

BUILD A BETTER WORLD

Concept Design Report



28 April 2023

imbridgeSeven



Table of Contents

Summary & Principles

- 3 Executive Summary
- 4 Literature Review Principles
- 5 MODS Hub for Resilience Education
- 6 EcoExplorers Focus Groups
- 7 Sustainability Goals
- 8 Sustainable Exhibit Precedents
- 10 Character Study — Salvaged Materials
- 11 Character Study — Natural Patterns
- 12 Character Study — Using Double-Height Space

Initial Studies

- 13 Exhibit Focus Variations
- 14 Visitor Journey Across the MODS Property
- 15 Two Conceptual Options

Option 1 — A Resilience Journey

- 16 Perspective Section through Atrium
- 17 Exhibit Plan
- 18 Circulation Features
- 19 Rendered Views
- 22 Character Study — Florida Trees

Option 2 — Nature + Technology

- 23 Perspective Section through Atrium
- 24 Exhibit Plan
- 25 Circulation Features
- 26 Rendered Views

Exhibit Descriptions & Additional Tools

- 29 Build a Better World Exhibit Elements
- 39 Additional Proposed Exhibit Updates
- 40 Existing Condition Images
- 43 Conceptual Exhibit Matrix

“You cannot get through a single day without having an impact on the world around you. What you do makes a difference, and you have to decide what kind of difference you want to make.”

Jane Goodall

Executive Summary

Build a Better World is a new exhibit that engages and involves visitors with the stories of resiliency that are ever present in South Florida, but it is much more than this. It is a new way to view the work and purpose of the Museum of Discovery and Science (MODS) as a robust community partner and change maker. Building this better world is a task of productively addressing climate change, increasing equity and inclusion, enabling sustainable economic futures, providing space for debate and collaboration, and expanding access to critical climate information. Build a Better World is ultimately about encouraging and equipping visitors to take positive, collective action in the world around the topic of resilience in its broadest definition for the enrichment of South Florida and beyond.

Process

Grounded in the specifics of South Florida’s daily life, the exhibit leverages the Broward MPO’s Broward Vision: The Path to 2100 - “Pathways to Resilience” and has relied deeply on the principles and initiatives undertaken by the MPO including the Complete Streets and the Transportation Planning Equity Assessment.

Building on this real-world connection between policy and practice, the Museum of Discovery and Science team undertook an extensive literature review to understand the current state of play in resilience education for the purpose of crafting an exhibition as well as a community hub for community engagement in local and regional resiliency planning and climate action. The review consists of three parts: 1) current national and global climate resilience frameworks to define pertinent aspects of climate literacy. 2) best practices in climate engagement for informal learning settings like museums and 3) a review of local climate action plans to ensure the exhibit is balanced between regional relevance and global impact.

In February or 2023, MODS hosted a two-day workshop that brought together the core exhibit team members, CambridgeSeven’s design team, wider museum staff, Resilience Hub members, EcoExplorers, and members of the public on a high-attendance Saturday. Workshops and engagements allowing for broad input and deep discussion produced a clearer direction for the exhibit design. The weekend also provided data for an evaluation process led by Brenda Guerrero.

From February to April, The CambridgeSeven absorbed these findings and work closely with the MODS core team to develop concepts that bring to life the aspirations of the groundwork focusing on ways in which the exhibit can “walk the walk” of demonstrating

resilient, sustainable practices in the making of the project. These included exploration of certification under a Living Building Challenge pathway, responsible material usage and decommissioning strategies, a holistic visitor journey, a multi-audience approach, a balanced combination of tactical updates in the whole museum and a primary focus on crafting an exciting core exhibit with diverse experiences that capture the breadth and local flavor of the resilience action in South Florida.

As there is no single correct way to tell the resilience story, the Concept Design report organizes exhibit experiences and elements as an “a la carte menu” for determination in the next phase based on content preference, learning goals, audience type, partner interest and budget among other variables. To that end the report summarized two different approaches to the overall visitor journey, including two different designs for climbing structures/exhibit armatures and a range of different individual exhibits. Flexibility and adaptability, just like a resilient community, are key at this part of the process allowing for course correction as the design and implementation advances.

Next Steps

Concept Level Pricing: CambridgeSeven in collaboration with MODS have initiated a pricing exercise based on concept level input. The intent is to develop a per-exhibit cost to provide a flexible menu of choices for MODS to align goals and budget for the core exhibit as well as wider museum efforts including exhibit upgrades outside of Build a Better World, LEED Operations & Maintenance certification, and Evaluation studies.

Consultant Team Assembly: Responding to scope and goals, like Living Building Challenge certification and intent to work as locally, CambridgeSeven will collaborate with MODS to identify sympathetic fabrication, media partners and all other consultants to carry the project from Concept Design into Construction.

Receive Feedback from MODS and key partners: The project will evolve and tighten focus as the Concept Design is reviewed. CambridgeSeven will collect all feedback and use it to refine the concept pricing approach or incorporate it into the Schematic Design process.

Initiation of Schematic Design: Using the above feedback and pricing data, CambridgeSeven and MODS will begin the next phase of work. Alignment on specific schedules, fees, budgets, and scopes will be key factors in advancing into the next phase.

Literature Review Principles

The Museum of Science commissioned a literature review written by Betsy Loring in June of 2022 to assess best practices in resilience education. This review concentrated on global, national, and local frameworks that summarize key concepts important for climate literacy. The literature review summarized best practices for climate engagement in informal learning settings. It also reviewed local and regional climate action plans to start to form an exhibit outline that would find ways to engage the public about regional climate actions that are happening in the Broward County communities.

