

# PORTFOLIO

MATTHEW LAKE

SELECTED WORKS

2020-2023

**MATTHEW LAKE**

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480-734-8361

**Design Work**

**A** pg 4

**Socialized Floodplains**  
Rural trail and land planning for healthy communities, waterways and agriculture

**B** pg 10

**Umbra**  
A working urban forest + nursery to combat extreme heat within Philadelphia communities

**C** pg 18

**Reimagining Cobbs Creek**  
Urban design strategy to connect communities to water & re-imagine what it means to live in urban lowlands

**D** pg 24

**Multicultural Enschede**  
A climate solutions & knowledge sharing master-plan

**E** pg 30

**Professional Work**  
Blanche Nixon Library & Flowing Springs Inn

**Digital + Analog Skills**

**F** pg 36

**Digital Modeling + Drafting**  
3d modeling and drafting construction details

**G** pg 40

**Analog Media + Craftsmanship**  
Ideation through hand graphics and craftsmanship

# A.

## Socialized Floodplains

University of Pennsylvania. LARP 601, Fall 2021  
Instructors: E. Neises, Z. Hammaker

Chester County, PA. Greater Oxford area.

Regional/ rural planning, trail design



Agriculture is the single largest source of water pollutants entering local watersheds and the subsequent larger water-bodies, the Susquehanna River and the Chesapeake Bay. These pollutants pose a serious physical health risk to rural communities in Lancaster and Chester Counties, and aquatic landscapes. A lack of connectivity of Oxford area residents to public land, ecologically productive land, and an abundance of pollutants entering watershed systems and groundwater drinking supplies can be observed in the Tweed Creek watershed. Ecologically productive, public land can work towards the ideals that all people have a right to healthy water (for recreation and drinking). If the 200-year floodplain is secured for the public, it could re-mediate agricultural and urban runoff, restore the watershed and reduce pollutants for groundwater well users, while building connectivity between Oxford area residents to their public land.

### TOOLS USED:

ArcGIS Pro, Rhino 3d, Photoshop, Illustrator, hand graphics,



### OCTORARO WATERSHED

72% of land cover is agriculture

96% of waterways are impaired to aquatic life

280k People rely on its water

~8,850 Private wells

— Impaired waterway

OCTORARO LAKE

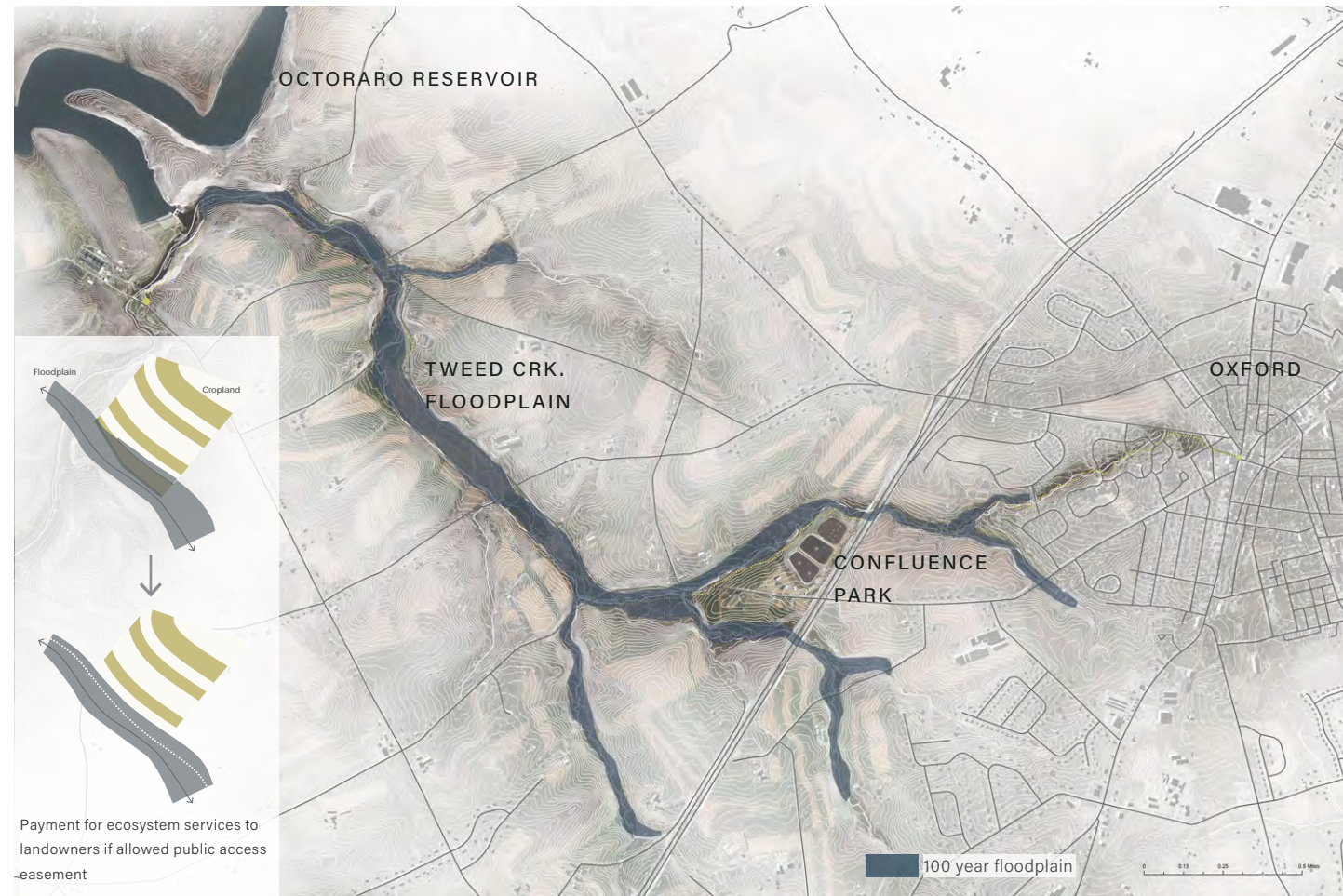
OXFORD, PA.

Runoff from farms using conventional farming practices create heavily impaired streams. Octoraro watershed is the leading contributor of nutrient and nitrogen runoff to the greater Chesapeake Bay watershed.

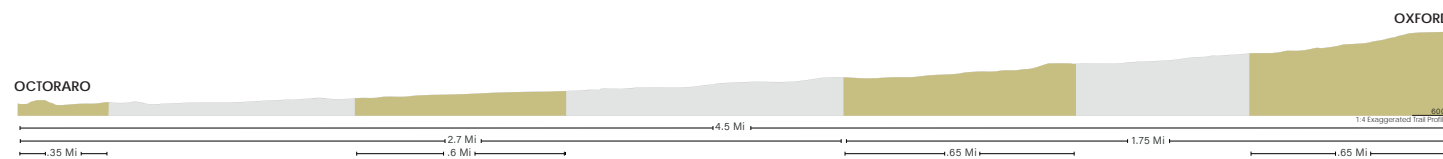
CHESAPEAKE BAY  
NORTH BRANCH

0 2 4 MI

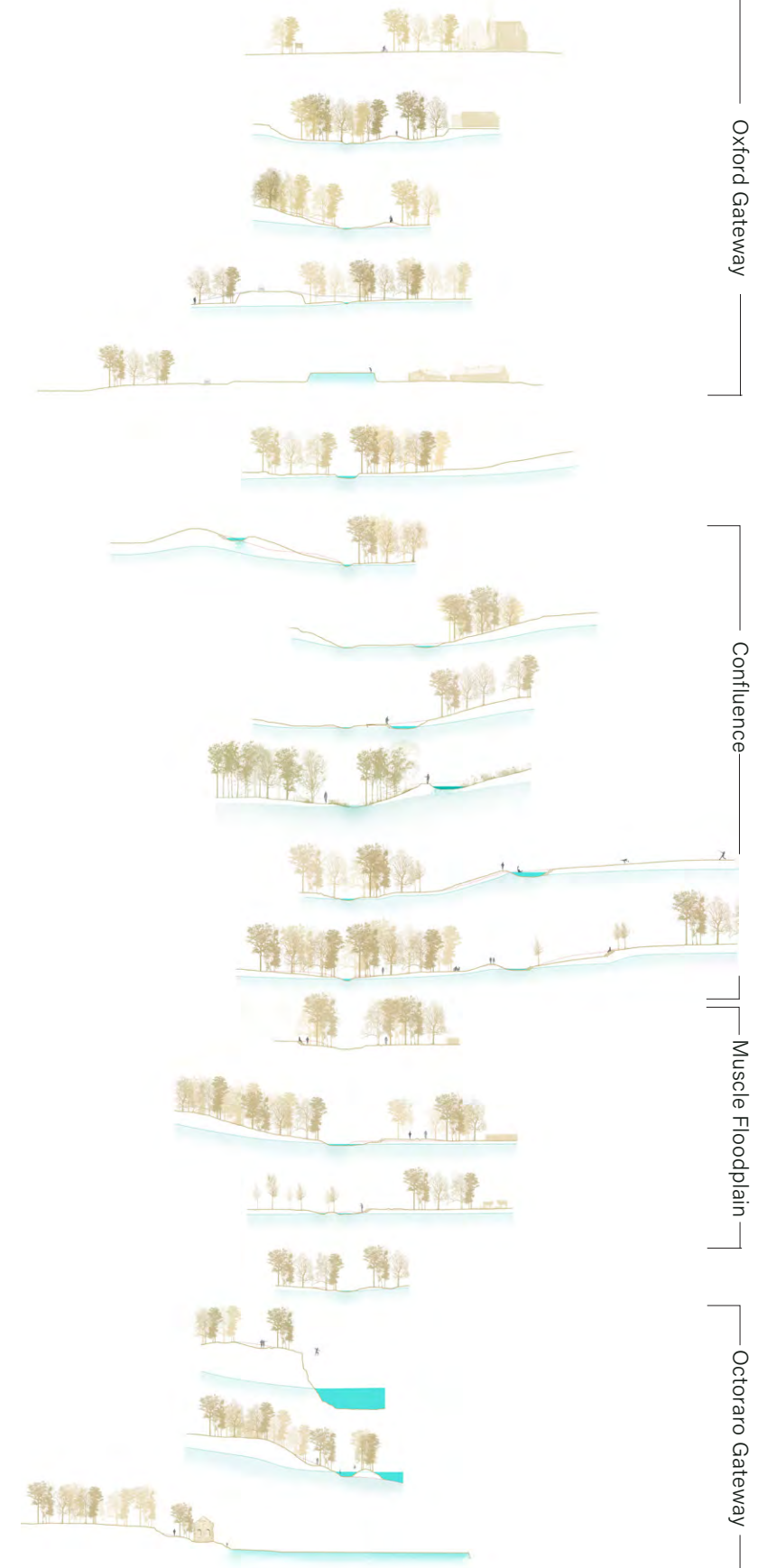
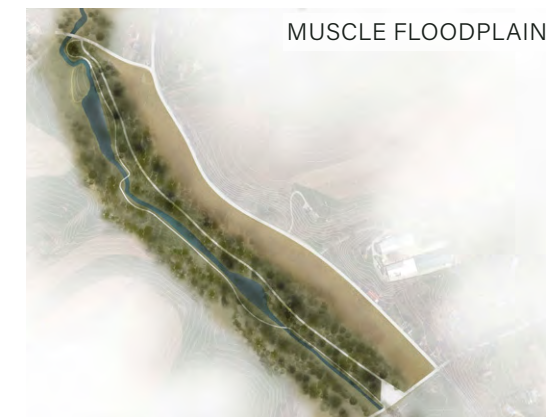
**A SOCIALIZED FLOODPLAIN MAP** / If the neglected floodplain is secured for public use it can keep residents and infrastructure safe, clean-up stream-ways and create additional public outdoor space. Creating The Oxford to Octoraro Trail (O to O Trail)



**TRAIL PROFILE + HUBS** / 2 gateways, 2 hubs and 4.75 miles of trail make up the O to O Trail. The Octoraro Reservoir & surrounding land is secured from privatization and maintained for public access. The Oxford gateway empties into Main St. to improve Oxford's tax base



**O TO O TRAIL HUBS + GATEWAYS** /



**CONFLUENCE REGIONAL PARK PLAN** / The main node of the O to O trail. The Confluence of Tweed Creek tributaries and the location of Oxford area regional park.

