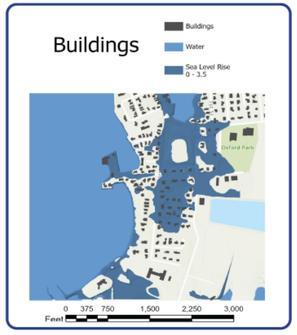
I Memory Lane

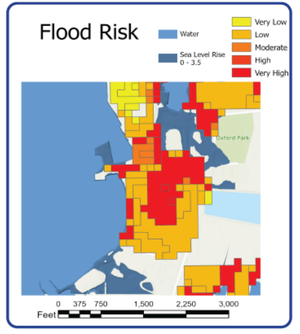
PROJECT AREA 3: THE CAUSEWAY

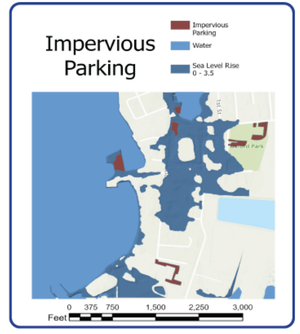
Critical Issues

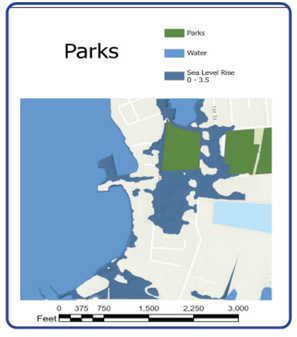
- Severe flooding driven by stormwater collection and lack of absorption
- Entry road, and consequently the town, becomes inaccessible in flood events
- Lack of natural water storage capacity aggreavated by impermeable clay-based soil

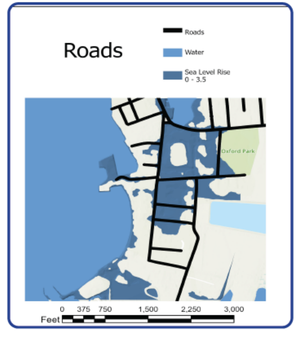
This turf field park is one of two recreational parks in Oxford. The park contains two tennis courts, a playground, and a soccerfield

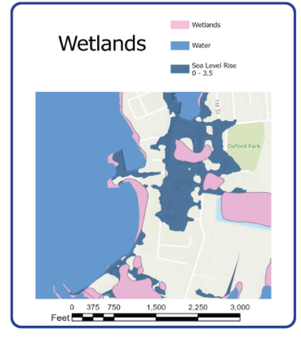












OXFORD 2100

Jainee Shah

Design Strategies & Precedents

This vision of Oxford 2100 is to use the projected sea level rise as an advantage, by creating a new waterfront development in the area that is already at risk of inundation

Environment

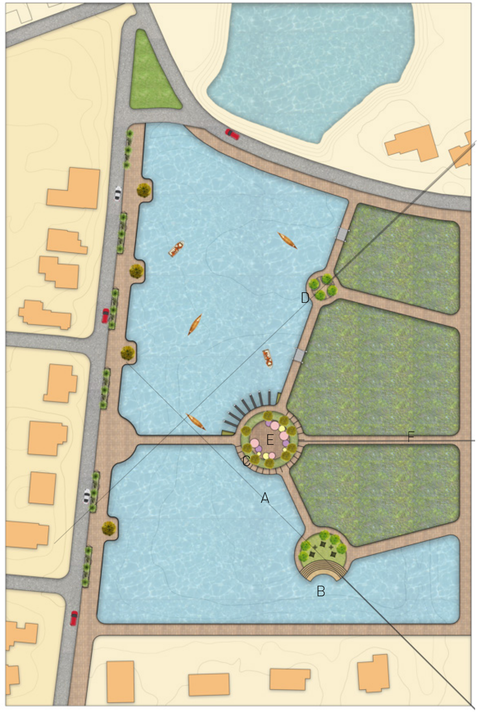
Increases resilience against risk of sea level rise