Documents Reviewed

- NOAA's Environmental Literacy Program's Community Resilience Education Theory of Change, ("NOAA ToC") designed to create a conceptual framework for increasing community resilience education.
- Action for Climate Empowerment's (ACE) National Strategic Planning Framework for the United States, ("ACE Framework") a plan for reengaging the US in the Paris climate agreement and building public awareness of and support for climate work underway across the country.
- Project Drawdown's Drawdown Review 2020: Climate Solutions for a New Decade, ("Drawdown Review") an analysis of key actions necessary for reducing climate change and its impacts and for restoring balance to the Earth's living systems.
- "Entering Climate Change Communications Through the Side Door" Stanford Social Innovation Review, July 10, 2018, Ezra Markowitz & Julie Sweetland
- "Expanding our Repertoire: Why and How to Get Collective Climate Solutions in the Frame" FrameWorks Institute, 2017.
- "Climate Communications 101: the Trusted Messenger" BU Institute for Sustainable Energy, Sarah Finnie Robinson, blog post April 16, 2019.
- "Perceived harm from global warming is becoming more widespread." Climate Note By Jennifer Marlon, Liz Neyens, Martial Jefferson, Seth Rosenthal, Peter Howe, Matto Mildenberger and Anthony Leiserowitz. Yale Program on Climate Change Communication, Feb. 23, 2022.
- Yale Climate Opinion Maps, Broward County, 2021
- "Global Warming's Six Americas, September 2021" Climate Note, by Anthony Leiserowitz, Edward Maibach, Seth Rosenthal, John Kotcher, Liz Neyens, Jennifer Marlon, Jennifer Carman, Karine Lacroix, and Matthew Goldberg. Yale Program on Climate Change Communication, Jan. 12, 2022
- "Climate Change in the American Mind" By Leiserowitz, A., Maibach, E., Rosenthal, S., Kotcher, J., Carman, J., Neyens, L., Marlon, J., Lacroix, K., & Goldberg, M. (2021). Climate Change in the American Mind, September 2021. Yale University and George Mason University. New Haven, CT: Yale Program on Climate Change Communication.
- "Consumer Activism on Global Warming, September 2021." Climate Note, by Anthony Leiserowitz, Edward Maibach, Seth Rosenthal, John Kotcher, Liz Neyens, Jennifer Carman, Jennifer Marlon, Karine Lacroix, and Matthew Goldberg. Yale Program on Climate Change Communication, Dec. 16, 2021
- State Climate Summary 2022, Florida, NOAA National Centers

- for Environmental Information.
- What Climate Change Means for Florida, U.S. EPA, 2016
 - Southeast Florida Climate Indicators, 2020 Update, Southeast Florida Regional Climate Change Compact.
 - Regional Climate Action Plan, by the Southeast Florida Regional Climate Change Compact ("Compact RCAP")
 - Broward Climate Action: Resilience Under the Sun; 2020 Broward County Climate Action Plan ("Under the Sun")
 - Broward Vision: The Path to 2100, ("Path to 2100") Broward Metropolitan Planning Organization, April 2020
 - Broward County Resilience Dashboard, ("Dashboard") Broward County Sustainability, Resilient Environment Program.
 - Mobilizing Miami for Sea Level Rise: Embodied Research, The Miami Foundation, June-August 2016. Cited as a resource for public outreach and communications by RCAP.
 - The Business Case for Resilience in Southeast Florida, Executive Summary, Urban Land Institute and Southeast Florida Regional Climate Change Compact.

Key Educational Strategies

- **Flexibility is Key** — Climate education/communication practices are changing rapidly, shift from literacy and products to increasing the capacity of people and communities to create and implement solutions.
- **Bridge the "Hope Gap"** — Education efforts have to address low public confidence that climate change can be solved effectively.
- **Equity in Action and Education** — Resilience education needs to reflect the interconnections between climate and equity and should be a tool in inclusive community participation in climate actions.
- **The Trusted Messenger** — Museums enjoy a high level of trust but must work with other grassroots services and organizations to reach all demographics.
- **Involve Youth** — Help youth see themselves, and be seen, as leaders in their communities. Give them the tools and confidence not just to contribute to designing and implementing solutions, but to speak to and collaborate with adults in government, their communities, and families.
- **Break Through the Noise** — Disinformation, misinformation, over communication. We must compete for the visitors' attention in a highly competitive communication environment.
- **Interconnectedness** — Messaging should emphasize the many interconnected systems of Earth's climate and therefore the multi-part systems impact of climate actions.

Exhibit Content Bubble Diagrams

CambridgeSeven read the literature review and started to organize the major content topics with stories and exhibit content that could be told in each area and educational strategies that lent themselves to various content areas. We saw that many educational strategies would work in many of the topic areas, but we identified the areas where we thought the strategies and the topic areas had strong links. For example "Equity in Action" is most often discussed in the literature review in reference to Transportation and Energy Resources, although it is an important element in other topic areas as well.



MODS staff reviewed initial content topic areas and educational strategies and gave feedback about which to prioritize.



MODS Hub for Resilience Education

MODS Hub for Resilience Education

The Museum of Discovery & Science has gathered a committee of community partners to raise community awareness about the local challenges of climate change. This committee, called the MODS Hub for Resilience Education, will strive to bring together residents, community leaders, business and others to broaden engagement about making Broward more resilient to climate change. They will serve as an advisory board to create museum exhibits and programs that educate visitors, encourage dialogue and inspire action about resiliency and sustainability. A primary goal of this committee is to encourage environmental collaborations that foster workable solutions.

Current members of the MODS Hub for Resilience Education include:

- Adrienne Arsht-Rockefeller Foundation Resilience Center
- AECOM (Infrastructure Consulting Firm)
- Barranco Gonzales Architecture
- Brizaga (Civil and Coastal Engineering Firm)
- Commissioner, Broward County
- Community Foundation of Broward
- Broward County Resilience
- Broward MPO (Metropolitan Planning Organization)
- Broward County Public Schools
- Advanced Roofings, Broward Workshop Resilience Chair (Business Leaders NPO)

- Children's Services Council of Broward County
- City of Fort Lauderdale
- Community Foundation of Broward
- The Cleo Institute (Climate Crisis Advocacy and Education)
- CMA (Chen Moore and Associates, Civil Engineers)
- The Everglades Foundation
- FAU (Florida Atlantic University) Florida Center for Environmental Studies
- FAU (Florida Atlantic University) Pine Jog Environmental Education Center
- FIU International Hurricane Research Center
- Flamingo Gardens
- Florida Fish and Wildlife Conservation Commission
- Florida Panthers Foundation
- FPL (Florida Power & Light)
- Friends of Birch State Park
- Greater Fort Lauderdale Chamber of Commerce
- The Lego Foundation
- National Wildlife Federation
- New River Gardens
- NOAA (National Oceanic and Atmosphere Administration)
- NSU Florida (Nova Southeastern University)
- South Florida Water Management District
- Spinnaker Group (Green Building Consulting Firm)
- Stimson Center
- Thrive Lot (Edible Landscape Consultants)
- Yea! (Youth Environmental Alliance)