- 1 Slow release of tertiary effluent from waste water treatment creates series of ponds
- 2 Bio mass staging & treatment for farm land application.
- 3 Contour planting mimics the regional agriculture practice of 'strip farming' which reclaims the practice that pollutants the streams and using it to clean streams



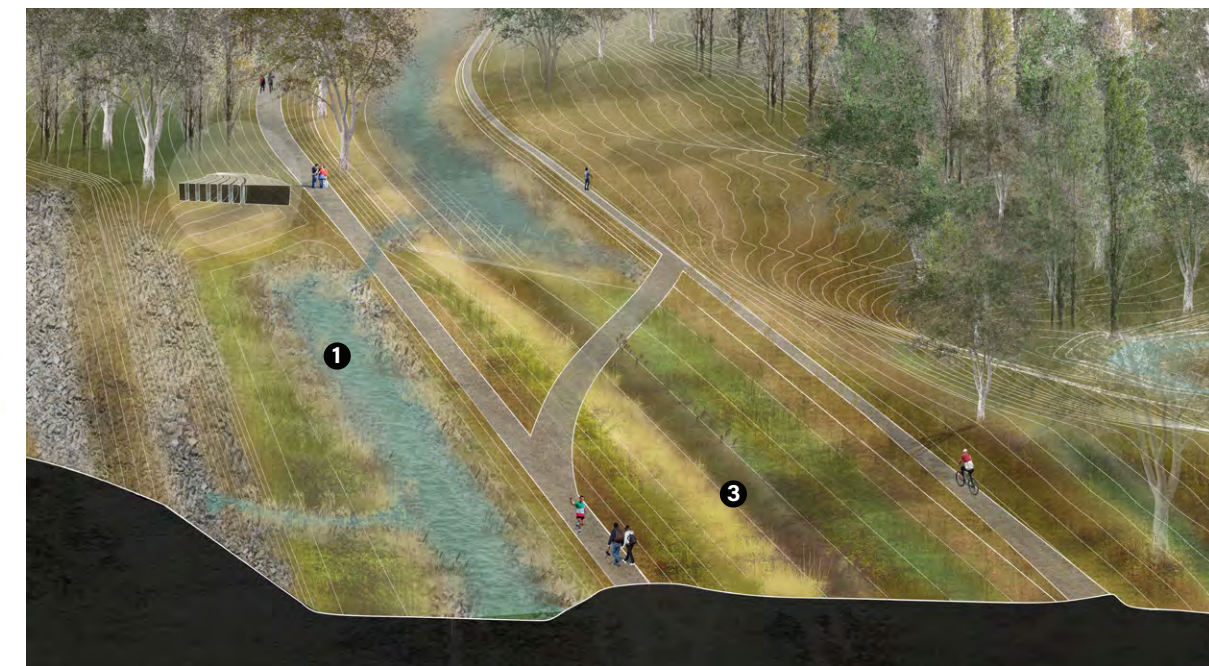
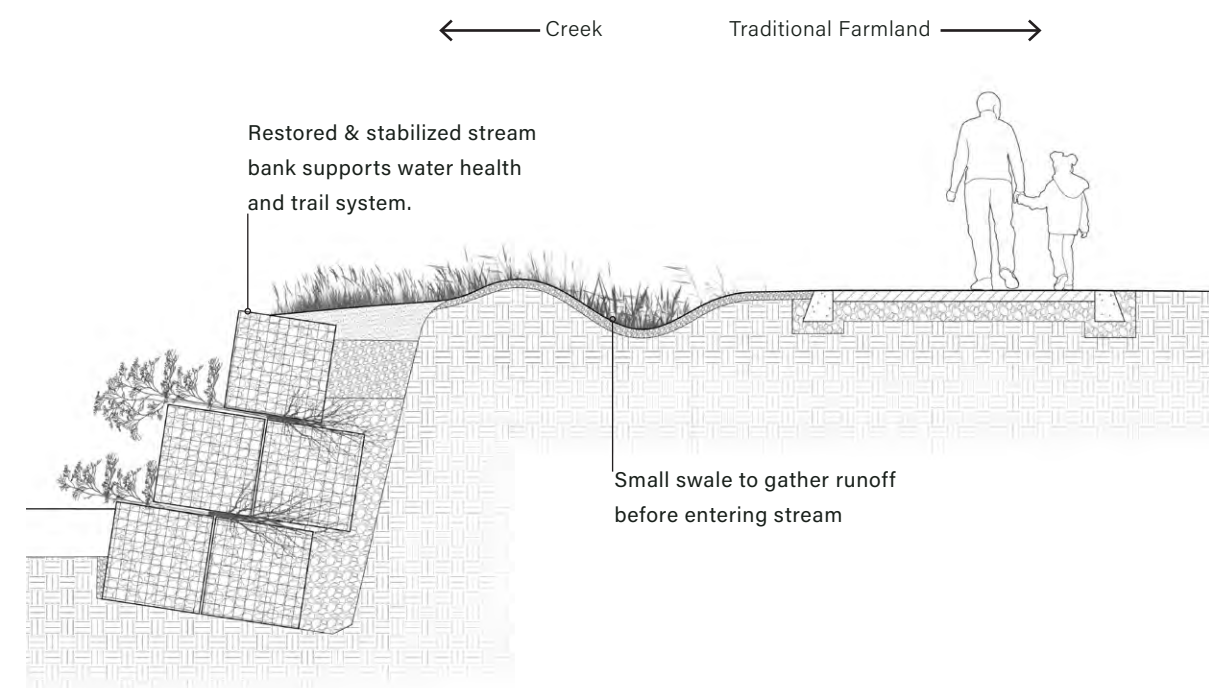
Process development  
Concept Diagram



chartpak + trace plan



**TYPICAL CREEK SIDE TRAIL SECTION** / Section through restored stream bank and trail



# B.

## Umbra

University of Pennsylvania. LARP 502, Summer 2021  
Instructors: Karen M'Closkey, Misako Murata

Philadelphia, PA.

Water front landscape / extreme heat



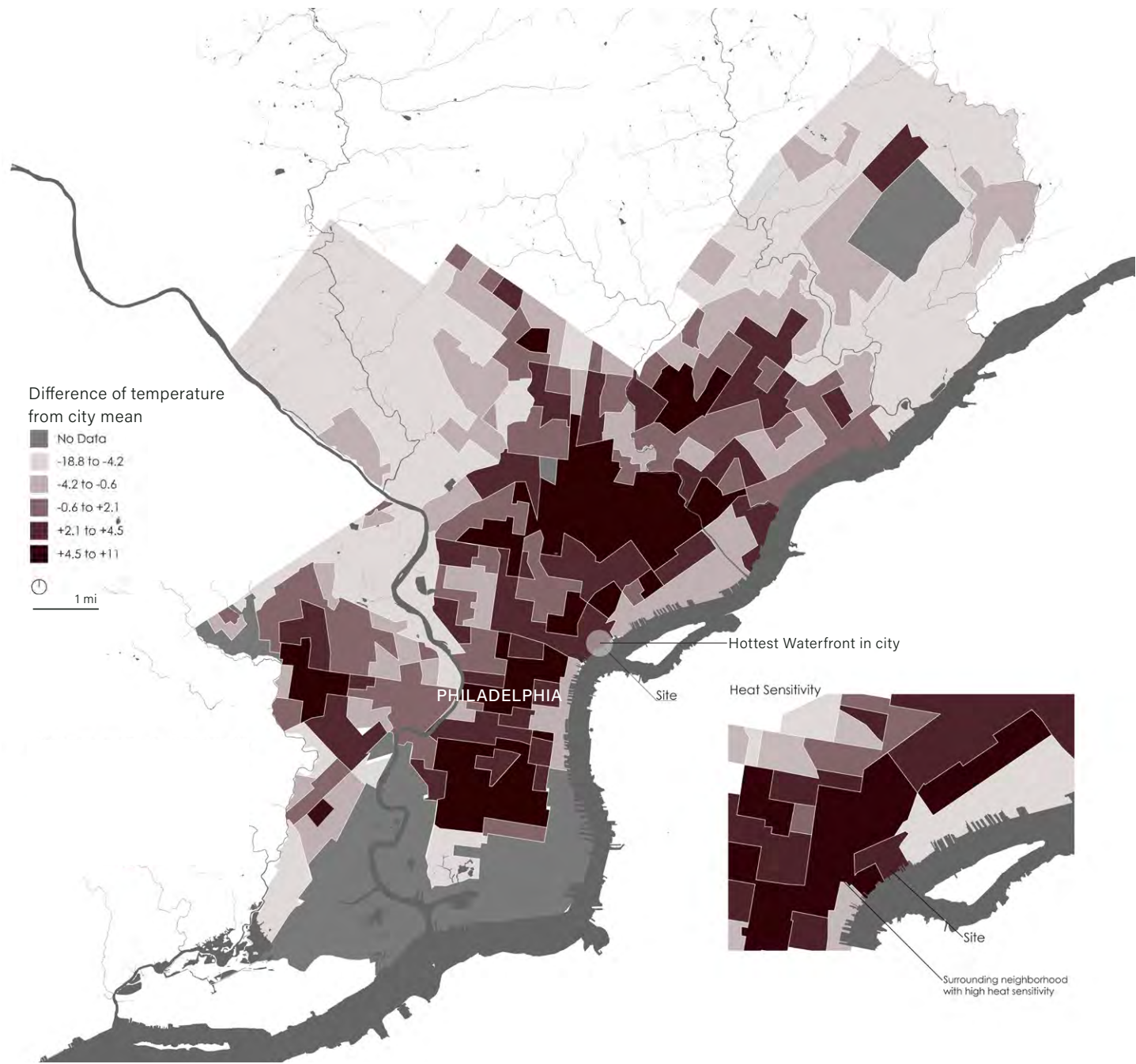
By 2050 Philadelphia is projected to have nearly 50 days per year over 90 degrees. That is an increase of nearly 30 days per year from 2021. Extreme heat is a chronic climate issue facing Philadelphia, with multiple deaths per year caused by heat induced illness. This investigation and waterfront design seeks to develop a cooling strategy for waterfront landscapes and to help mitigate heat related illnesses and stress-ors. Based off of the material - temperature relationship investigation, the design deploys a typology of materials to help bring summer temperatures down. The design uses a two stage forest succession growth strategy to grow an urban forest and sites and shade tree nursery, which grows and supplies shade trees to heat vulnerable neighborhoods in Philly. The design offers a future in which heat waves are seen as serious threats to health and safety. Emergency alerts can be delivered to residents and prompts them to take precautions.

### TOOLS USED:

ArcGIS Pro, Rhino, Photoshop, Illustrator, hand graphics

**CLOSE UP /** Existing condition section





Avg. # of days over 90°  
1971-2000

**21**

Avg. # of days over 90°  
by 2050

**60**

Difference between hottest &  
coldest neighborhoods

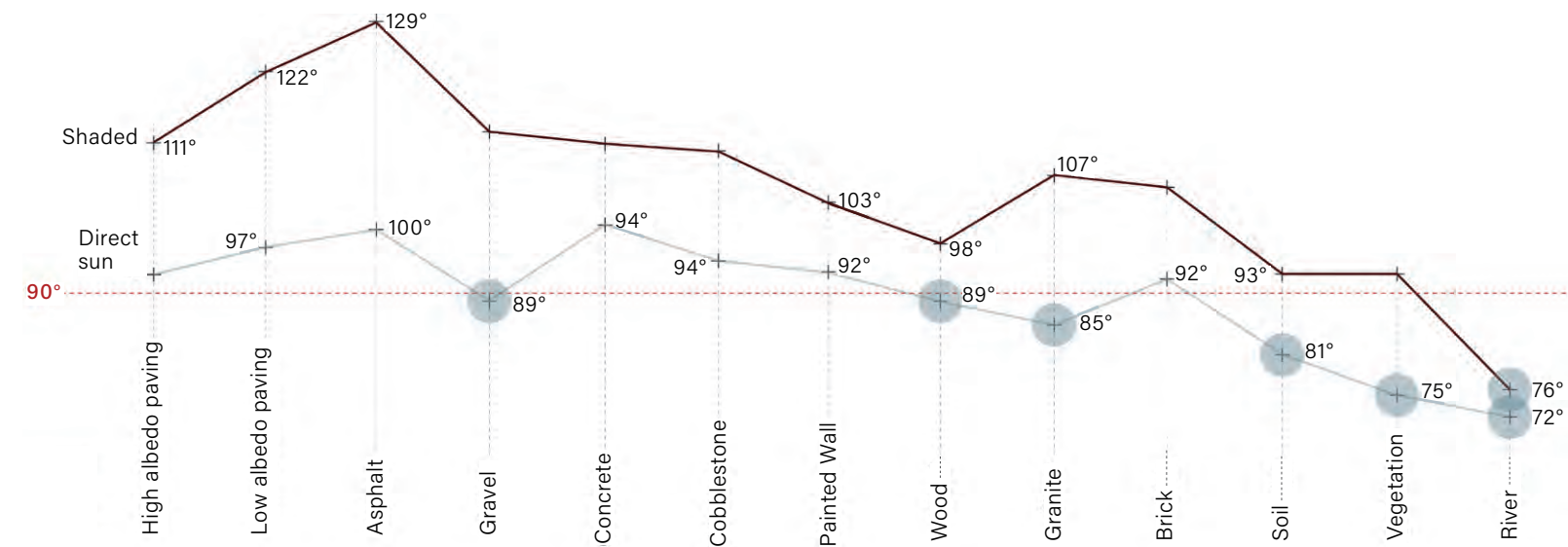
**22°**

**MATERIAL - TEMPERATURE STUDY** / Temperatures measured from varying site materials in shade and in full sun on a 90 degree day