Commercial

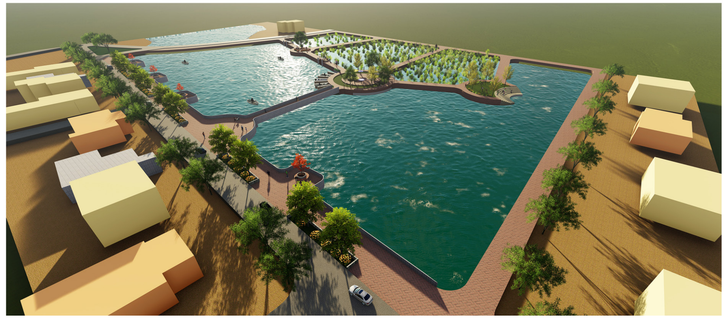
Proposed market area on the waterfront promotes commercial growth and will also attract more tourists

Recreational

Includes recreational areas for various age groups. The harbour helps people engage in various water-related activities and maintains the town's connection with water



SITE PLAN SCALE - 1:60

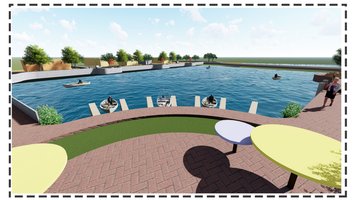


S.Morris street and promenade

A.Central plaza and market space

D.Seating area overlooking the waterfront

B.Amphitheater



E.Harbour created around the central plaza

C.Walkway around central plaza

F.Walkway overlooking central plaza

HARBOR TO HARBOR

RETHINKING AND RETELLING THE STORY OF OXFORD, MD

Micaela Ada

Design Strategies & Precedents

This design incorporates two sites within the town, excavating one (Focus Area B) to provide fill for the other (Focus Area A)

Focus Area A | Harbor Park

- Levee park will fortify low-lying area against storm surge and tidal intrusion.
- Increased vegetation, to include salt-tolerant and aquatic planting, will maximize stormwater infiltration.
- Elevated pedestrian infrastructure will allow participation with landscapes in varying inundation conditions.

Focus Area B | Causeway Park

- Marina on newly inundated land will help commmunity maritime-lifestyle persist by embracing SLR.
- New aquatic area provides opportunity for oyster and marsh habitat restoration.
- Elevated, shared access road will maintain access between Oxford and the mainland.