CambridgeSeven

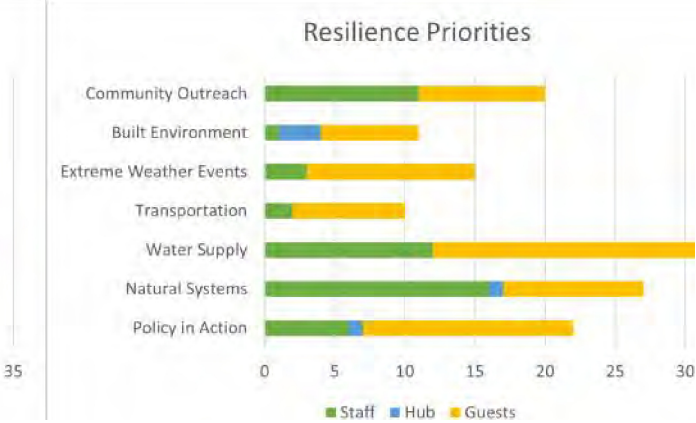
Hub Meetings with CambridgeSeven

CambridgeSeven met with members of the MODS Hub for Resilience Education on 3 February 2023. Key conclusions from the meeting included:

- Focus of exhibits should be on “Who is making a difference?” This will serve as an inspiration to act.
- The content topics from the bubble diagrams will interwoven throughout the exhibit and won't be seven distinct kiosks.
- The exhibit will strive to be like a Pixar movie with exciting elements for young children while also emotionally appealing to adults.
- We want to highlight South Florida's unique community but 20% of museum visitors are from outside of the tri-county area. Can tell stories from other places.
- We need to teach concepts like systems thinking, cost/benefit, and triple bottom line.
- We want “Actionable Items.” Sign up here at this booth to volunteer, or a map of other partner organizations and community events.



- Learning experience can start with transit to the museum – advertising and ticket prices could encourage public transit.
- We should tell stories of compromise and sacrifice. How has this worked in the past and what were the results? Highlight past successes CERP Flood Resilience Study – Section 216.
- Exhibits should emphasize that your voice matters. The youth movement is working. 16-year old is much more powerful at speaking truth to power. But you don't need to fix the problem yourself. Power in organizing community groups and businesses over the individual alone.
- How can various jobs and career paths make a difference with resilience and climate? My job is a climate job.
- We should not forget the individuals who are affected by climate change. It isn't all about Infrastructure. Discuss adaptation vs. mitigation and their affects on individuals. This is happening already.
- We should spread knowledge about solutions that are happening now: algae-based solutions, or capturing carbon for jet fuel.
- We should be a trusted messenger. We should meet people through the heart, through feeling. Be mindful of grief. Empowering but not guilt.



MODS staff, Hub for Resilience Education members, and museum guests all let us know which of the seven content areas they felt were most important.

Hub Members in Attendance

- Stan Bronson – Stimson Center
- Indyl Brown, Arborist – City of Plantation
- Keith Clark – Executive Director of Flamingo Gardens
- Olivia Collins, CLEO Institute
- Megan Kelley – New River Gardens
- Carolina Maran – Former Water Manager in Broward County, worked with Youth Climate Summit, now works for South Florida Water Management District
- Gregory John Mount – Broward County
- Glennys Navarrete – Flamingo Gardens and CLEO Institute
- Erick Strati, Wells Fargo Bank
- Katherine O'Fallon, Marine Research Hub – Blue Economy
- Colin Polski – Director of Center for Environmental Studies, FAU
- Summer Scarlatelli – MODS
- Harrison Grandwilliams – Broward County



EcoExplorers Focus Groups

CambridgeSeven worked with two groups of MODS EcoExplorers, paid high school-aged interns who work at the Museum of Science. The purpose of the focus groups was to find out from people who are regularly speaking to visitors about what they would like to see in an exhibit about resilience and climate change. We also wanted to ask them who they felt was missing from the museum and what we could do as we started to design the new exhibit to reach out to under-represented groups.

We saw some major themes from all the EcoExplorer's comments which were quite insightful and gave us a broad view of what the exhibit could be

Cool Exhibits

The animals need to be in the habitats, the buttons need to work, the experience needs to be massively engaging.

Core of the physical experience leveraging some of the above

- Experiential
- Immersive
- Empathetic
- Multi-generational and multi-cultural and multi-lingual
- Simulation-capable
- Mixed media with animals, habitats, digital and analog experiences
- Play-based (role play, scenario planning & gross motor)
- Self-directed or enhanced with experts, docents and guests

Potential Pathway Alignment: Natural Systems, Built Environment, Extreme Weather Events

Museum as convening space for new groups of MODS-goers beyond families and young children

- An only-an-the-museum experience or “clubhouse” venue that can support casual self-directed learning.
- A deeper resources library (resource writ large....experts, books, artifacts
- Consider new internships as an extension or as “post-doc” beyond the EcoExplorers program. Would Resilience Hub members be willing to take on EcoExplorers for shadowing opportunities or longer-term employment and job placement?

- Launch pad for excursions and outreach, but not a replica for the excursion itself. This is the “mission control” or “home base” for the field trips and the “campaign headquarters” for civic action.
- Monthly home of the Resilience Hub meeting. Able to host presentations, lectures. Workshops, meet and greet, wine and cheese fund raisers, etc...Multi-generational. Fun for a kid, cool for a teen, challenging for a student, surprising for a parent, and desirable for a professional

Potential Pathway Alignment: Natural Systems, Community Outreach, Policy in Action, Built Environment

Human to human interactions outside the walls of the museum whether outreach in the community and excursions into the world

- Connect STEM mobile to Resilience Hub activities.
- Community connection opportunities to link in-museum activities with out-of-museum programs.

Potential Pathway Alignment: Transportation, Community Outreach, Policy In Action

Savvy social media, improved digital presence develop core marketing channels to be more than a museum visitation pitch.

Goal of building awareness of MODS as a destination, resource and hub in the community around resilient issues.

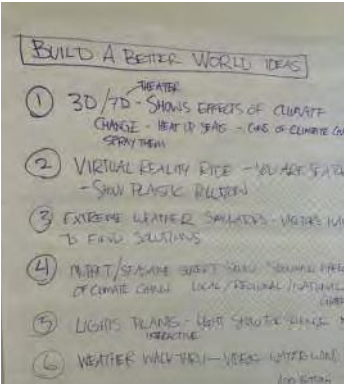
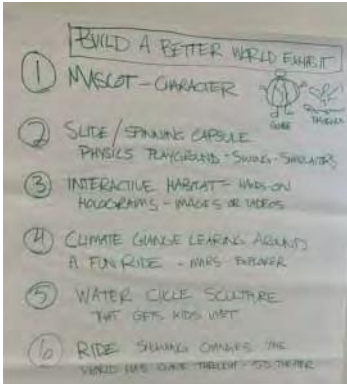
Potential Pathway Alignment: Policy in Action

Other Thoughts

- Specific areas for different age groups, but broad enough that can achieve some mixed age experiences.
- Data simulations that are beautiful and mesmerizing enough for a small child to be transfixed.
- Climbing, full body experiences that engage young audiences, but don't exclude teens and even adults.
- Self directed learning
- A multi-generational gathering space that can change throughout the day. Early morning and daytime for young kids, mid afternoon and early evening as after school teen hangout and evening as meeting space for community and resilience leaders.