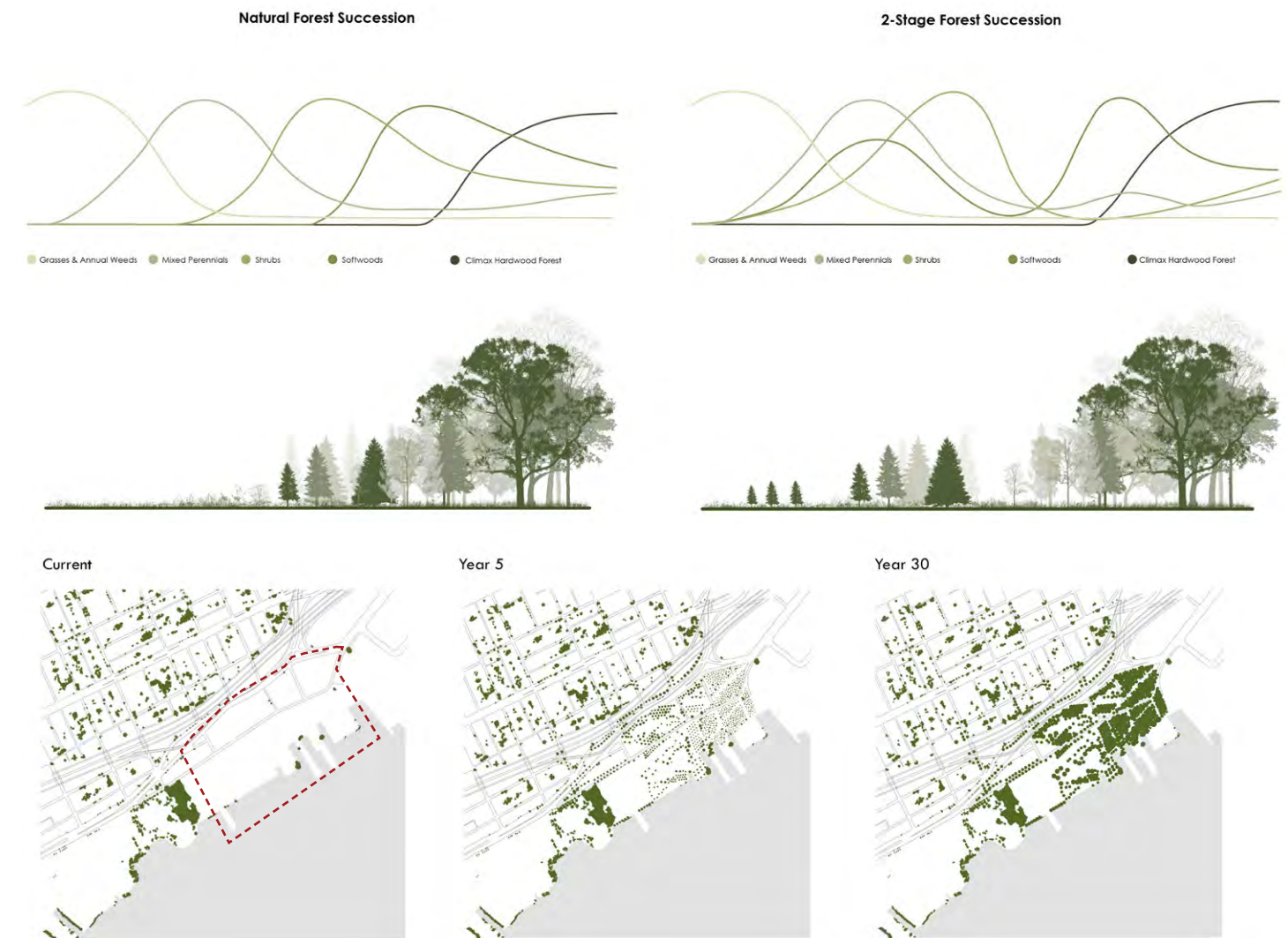
**Conclusion of Material - Temperature analysis**

- More instances of habitable space that are:
- In the shade
  - Surrounded by vegetation
  - Able to feel summer winds
  - Near water
  - Using water absorbing material
  - Using cool or high albedo material
  - Accessible by the neighborhood

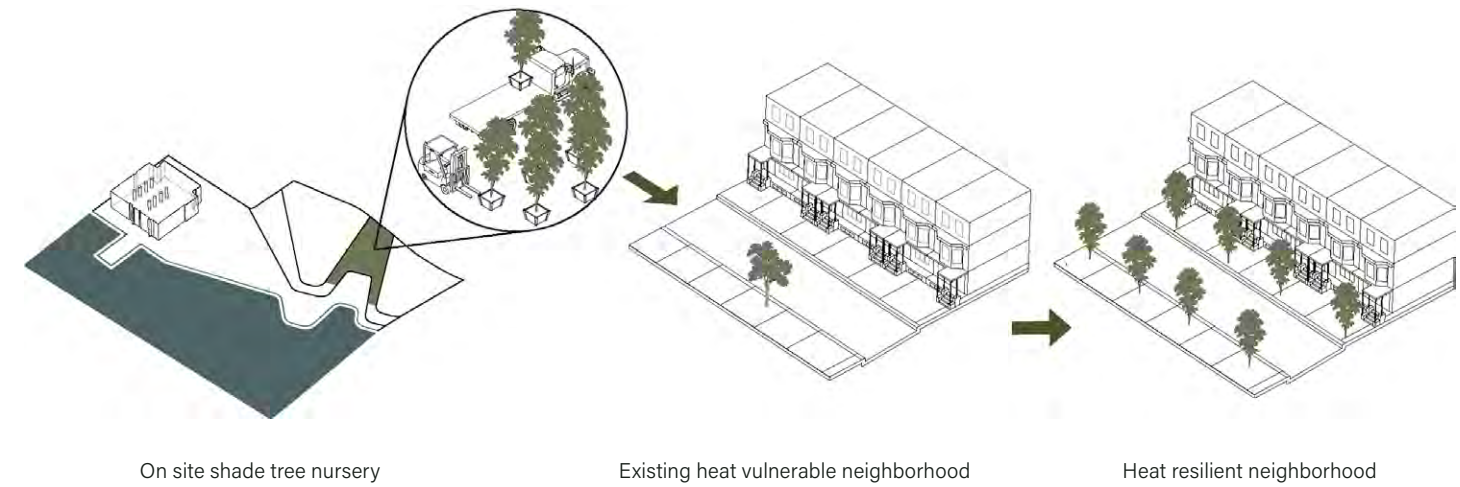




**CRAFTING UMBRA** / Zone One utilizes a 2-stage forest succession model to prepare the urban soils to grow a dense urban forest canopy near the waters edge and create cooler environments during major heat events.



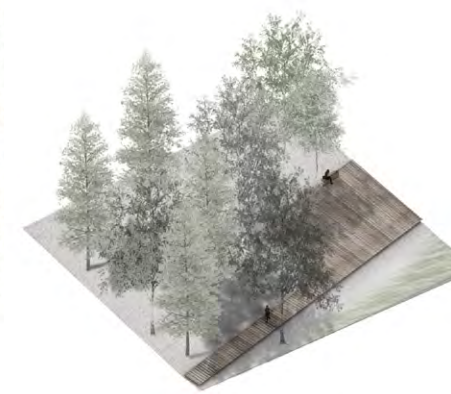
**WORKING WATERFRONT** / Zone two creates a working shade tree nursery. For hundreds of years this Philadelphia waterfront was a landscape of labor and production. This design continues to use the waterfront as a source of production but for the benefit of the surrounding community.



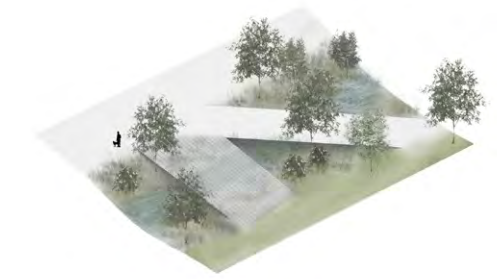




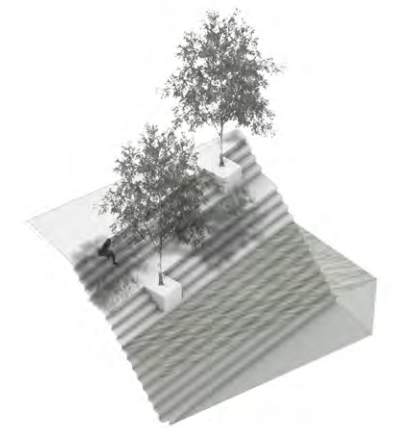
Zone 1



Zone 2

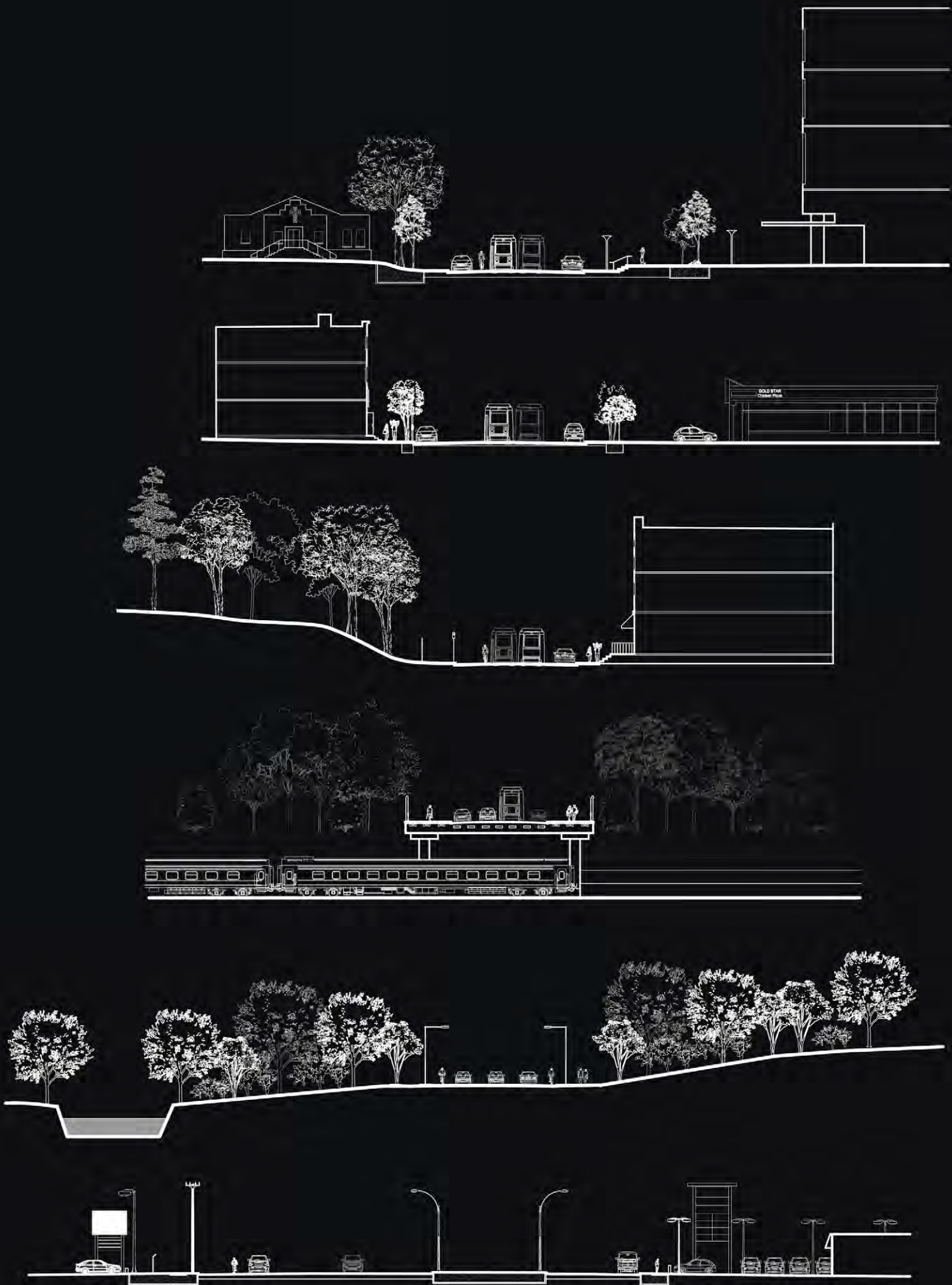


Zone 3



**EMERGENCY - HEAT WAVE IODA**

HEAT EMERGENCY - Heat Wave IODA will be active in your area from June 6th, 9am to June 9th, 9pm. Take shelter in cooler areas like green spaces, pools and climate controlled buildings. Your nearest cooling center is at: 1500 N. Delaware Ave. Philadelphia.