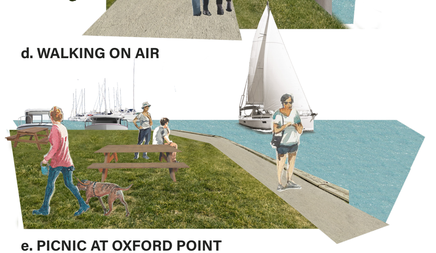
MASTER PLAN | FOCUS AREA A

a. A MOMENT WITH THE DUCKS

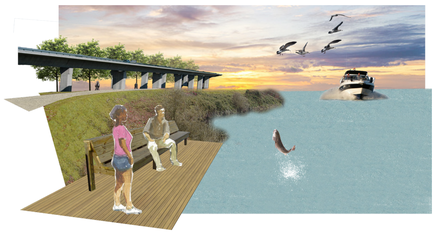
b. OUTING TO THE PARK

c. A VIEW OF IT ALL

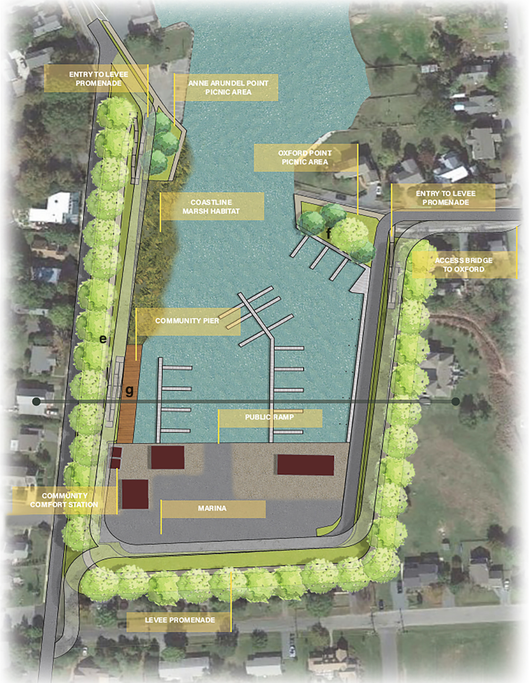
d. WALKING ON AIR



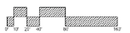
e. PICNIC AT OXFORD POINT



f. DOWN TO THE WATER



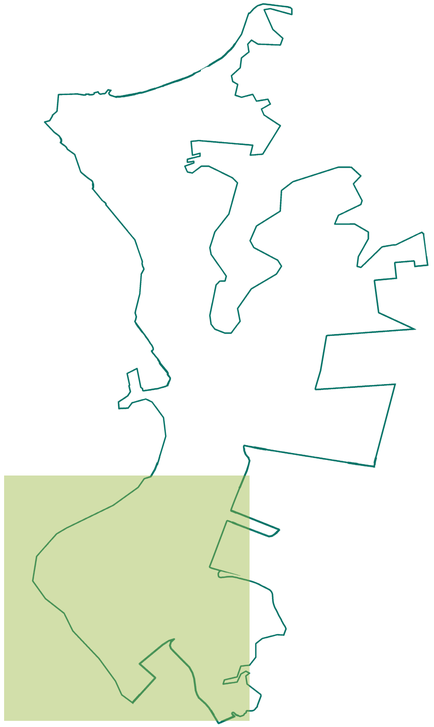
MASTER PLAN | FOCUS AREA B



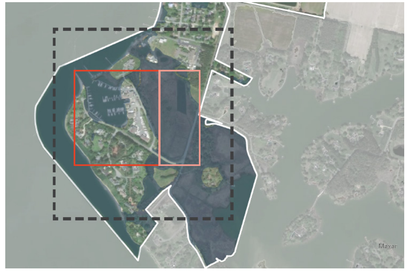
PROJECT AREA 4: SOUTHERN OXFORD

Critical Issues

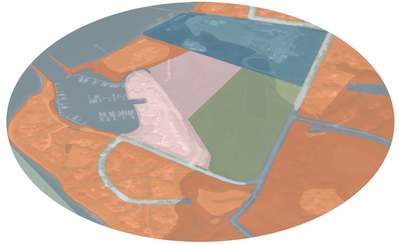
- Exposed to wind-driven storm surge flooding
- Salt water intrusion threatens wetlands and stormwater infrastructure



oxford 2021

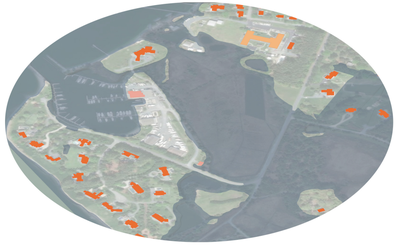


oxford 2100 (3.5‘ SLR)

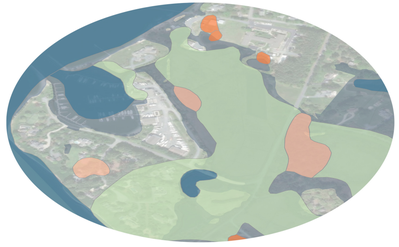


zoning residential (50%) commercial (15%)

transportation sole artery submerged



structures 20% of homes threatened



wetlands estuarine dominant

WETLAND, WATER, WONDER

OXFORD IN 2100

Erin Callahan

Design Strategies & Precedents

This project creates a mixed-use waterfront site that increases interaction with both the wetland and the bay while accomodating nature's rhythms. In addition to recreation, the waterfront will be a destination for economic activity: from a restaurant, farmer's market, to community space, the site's multiuse capabilities will encourage entrepreneurship against a backdrop of wonder and beauty. The site is designed for periodic flooding, sparking important dialogue and reflection of the landscape with visitors