The themes nest in order of scale from nearest and most concrete to widest and most abstract. The below diagram represents the concentric themes.



Sustainability Goals

Living Building Challenge Core Certification

Our team set a goal of achieving the International Living Future Institute's Living Building Challenge Core certification for Interiors for the new "Build a Better World" exhibit footprint. Core certification for interiors includes a list of requirements in 10 imperatives. The C1 Ecology of Place imperative is not required for interior projects.

IMPERATIVE	TYPOLOGY		
	New Building	Existing Building	Interior
Ecology of Place			
Human Scaled Living			
Responsible Water Use			
Energy + Carbon Reduction			
Healthy Interior Environment			
Responsible Materials			
Universal Access			
Inclusion			
Beauty + Biophilia			

IMPERATIVE REQUIRED FOR TYPOLOGY

REQUIREMENT DEPENDENT ON SCOPE

NOT REQUIRED

CambridgeSeven has spoken to The International Living Future Institute to determine the feasibility of certifying the project. Our contact there, Lisa Carey Moore, Director of the Buildings Team feels that because the HVAC systems are in the control of the museum, the cannot be excluded from the energy calculations. This means that some degree of energy modelling will be required to determine the efficiency of the existing system. We will need to include the HVAC systems when documenting the 35% energy reduction from the baseline, They are "cautiously optimistic" that there is a path forward for us, but this will be the first interior-only exhibit fit-out to attempt to achieve Living Building Challenge CORE certification.

Some of the more challenging requirements of the Living Building Challenge Core Certification include:

- We will need two EV parking spaces. We think that the MPO strategic plan might be able to help with this.
- Water – We would have to collect storm water and treat it on site. Harvested water needs to be treated by reverse osmosis or a similar natural or mechanical system. No chemical treatments are allowed. We may be able to collect it in rain barrels for exterior landscaping. We will need to use 30% less water than a baseline. We may be able to achieve this goal by designing a closed loop systems in life support systems.
- Energy – 35% reduction from baseline (Baseline determined through Zero Tool or World Bank Edge) Solar panels will help as will motion/daylight sensors. MODS cannot double count the PV panels by selling the RECs to someone else. MODS will also need to pro-rate any savings from the PV panels in some way to accurately estimate how much of the solar power is being used in the exhibit compared to the rest of the building. We will consider finding ways to use mirror systems

- and/or other ways to maximize natural light in the exhibit. One possible use of redirected natural light is to light the coral tanks with some degree of natural light.
- Equity – MODS may need to obtain a Just label from the International Living Future Institute.
 - Carbon – We will need to select materials with a “lower than industry carbon footprint for product categories for which embodied carbon data is readily available.”
 - Materials – at 3000 sq ft (279 sq m). Two Declare labels will be required. All other product manufacturers need to receive a letter requesting that they disclose their ingredients and identify any Red List content.
 - Materials – 50% of wood products will need to be FSC or salvaged / reclaimed wood. We will consider using Dade County pine which is often available for salvage. The museum has already started collecting wood salvage from other exhibits that we may use in the exhibit.
 - 20% of materials budget (excluding labor and soft costs) must come from within 500 kms (310 miles) of the museum. Declare products and salvaged material from within 500 kms may be counted at twice their value.



Living Building Challenge
CORE Certification
Imperatives

HUMAN SCALED LIVING

- Bicycle Infrastructure
- EV Charging Stations
- Reduce Single-Occupancy Vehicle Trips by 30%

RESPONSIBLE WATER USE

- Don't Use Potable Water for Irrigation
- Reduce Water Use by 30% from Baseline
- Treat Stormwater

ENERGY + CARBON REDUCTION

- Reduce Energy Use by 35% from Baseline
- Use Low Carbon Footprint for Materials

HEALTHY INTERIOR ENVIRONMENT

- Green Cleaning
- Clean Interior Air
- Daylight & Views

RESPONSIBLE MATERIALS

- 50% Wood Must be FSC or Salvaged
- 20% Material Budget Must Come From 500 km
- 80% of Constr. Waste Diverted from Landfill
- Composting

UNIVERSAL ACCESS + EQUITY

- Public Art & ADA
- Just Label
- Include Diverse Stakeholders

BEAUTY + BIOPHILIA

- Biophilic Design Workshop
- Connected to Community
- Educate Others about Sustainability

Additional Sustainability Goals

- MODS wants to innovate with circular economy and electronics. What are better ways of recycling old computer equipment. Could MODS lease equipment that is updated on a contract? Then the company supplying the equipment could recycle and reuse what they can?
- We will prioritize AV systems that can be easily repaired and upgraded and software systems that function in platform neutral environments so that they are not dependent on future outdated platforms.
- MODS would like to think about the end of life of AV equipment/ lighting in order to optimize repair, reuse and recycling. New AV and lighting equipment should be RoHS compliant.
- MODS doesn't want the exhibit to be brown and recycled looking. We want to show the "Color of Life."
- MODS is also interested in pursuing LEED certification through USGBC for ongoing operations and maintenance of existing buildings. This may include upgrading HVAC systems for energy optimization, water reclamation and on site storm water retention, and photovoltaic panels.
- MODS would like to reach out to a broad spectrum of community partners throughout the design process. We would like to reach out to community and business partners in the Hub for Resilience Education and in under-represented community groups to make sure the topics covered in the exhibit represent and include a diverse array of community voices.



Caroline Lewis, Founder of the CLEO Institute, which is an important partner on the MODS Hub for Resilience Education and will be one of the key partners in reaching out to traditionally under-represented community partners.

Sustainable Exhibit Precedents



Photo credit: Michelle Peters

Cincinnati Zoo’s Painted Dog Exhibit

According to the International Living Future Institute, they have certified two previous projects under the Living Building Challenge certification. Both achieved “Petal” certification. Both were outdoor zoo projects with associated indoor buildings. One was Cincinnati Zoo’s Painted Dog exhibit, certified in 2017. The project area included 16,421 sq feet. The project used extremely lighting, efficient pumps and water cleaning equipment, geothermal heat pumps and solar panels to achieve net zero energy use. The water from the exhibit comes from a 400,000 gallon storm water collection basin under the exhibit that also protects the city of Cincinnati from flooding.



Photo credit: Zeidler Architecture Inc.