Existing Street Sections of Southwest Philadelphia

## C. Reimagining Cobbs Creek

University of Pennsylvania. LARP 602, Spring 2022  
Instructor: Christopher Marcinkoski

Collaborators: Audrey Genest, Zoe Goldman

Southwest Philadelphia, PA.

Urban Design / Flooding / Place-making



What would it be like to have your **heart rate rise** every time you felt raindrops? To feel the **knot in your stomach** each time there is just a half inch of rain in a day? This is the reality of residents living near Cobbs Creek in Southwest Philadelphia. By no fault of their own, residents of the Eastwick neighborhood live in homes in the lowest-lying area of Philadelphia. With each significant rain event (which is increasing in frequency over time), flood waters escape the banks of Cobbs Creek and flow into Eastwick. Some recent floods have brought up to seven feet of water. This urban design vision implements infrastructures at the landscape scale that can allow Eastwick residents to keep their homes and settle flooding anxiety. This vision also reimagines what living in historically marshy lowlands means. It connects the larger community to the new Cobbs Creek park, which will expand over time to follow the precedents of other Philadelphia river parks.

All graphics were composed myself unless otherwise stated.

### TOOLS USED:

ArcGIS Pro, Rhino, 3d modeling Illustrator, Photoshop

**LANDSCAPE & INFRASTRUCTURE** / Pre-settlement, the Eastwick area of Philadelphia was a marsh, only a few feet above sea level. Now as an urban neighborhood, Eastwick experiences intense and dangerous flooding during major rain events due to a tight pitch point at the confluence of the Darby and Cobbs creeks, which causes a backup of stormwater to flow into the neighborhood.



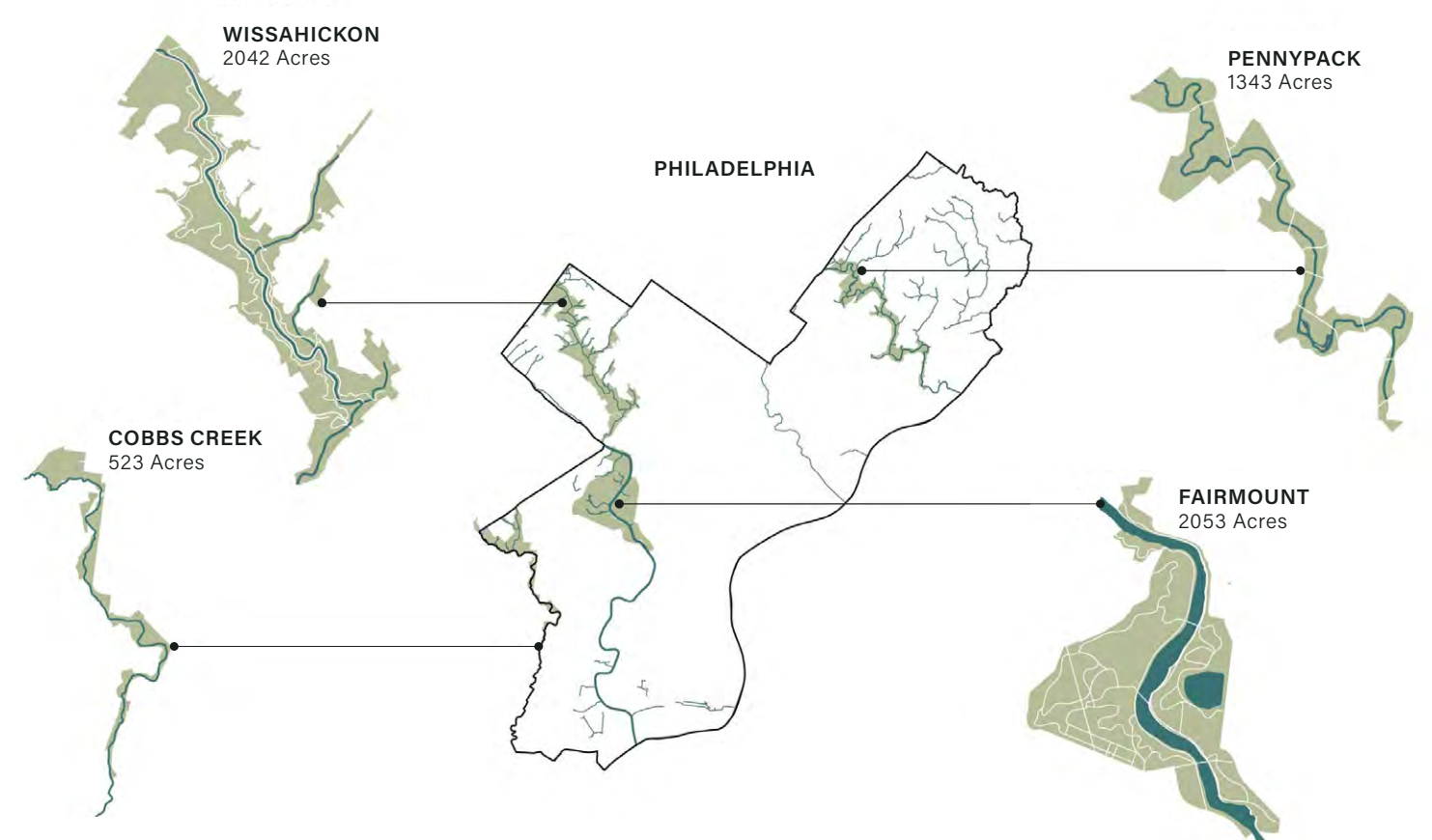
**Pinch Point** causes back flow of creek into Eastwick neighborhood during major storms



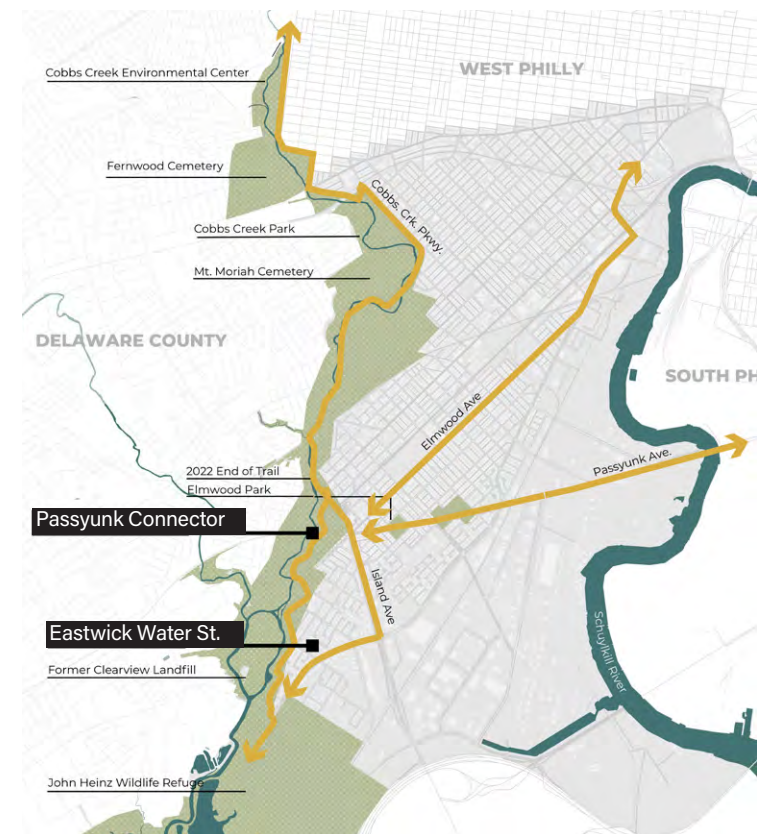
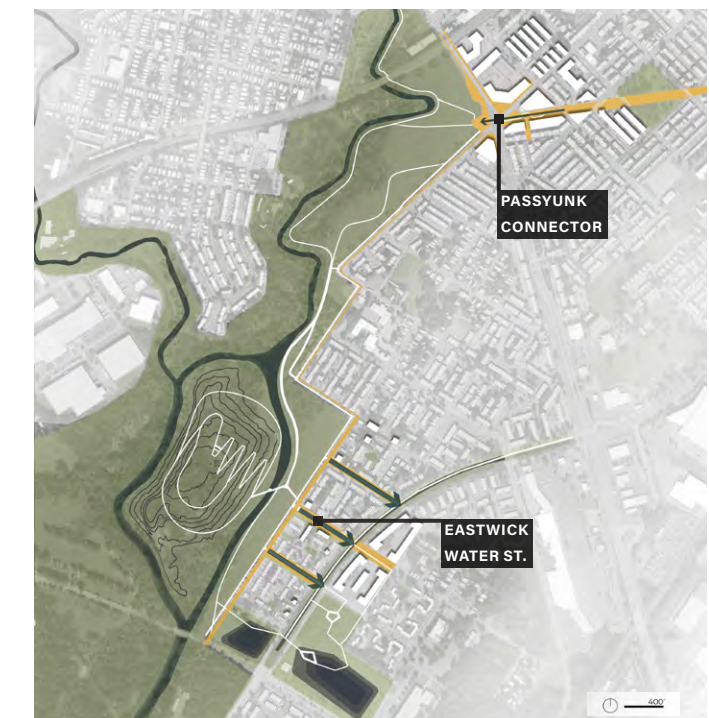
**Channel + Berm** sets a framework to build a safe place-making strategy



**Cobbs Creek Park** becomes an anchor to the neighborhood & spotlight of Philly climate resilience.



**A CITY OF PRECEDENT** / Philadelphia prides itself on urban parks around its major rivers. Comparatively, the greenway around Cobbs Creek is deficient and unsafe during storm events.



**EASTWICK WATER ST.** / This design is able to store large amounts of rainwater during storm events. While in dry conditions, it serves as a neighborhood park for residents. The basins hold and slows rainwater flowing into combined sewers, ensuring that the sewers do not overflow. These Water Streets connect the neighborhood to Cobbs Creek and help redefine what it means to live in Philadelphia's lowlands.



**PASSYUNK CONNECTOR** / Passyunk Ave. is one of Philadelphia's few diagonal streets. The Avenue terminates here at the Passyunk connector, a pedestrian only walk that connects Southwest Philadelphia to the expanded Cobbs Creek Greenway.



# D.

## A Multicultural Enschede

University of Pennsylvania. LARP 701, Fall 2022  
 Instructors: Matthijs Bouw

Enschede, Netherlands

Master planning, Urban Design

Collaborators: Kristel Salloum



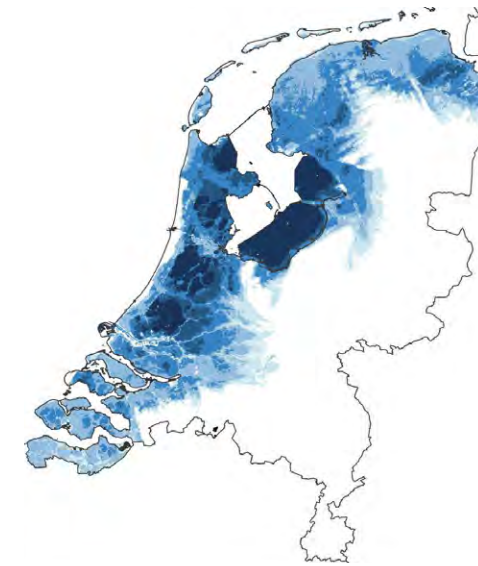
As the Dutch begin to experience two meters of sea level rise or more, millions of Dutch citizens will be at risk of displacement. A meebewegen, or “moving with the flow” scenario will be enacted by the Dutch Deltares . In this scenario, millions of people living along the western Dutch coast will have to move to higher ground towards the eastern Dutch and German border. In this scenario, the intercultural aspect of the Netherlands will increase to new levels. Millions of people from various cultures and backgrounds will be living amongst one another within one of the densest countries in Europe. This leads us to ask the question, how can we create a meaningful sense of belonging for all represented cultures and communities? With an increased amount of people along the Dutch and German border, can access to life sustaining natural resources be stabilized for generation to come? This design begins to answer these questions by creating a masterplan for a transboundary park near the Dutch-German border. This park system builds on climate adaption knowledge sharing from represented countries and cultures and implements said knowledge to boost the Dutch climate response. The park system implements design typologies in architecture that are representative of multiple cultures.