Goals

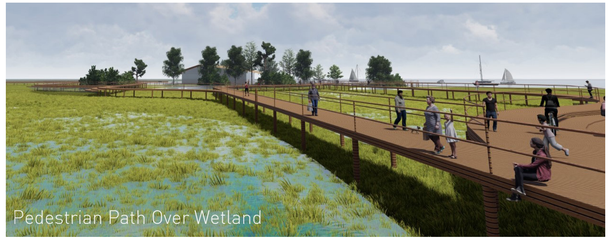
- Expand Public Realm
- Extend Wetland Edge
- Enhance Circulation
- Encourage Industry and Economic Development
- Improve Wetland Health
- Connect and Engage Visitors To Wetland Through Informative Signage and Close Interaction With Ecosystem

AREA 1: NORTHERN BOATYARD (LOWLAND)
A: Campbell's Boat Yard and overflow parking
AREA 2: CENTRAL PLAZA (MIDLAND)
B: "Amphi-theatre"
C: "Center Sponge": alternating wetland planters and grates
D: Floodable tidal gardens and "pool"
E: Wetland spine
F: Lawn
G: "Amphi-theatre" to rock and rain garden
H: Storage facility and public amentities (water, restroom)
I: Transitional gabion walkway over wetland plantings

AREA 3: SOUTH COVE (UPLAND)
J: Multi-use facility with restaurant, cafe, pro-shop, and open programmable space; covered outdoor seating
K: Rock and rain garden with bench seating
L: Gabion retaining wall and sand bar
M: Dock walk
N: Coastline fortification and erosion control
O: Grand lawn
P: Golf cart, bicycle parking
Q: Wetland "sponge" and elevated walkway to entrance
R: Elevated road
T: Wetland buffer


Plaza and Tidal Gardens


A Restaurant and Main Lawn


Pedestrian Path Over Wetland


Wetland Engagement Area

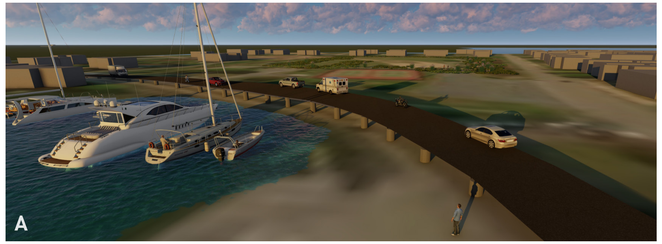
A STEP AT A TIME

A PLAN TO RAISE, PROTECT, AND HIGHLIGHT SOUTHERN OXFORD

DANNY BENTLEY

Design Strategies & Precedents

This design includes multiple solutions that target southern Oxford to help solve the issues facing the town related to sea level rise projections. Living shorelines and oystertecture breakwaters reefs will protect the fragile shoreline from storm surge and daily boat traffic. Erosion will be minimized through salt water grass plantings. Oxford can add to its impressive array of oyster recovery projects on the eastern shore. The centerpiece will be the newly constructed blue pier. It will serve to draw tourists and locals alike to the area. More importantly, it will highlight the work being done to save the bay's oysters and educate the public on the possibilities of shoreline protection and oyster recovery. A new education center on a lower level of the pier can educate while the rest of the pier serves as a new recreation site for sunsets and ice cream. It is sure to be a frequent destination for visitors but also for locals on a daily basis.



PROJECT REFLECTION FROM THE COHORT

Oxford 2100 was a welcome challenge to our cohort. In an era heavily focused on climate-action, we will undoubtedly see more projects like this in our careers. This studio was our first encounter with regional-scale design and explicitly leading with climate mitigation strategies. It was also a great lession in thinking about resilience from both a functional and cultural lens. We had to strike a balance between proposing considerably novel, future-oriented design strategies with the historic town's dedication to adapting-in-place and maintaing their community heritage. As more communities aound the world deal with flooding and sea level rise, this balance of adapting and maintaining cultural identity will be on many people's minds. It was great to have the opportunity to work on these serious global issues at the local level.

From a technical skills standpoint, learning Geographic Information Systems (GIS) mapping was invalueable to inform the design process at this scale. At the writing of this booklet, we are now a year out from the Oxford 2100 studio. In that time, many in our cohort have utilized these GIS skills in other studio projects and internships.

We thank the town of Oxford for welcoming us into their community and collaborating with us, along with PALS, to execute a vision for their future. We look forward to bringing all these lessons learned and skills into our future work.