Calgary Zoo’s Panda Passage

The second was the Calgary Zoo’s Panda Passage, certified in 2019. The Panda Passage exhibit achieved four petals including health and happiness, materials, equity, and beauty. The project began in 2016 and was completed in 2018 with a \$14.4 million CAD budget (approx. 10.5 million USD). The project included two indoor habitats totalling 4,600 sq feet and 16,300 sq feet of outdoor habitat. The exhibit used non-toxic materials, Forest Stewardship Council (FSC) certified wood and repurposed materials. Large logs in the habitats are deadfall collected from the zoo’s Flood Protection Project. The Panda Passage project accounted for the total embodied carbon (tCO2e) impact from its construction through a one-time carbon offset from an approved carbon offset provider.

Sustainable Exhibit Precedents



Photo credit: CambridgeSeven

Expedition Blue

Expedition Blue is a series of installations designed by CambridgeSeven, throughout Cape Cod and Southern Plymouth County. The kiosk in the town of Hyannis is currently pursuing Living Building Challenge Core certification for Landscapes. The gathering places and outdoor museums connect people to the ecology of place by drawing upon 18th century Cape Code shacks built to shelter shipwrecked sailors from storms. The wood used in the project is FSC certified. The kiosk design includes elements such as natural patterns, light filtering, prospect and refuge that nurture the innate human/nature connection. Educational signs, known as waypoints, sharpen the focus, both literally and figuratively, on a significant natural or economic feature at each location.

CambridgeSeven



Photo credit: the DESIGN MUSEUM

Waste Age: What Can Design Do?

This temporary exhibit in London was open from October 2021 through February 2022. The exhibit focused on how design can eliminate waste through designing for reuse. The museum hired a consultant to evaluate the carbon footprint of the exhibit design and construction process. Exhibit walls and plinths were built of unfired bricks which saved 6 tons of CO2e over fired bricks. Many exhibit graphics were printed with a hand-held printer. The total exhibit impact was 10 tons CO2e, 80% of which was in the construction of the exhibits. The biggest carbon impact was from the 4,800 stainless steel screws which equalled 1.9 tons (20%). Exhibit transportation made up .2% as most artifacts and materials came from the London area. 11,000 email messages caused 10% of the impact.

Character

Salvaged Materials



Salvaged painted wood cut in strips



Salvaged Dade County Slash Pine



Using salvaged wood in biomorphic shapes



Art made from salvaged materials — *Styrofoam Cup Sculpture*, Tara Donovan



Making salvaged wood beautiful



Suspending salvaged objects as art — *Coalescence*, Paul Cockshedge



Suspended water bottles filled with colored liquid



Possible use for salvaged glass



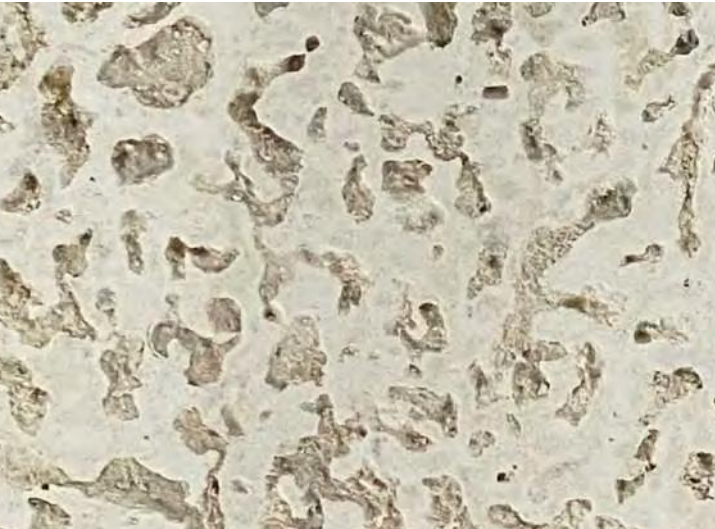
Possible use for salvaged wood

Character

Natural Patterns



Contour curves using flat panel wood stock



Oolitic limestone, local material



Biomorphic space made from stock wood planks



Natural forms using simple wood dowels



Natural forms made from stock wood dowels



Natural curved forms using flat wood



Abstracted tree forms using simple lumber



Natural volumes formed using stock wood planks



Natural curved forms using flat wood and a living wall

Character

Using Double-Height Space



Lashed wood tree-walk platforms



Overhead net walk, in orbit, Tomás Saraceno, Kunstsammlung



Bowerbird nest



Four-sided ladder



Art installation — Untitled Styrofoam Cups, Tara Donovan



Overhead net hang-out space, Morris Arboretum



Lucky Climber - Rochester Museum & Science Center



Overhead net hang-out space, Morris Arboretum



Art Installation Cloudy House, Tomás Saraceno



Roots as climbing structure

Exhibit Focus Variations

Initial Bubble Diagram Content Layout Options

CambridgeSeven and MODS reviewed four initial focus options for laying out the exhibit content in the space. This tested out ideas of priorities, adjacencies and flow through the exhibit space. We identified pros and cons for each layout. We felt that Biomimicry as an organizing principal might be too limiting for the wide range of technological solutions that we want to discuss. We also were concerned that organizing the exhibits around individual people may require more frequent updating of the graphic panels than MODS will be able to accomplish. We do want to talk about Biomimicry and about people but not as primary organizing principles.



Visitor Journey Across the MODS Property

We then took a step back to look at the how the resilience messages could be part of the entry experience and be integrated into kiosks or updates throughout the first floor of the building.



Two Conceptual Options

Based on the feedback we received from the MODS team, CambridgeSeven developed two options for encountering the resilience messaging as visitors move through the building specifically considering how the exhibits would engage the double height space around the stairs and the elevator.

Option 1 A Resilience Journey

Emphasis on a “Complete Street” of resilience ideas

- More of a single path, connected narrative from entry to Science Park
- Directed path
- Existing galleries receive some resilience retooling
- Point to Point scavenger hunt
- Greater transformation of existing exhibits, setting up an apex experience at the core
- More emphasis on the path and less on the individual galleries but the wayfinding shows that built and natural resilience can occur together
- We can rebuild natural systems to be resilient, we can learn from natural systems that are already resilient.
- Emphasizing different “lanes” and components.



Option 2 Nature + Technology

Emphasis on Nature and Technology as separate elements that come together in an interwoven fabric of ideas.