All graphics were composed myself unless otherwise stated.

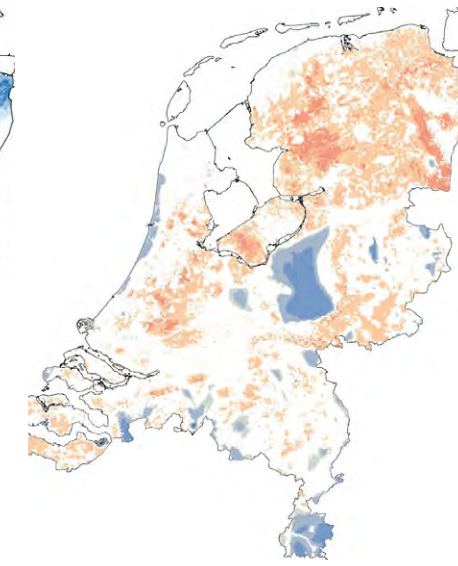
**TOOLS USED:**

Photoshop, Illustrator, ArcGIS Pro, Rhino

**NETHERLANDS CHANGING IDENTITY** / The small European country is dealing with issues of rising sea levels and falling ground water. At the same time the country becoming more culturally diverse at an exponential rate

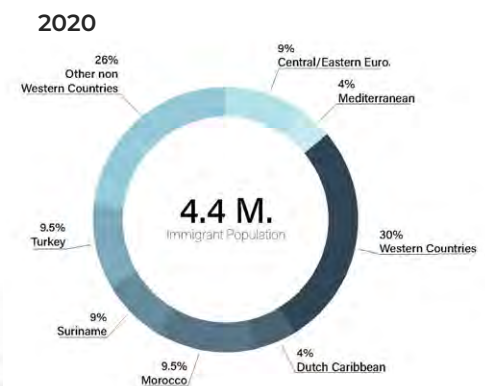
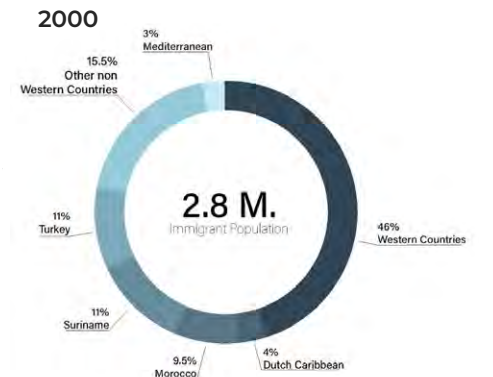


The at risk areas in NL with 3m of sea level rise



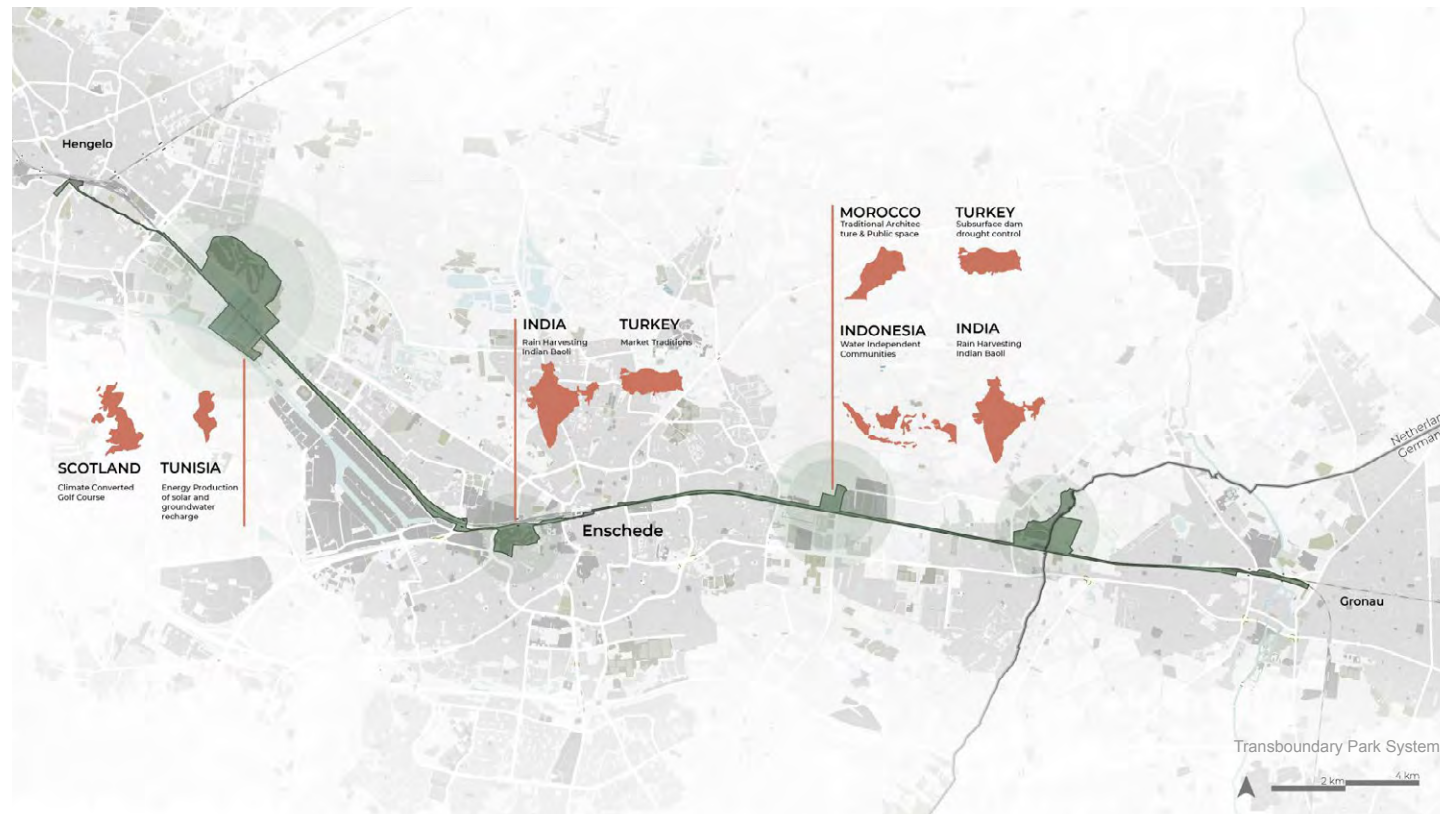
ground water losses and gains in 10 years

NL immigration stats in 2000 & 2020

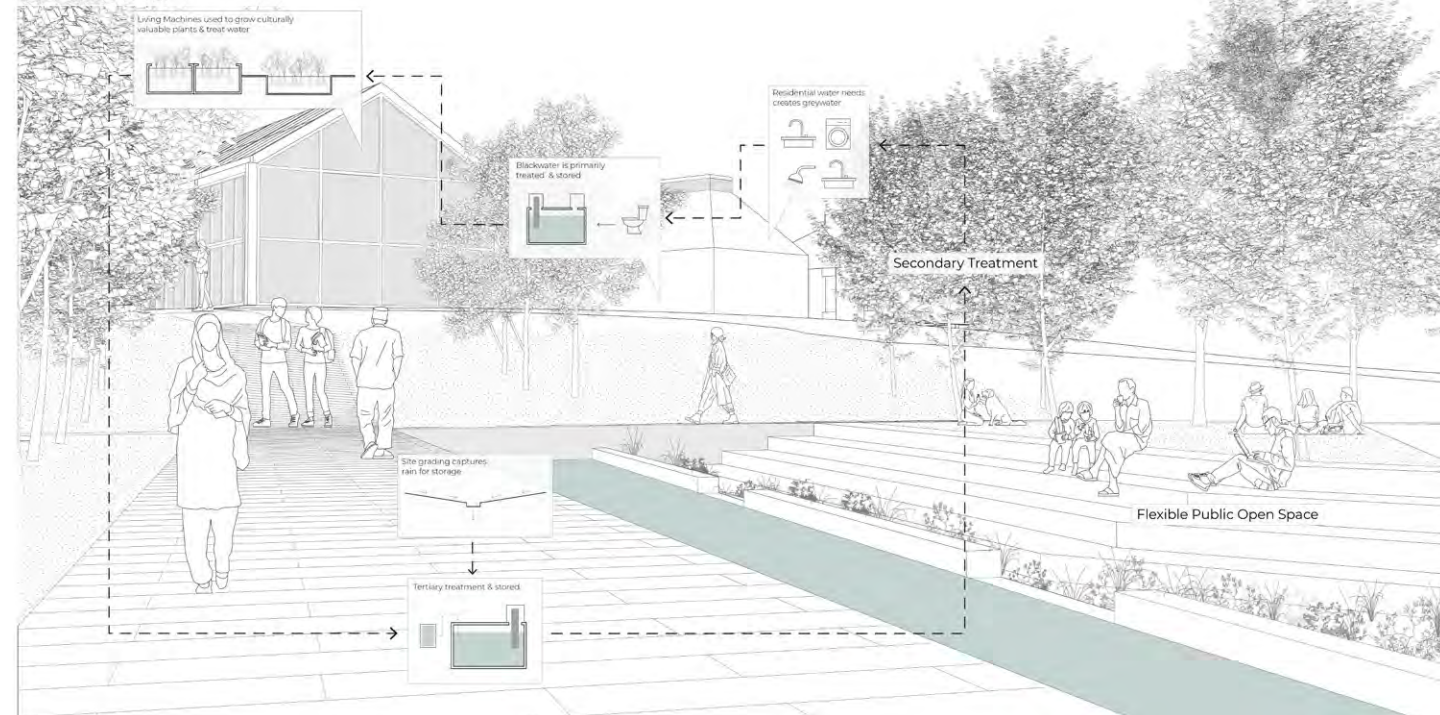


Cultural Representation

**CLIMATE KNOWLEDGE SHARING IN A DIVERSE WORLD** / This Enschede, NL. master plan sets up a climate sharing program where climate solutions from around the world are shared then adapted to local site conditions.



**PUBLIC SPACE USING CLIMATE KNOWLEDGE OF INDIAN BAOLI AND WATER INDEPENDENCE**



**DESIGNING A MULTICULTURAL PUBLIC REALM** / Can people from multiple different cultural background interact with the same open space and feel a similar sense of belonging? This design allows visitors and residents to share cultural backgrounds and interact with climate resilient infrastructure that is informed by different countries strategies.



# E.

## Professional Work

### Blanche Nixon / Cobbs Creek Library

Professional Work with SALT Design Studio

Philadelphia, PA. Summer 2022

Site Design / Public Realm / Play



Photo: Philadelphia Rebuild

SALT Design Studio was hired by Philadelphia Rebuild's project manager to design new grounds for Blanche Nixon Library in West Philadelphia. SALT Design Studio focused on making community gathering spaces for outdoor learning, play, and community organizing. This project is part of Philadelphia's initiative to invest hundreds of millions of dollars in revitalizing parks, recreation centers and libraries, and other community infrastructure spaces.

Major contributions:

- Designed an updated site circulation pattern, paths, layout and amphitheater gathering space, based off of feedback received after presentation of SD package, direction of firm principal and community engagement events.
- Selected site furnishings
- 3d modeled site in Rhino for site grading, layout and visualization studies
- Composed perspective renderings
- Updated plan rendering with site design changes
- Assisted Studio Project Manager in preparing construction details for bidding
- Prepared design boards for community engagement meetings



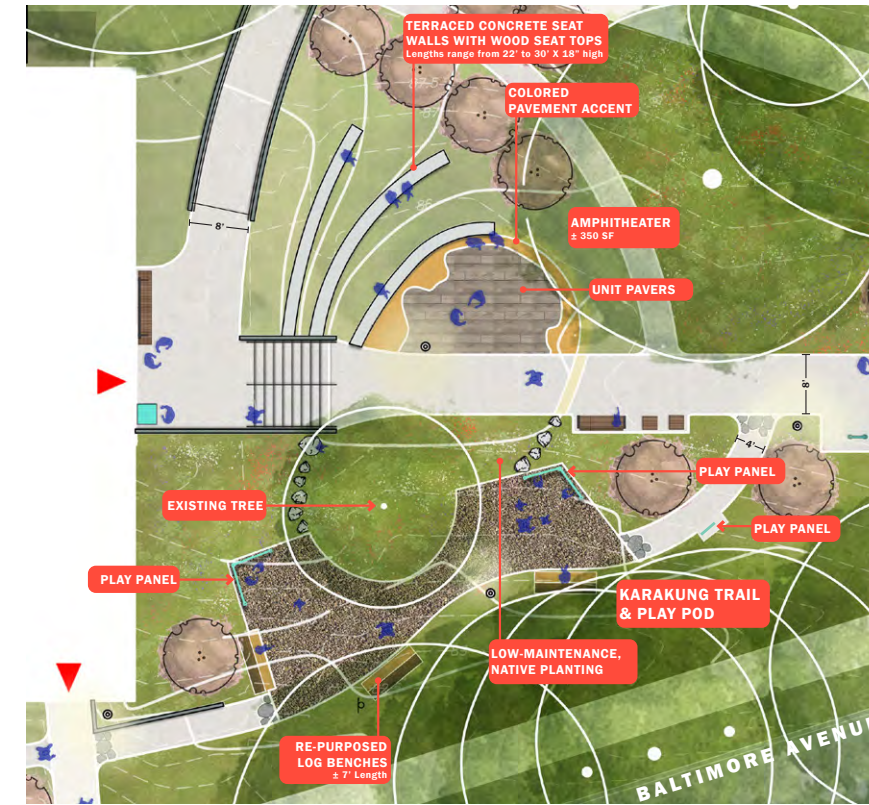




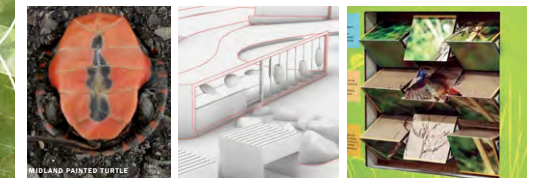
**Above** / A perspective rendering showing the new entrance to Blanche Nixon Library. Including the new "Blanche's Garden", Amphitheater, nature play trail and extended stair landing with ramp.

**Right** / Two community engagement boards that were designed to communicate design intent using snapshots of the Rhino 3d model to show space and form and the rendered plan to show layout. The boards were also designed to spark discussion with community members and receive feedback.

## PLAYFUL LEARNING PLAN ENLARGEMENT



## GAME PANEL



## NATURE VIEWER



## COBBS CREEK ECOLOGY MAPPING



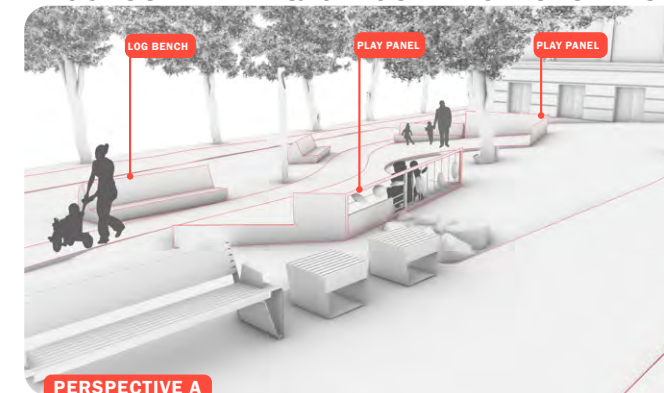
## TELL US...

- WHAT LEARNING THEMES ARE IMPORTANT TO YOU FOR KIDS WHO COME TO THE LIBRARY?
- WHAT SUGGESTIONS DO YOU HAVE TO MAKE THE PLAYFUL LEARNING ELEMENTS EVEN MORE SPECIFIC TO THIS COMMUNITY?
- HOW DO YOU ENVISION YOURSELF USING THE PROPOSED AMPHITHEATER?

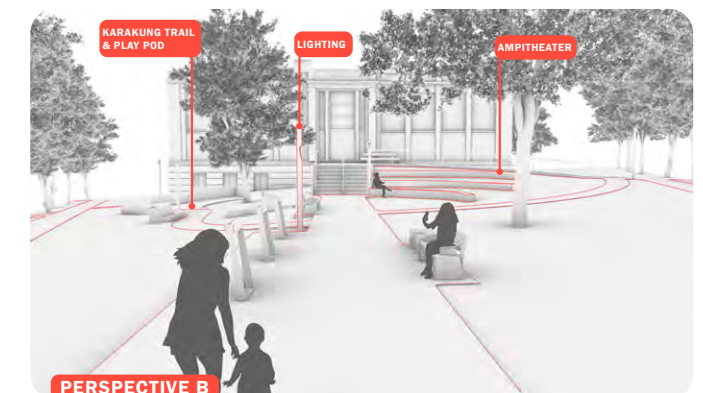
BLANCHE A. NIXON / COBBS CREEK LIBRARY  
COMMUNITY MEETING 7.13.2022

SALT  
DESIGN STUDIO

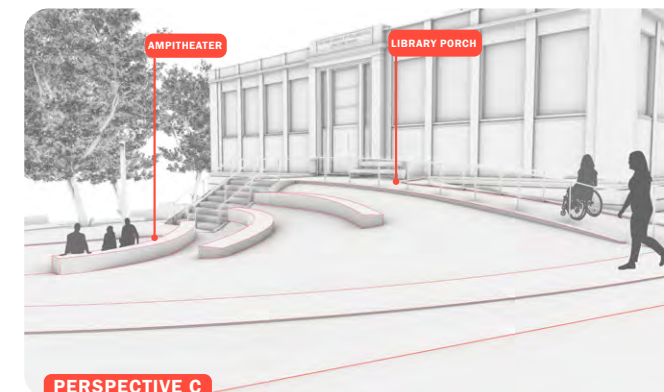
## ACCESSIBILITY & CIRCULATION STUDIES



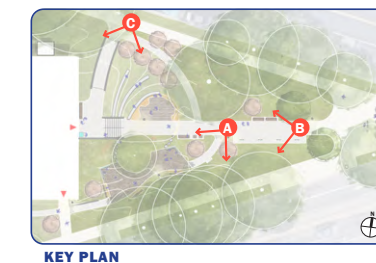
PERSPECTIVE A



PERSPECTIVE B



PERSPECTIVE C



KEY PLAN

BLANCHE A. NIXON / COBBS CREEK LIBRARY  
COMMUNITY MEETING 7.13.2022

SALT  
DESIGN STUDIO

# E.

## Professional Work

### Flowing Springs Inn.

Professional Work with SALT Design Studio

Pottstown, PA. Summer 2022

Site Design / Hospitality / Event space

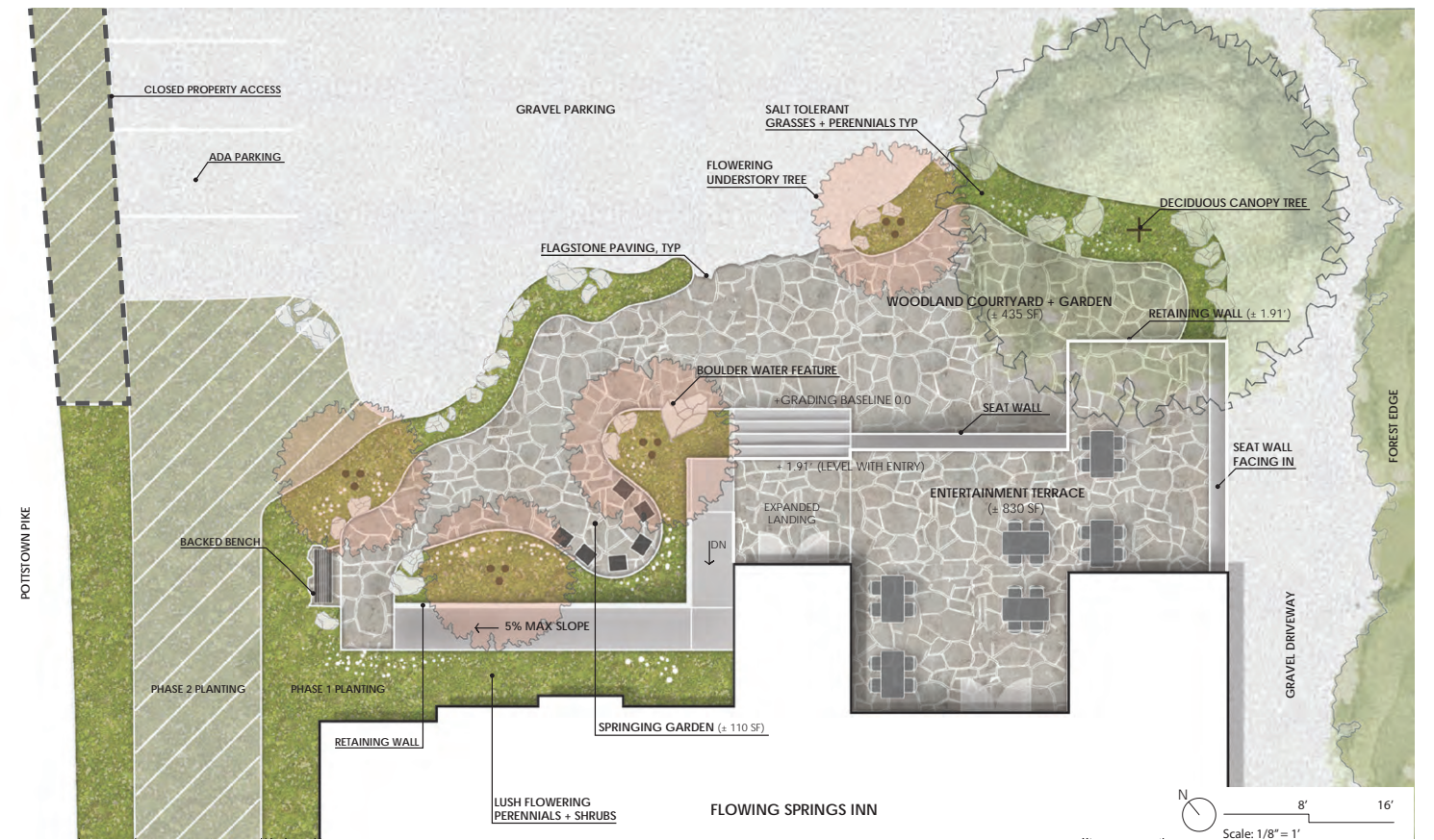


Existing Conditions

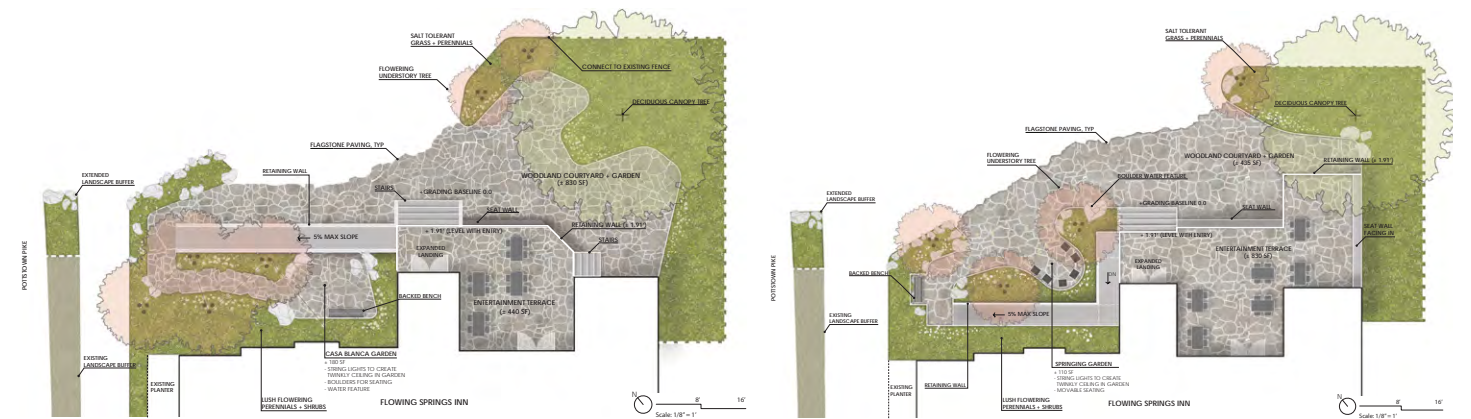
SALT Design Studio was hired by Flowing Springs Inn, a semi-rural b&b and event venue, to produce a schematic design for the northern exterior space of their building. Flowing Springs Inn holds dozens of significant events every year. So, it was necessary for them to have quality and accessible outdoor space to accommodate their guests. This design provides large outdoor entertaining spaces coupled with intimate and calming spaces on the opposite side of the extended entrance landing. Flowing Springs' namesake comes from an actual spring in the basement of the Inn. This design utilizes this spring water in the form of an outdoor boulder water feature to help mask highway noise in the entertaining space and mask the crowd noise in the intimate space.