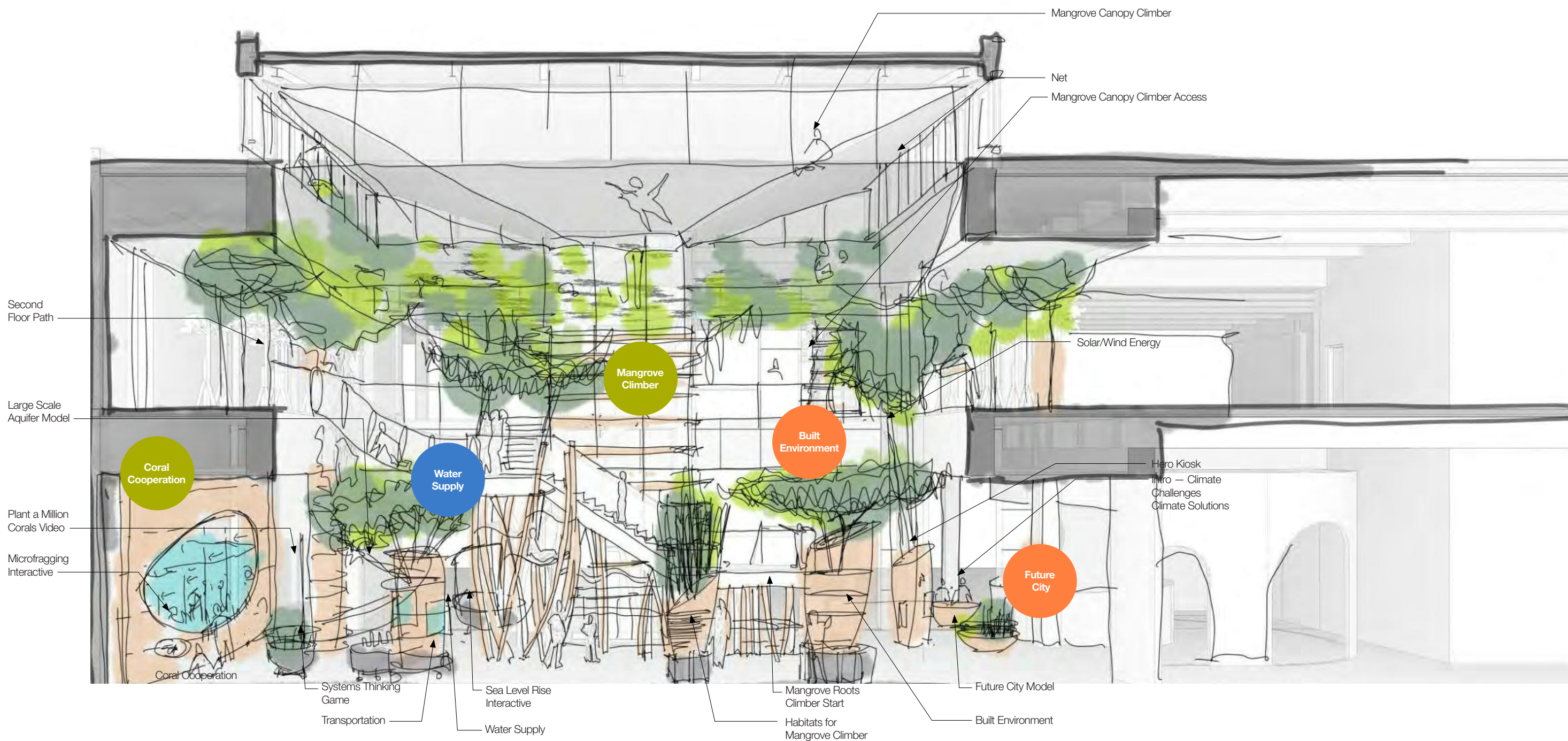
- Compare and contrast
- Discrete episodes of resilience
- Multi-Nodal
- Independent galleries that emphasize independent themes and topics
- Choose your own path of interest
- Less transformation of existing exhibits, setting up surprise at the core
- Less emphasis on the path and more on the topic, but the wayfinding shows that built and natural resilience are two sides of the same coin.
- We can rebuild natural systems to be resilient, we can learn from natural systems that are already resilient.