Major contributions:

- Prepare existing site conditions plan based on measurements taken on site.
- Produce multiple initial design concepts and present designs to Project Manager and Firm Principal.
- Compile a conceptual design package including; existing conditions plan, two conceptual design schemes with rendered plan, materials and plant palette boards.
- Present concepts to Client along with Firm Principal and Project Manager
- Incorporate client's feedback into a final site design scheme with rendered plan, plant palette and material palette.



Final Illustrative Site Plan



Concept 1

Concept 2

### MATERIAL PALETTE

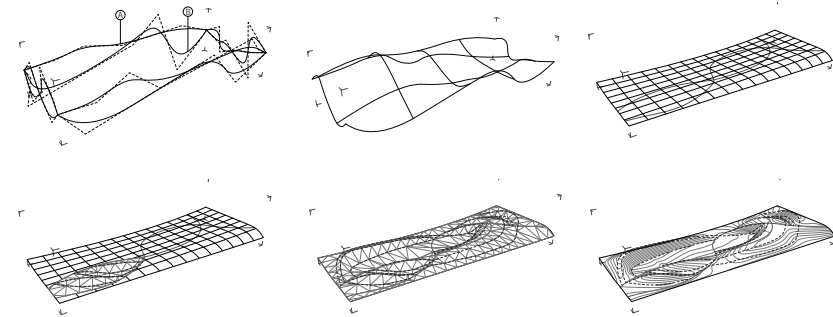


# F.

## Digital Modeling and Drafting

University of Pennsylvania.  
Instructors: Keith VanDerSys, Greg Burrell, Brad Thornton

Digital Modeling, Drafting, Parametric Modeling, Rendering,

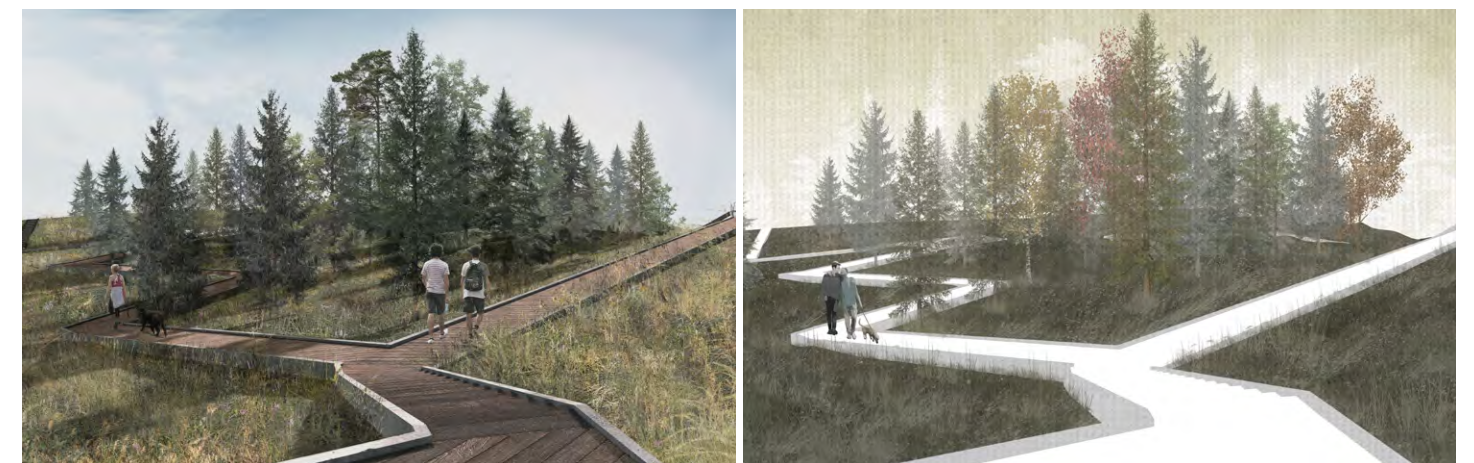
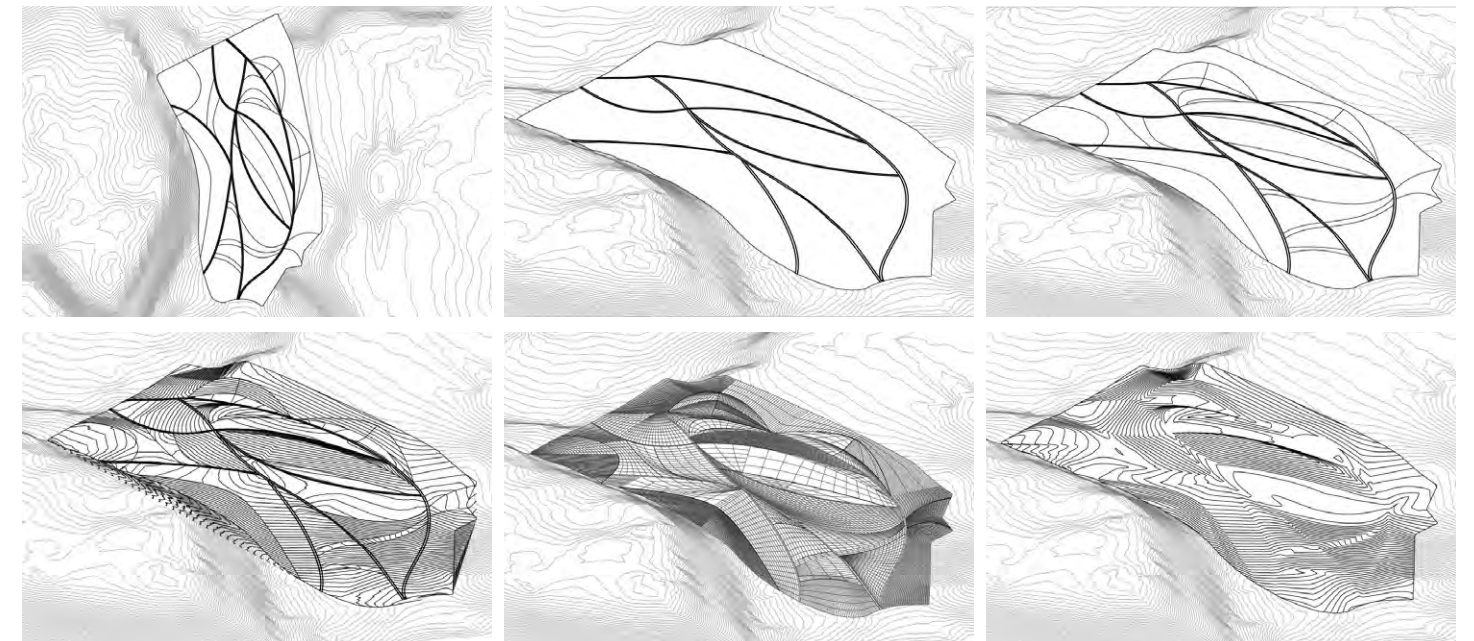


3d modeling not only adds a layer of precision to my design process but it also assists my process when studying landform design and potential circulation patterns. Parametric modeling allows me to quickly iterate on designs. This section also highlights my skills in drafting which demonstrates skills not just in the software used but the talent of drafting and communication of design intent through 2d visualization.

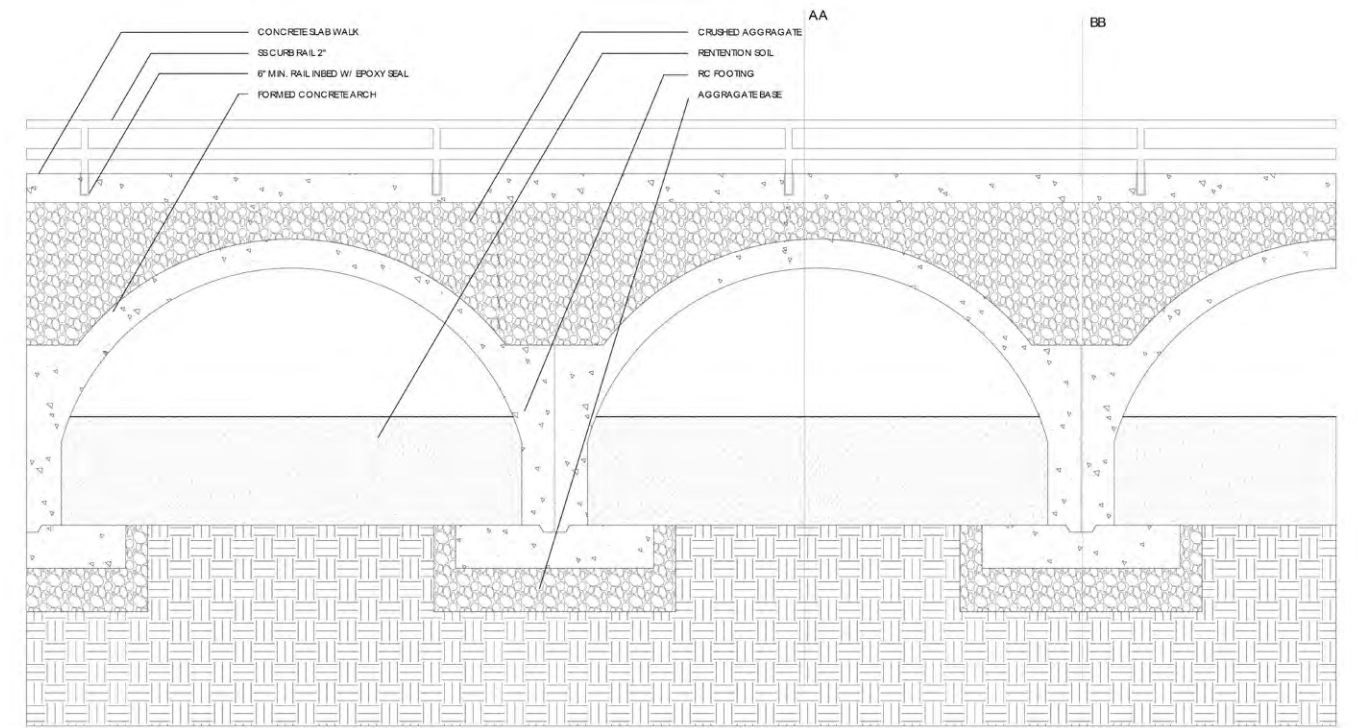
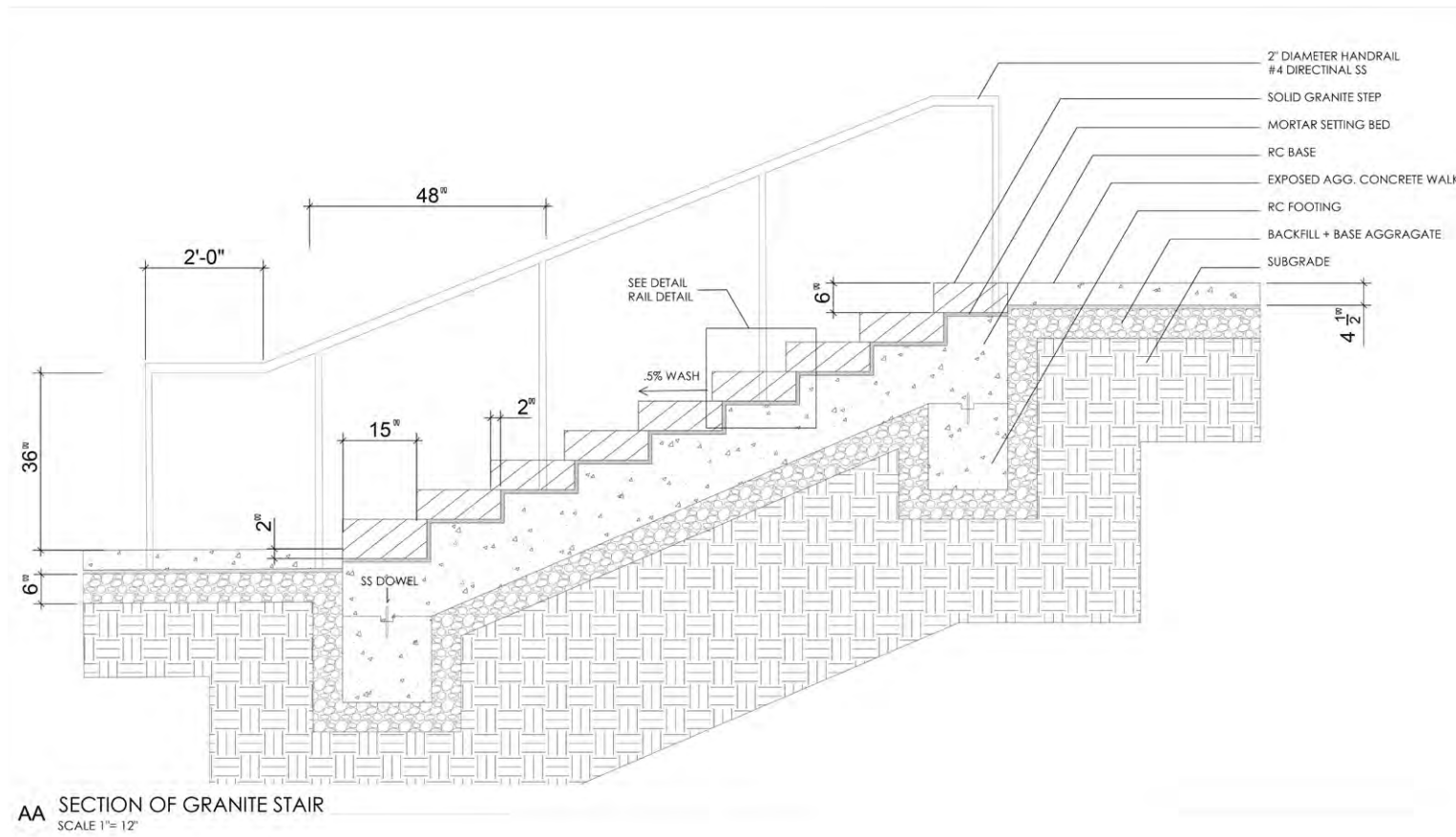
### TOOLS USED:

ArcGIS Pro, Rhino, AutoCAD, Grasshopper, Vray, Photoshop

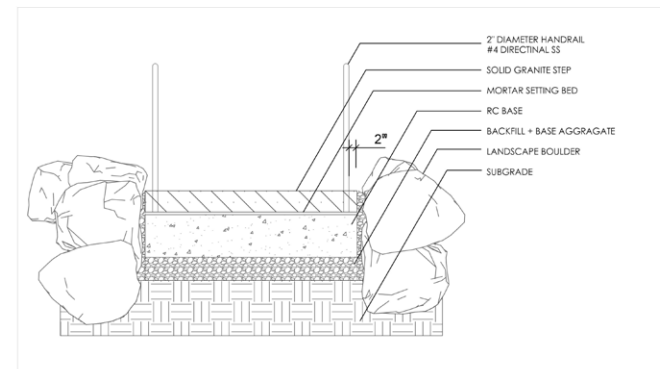
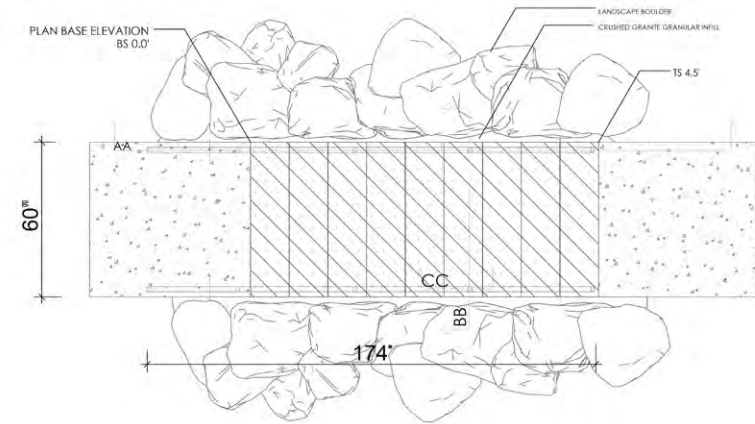
**PARAMETRIC MODELING FOR LANDFORM STUDY** / Using Rhino and Grasshopper potential landforms and circulations were tested. Vray and Photoshop were then used to create 2d visualizations of this imagined landscape.



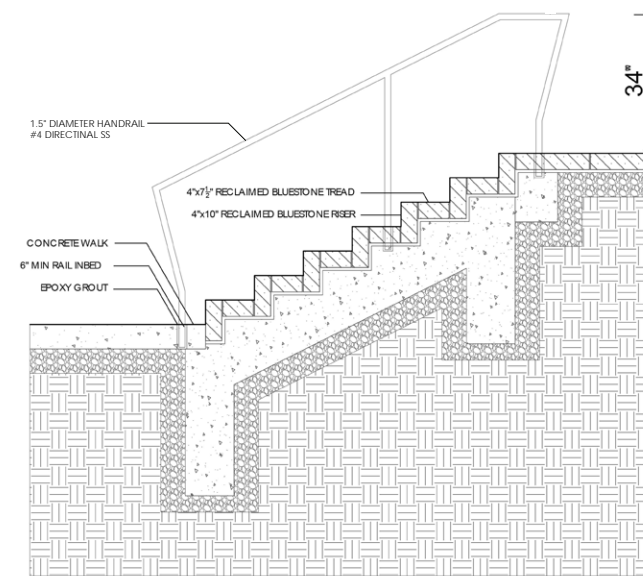
**CONSTRUCTION DETAILS** / After diagramming by hand, showing how multiple materials would come together in a system, construction details of existing landscape features were drafted using Rhino and AutoCAD.



**CC DETAIL SECTION RETENTION WALKWAY ARCH SYSTEM**  
SCALE 1"= 18"



**BB CROSS SECTION OF BOULDER FACE W/ STAIR**  
SCALE 1"= 18"

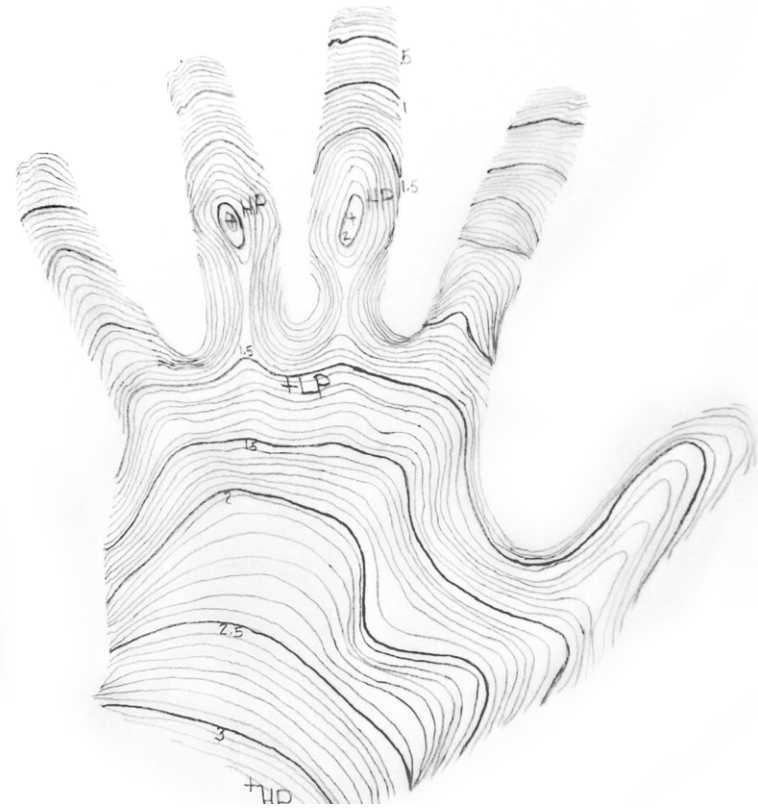


**AA DETAIL SECTION OF STAIR SYSTEM**  
SCALE 1"= 18"

# G.

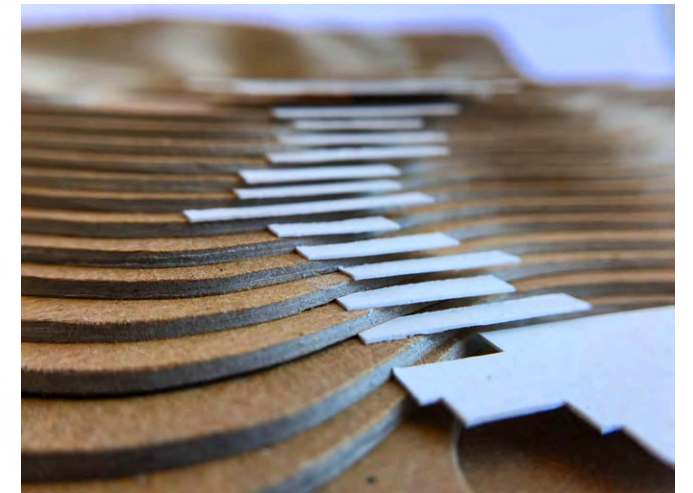
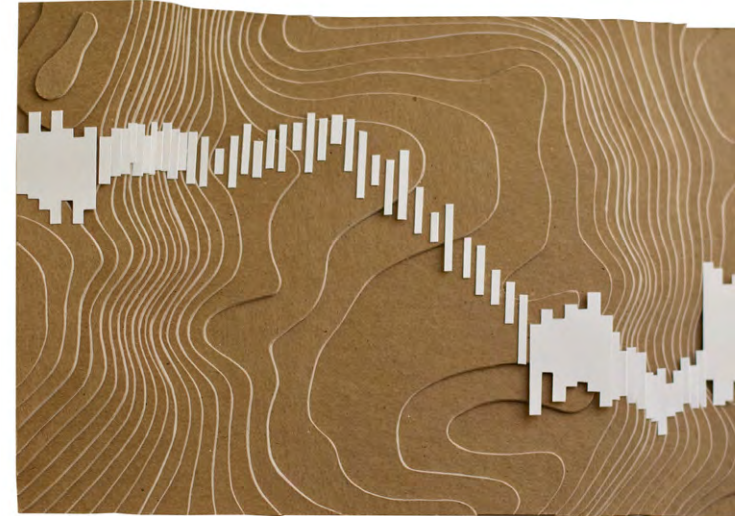
## Analog Media and Craftsmanship

Personal work

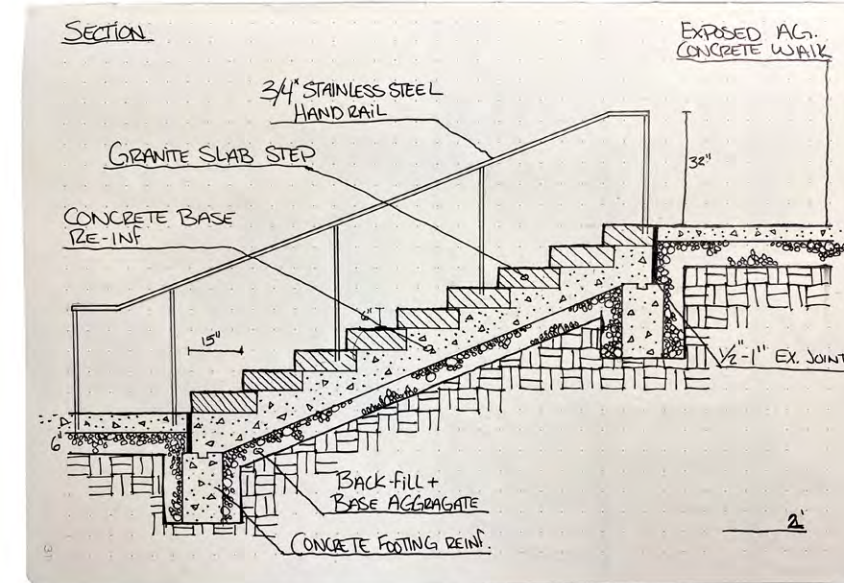


One of my favorite moments in my design process is when I am able to take out trace paper and markers and start ideating. Analog methods of representation and exploration are important parts of my design process. In early stages of design I trust my hand to communicate quick thoughts, which allows me to ideate and iterate on design potentials. An attention to detail and craft are also key to my design process. I take pride in being able to deliver quality work and move a project over the finish line with a high degree of craft and precision.

**TOPOGRAPHY + CIRCULATION MODEL** / Hand-cut chipboard relief physical model with hand cut bristol board circulation study.



**HAND GRAPHICS** / Process through details by hand



**HAND GRAPHICS** / Watercolor



**WOOD WORK** / 20" high X 48" long mudroom bench



**MATTHEW LAKE**

**SELECTED WORKS 2020-2023**

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