Option 1

A Resilience Journey

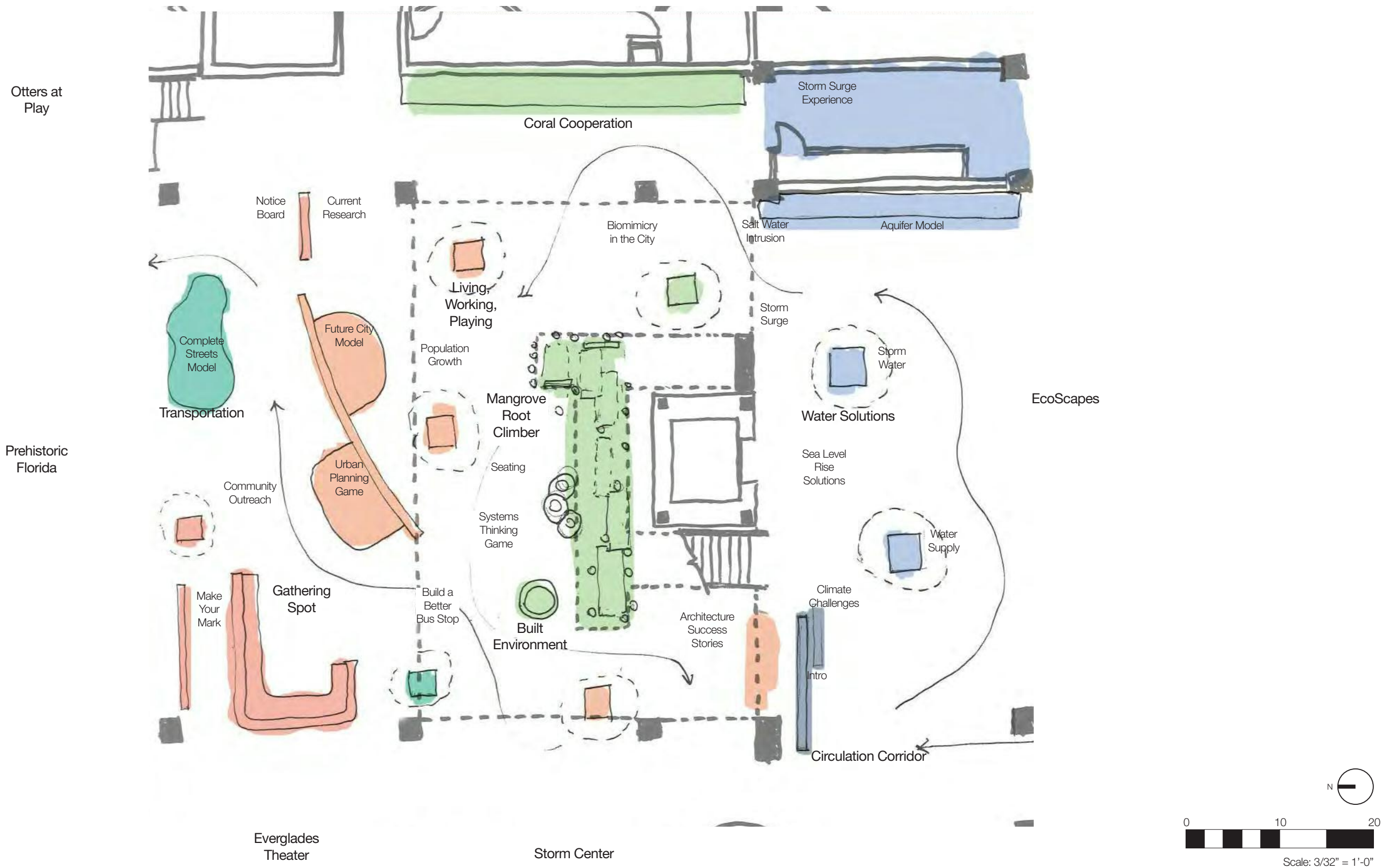
Perspective Section through Atrium



Option 1

A Resilience Journey

Build a Better World Exhibit Plan



Option 1

A Resilience Journey

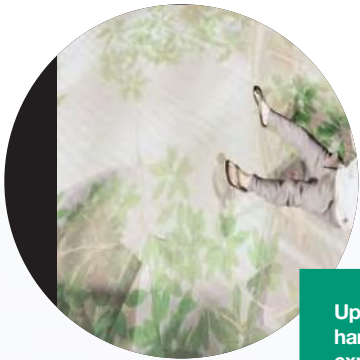
Circulation Features



Upper level atrium railing also engages exhibit with rail displays, planting and view corridors to climber.



Lower mangrove climber geared to younger age audience with a single path in and out.



Upper level access to net hangout. Geared toward expanded age range (teens and even brave adults).



Existing elevator serves as fully accessible experience within.



Existing stairs are actively engaged in the exhibit experience. Upper landing can be future connection point to EcoScapes.

Option 1

A Resilience Journey

Atrium View



Option 1

A Resilience Journey

Atrium Upper Level View



Option 1

A Resilience Journey



Character

Florida Trees



Red Mangrove



Bald Cypress with knees



Bald Cypress



Strangler Fig on Oak Tree



Strangler Fig on Cypress Tree



Red Mangrove



Bald Cypress



Red Mangroves



Red Mangroves

Option 2

Nature + Technology

Perspective Section through Atrium



Option 2

Nature + Technology

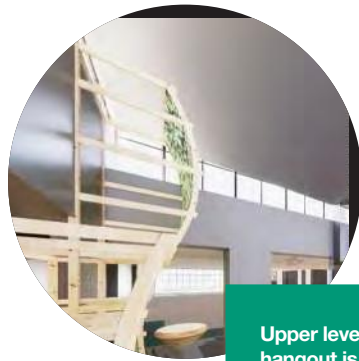
Build a Better World Exhibit Plan



Option 2

Nature + Technology

Circulation Features



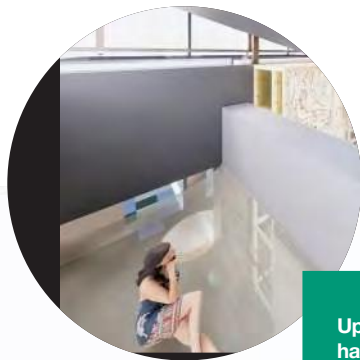
Upper level access to net hangout is through each side of the climber.



Rooms within have exhibits which are accessible from the 2nd floor as well as internal to the climber.



Entry to the "Nature" side of the climbing structure.



Upper level access to net hangout is through each side of the climber.



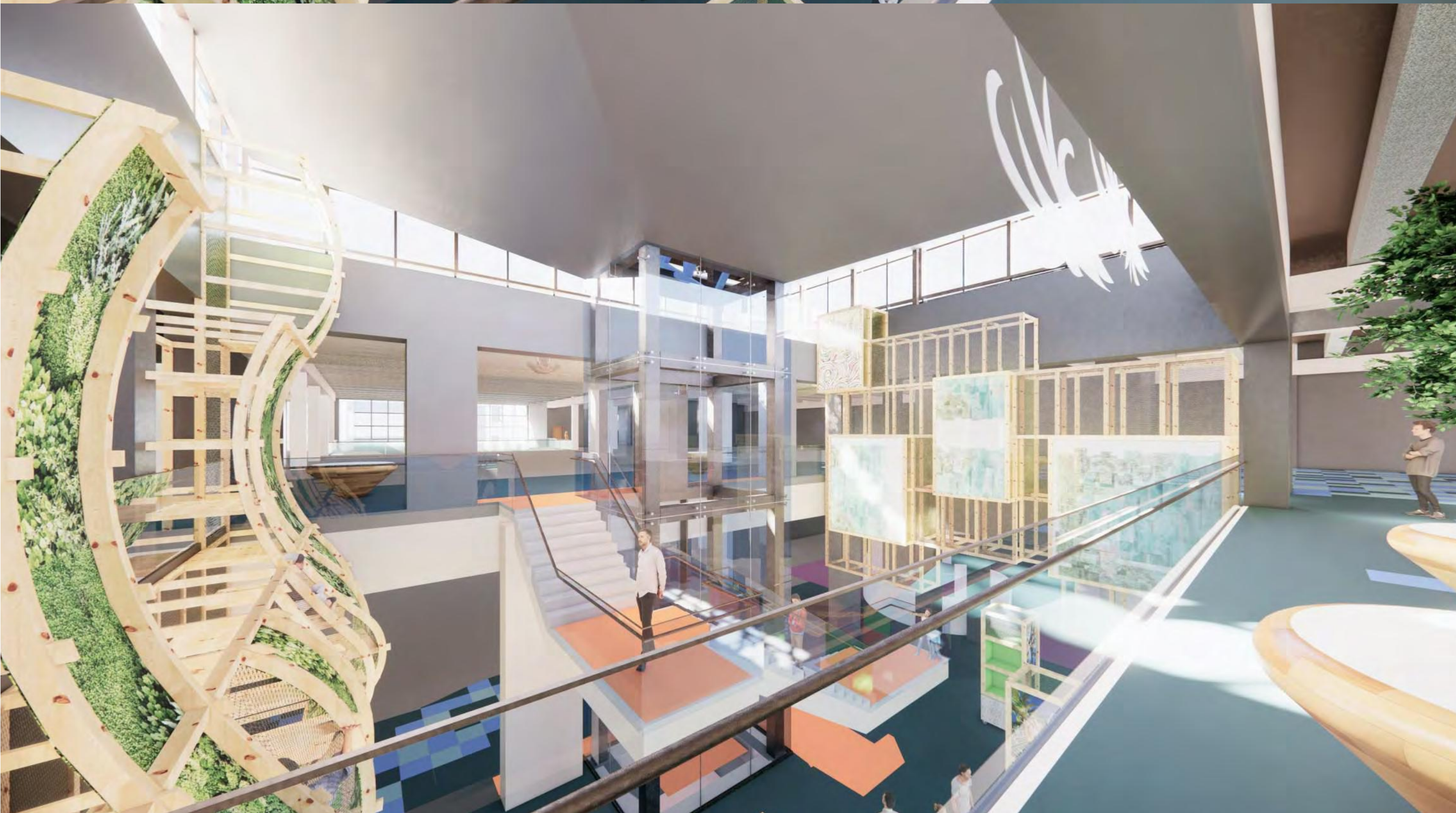
Rooms within have exhibits which are accessible from the 2nd floor as well as internal to the climber.



Entry to "Technology" side of climber.

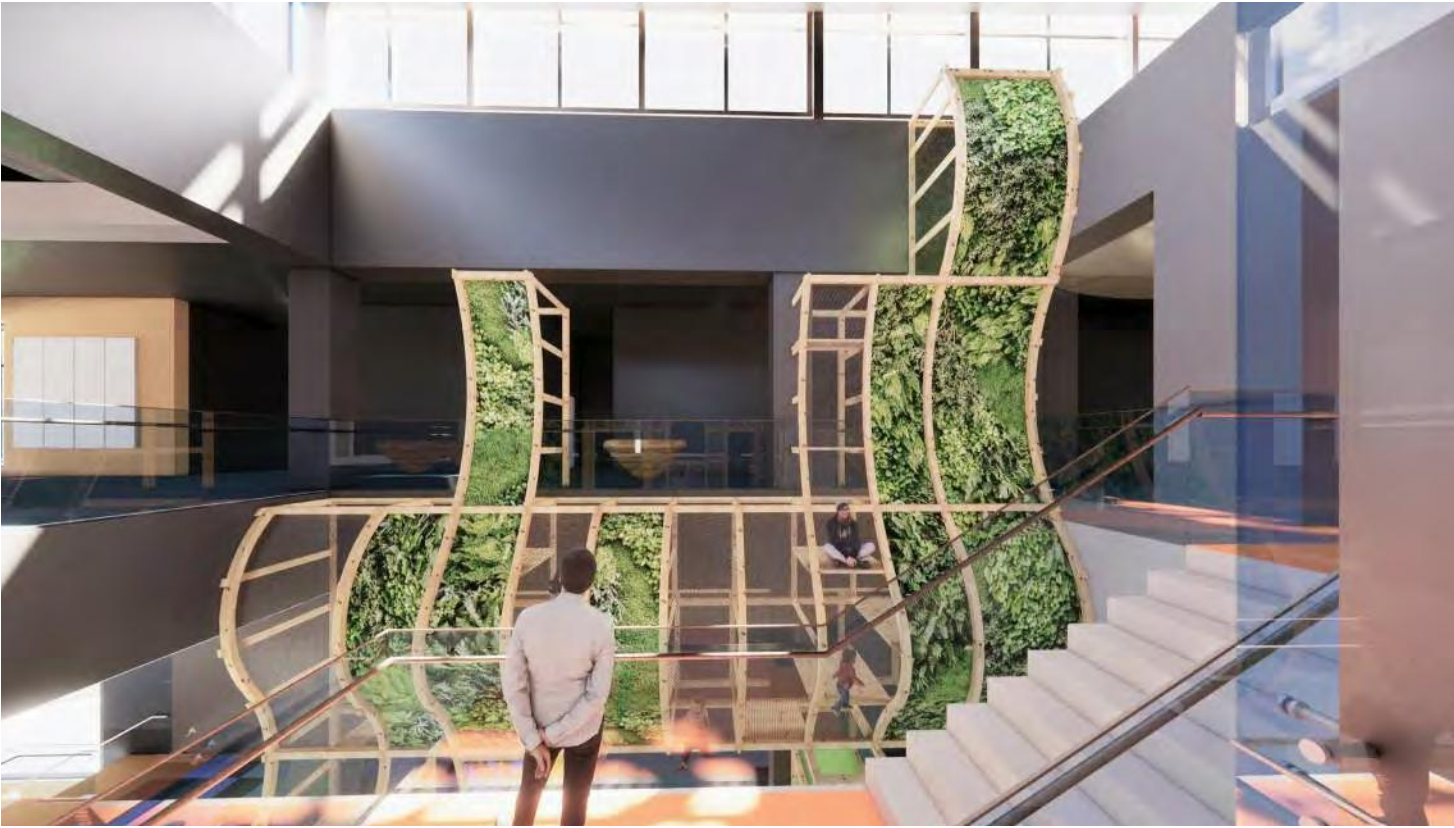






Option 2

Nature + Technology



Build a Better World

Exhibit Elements

About the “Exhibit Elements” Pages

To help the MODS and their partners make decisions as we move into the Schematic Design phase, we chose one of the two options to itemize and fully describe. This will help to get a rough order of magnitude (ROM) budget estimate for each area and give us more tools for decision making as we refine the design. This does not indicate a preference on anyone’s part for one option over the other.

We assume that the final design will incorporate elements of both options. All of the learning goals for each area are similar in both options laid out in the concept design. Any of the activities and experiences described here in the “Resilience Journey” option could be adapted for the “Nature + Technology” option, or for a hybrid option yet to be developed.



Exhibit Elements

Build a Better World Introduction

Build a Better World Introduction Learning Goals

Learning goals for this area include an introduction to the challenges we are facing regarding resilience in South Florida, and the world. The emphasis of the exhibit is on the solutions that have happened and are in the process of being rolled out as well as a vision of what we can and will do in the future to keep our society healthy and safe in a changing climate. In this exhibit, we will take visitors on a journey. The quest of a thriving, resilient community needs to involve all community members. In the introduction exhibit area, we invite visitors to join us in a resilience journey and to make their voice heard as they answer questions at each journey station to say what they think is important in our shared community.

Our Challenges



Growing Population - We are the 5th largest metropolitan area in the US and adding 1,000 residents per day.



Changing Climate - Sea-level rise and severe weather events must be addressed in Resiliency Plans.



Increasing Cost of Transportation and Housing - On average, 63% of income is spent on housing and transportation in Broward County.



Restricted Revenue - 93% of MPO transportation revenues have little flexibility in how they are allocated to transportation projects (mostly roadway improvements).



Limited Access - We need to change our development patterns to a denser, smart-growth approach that is more cost-efficient for infrastructure.



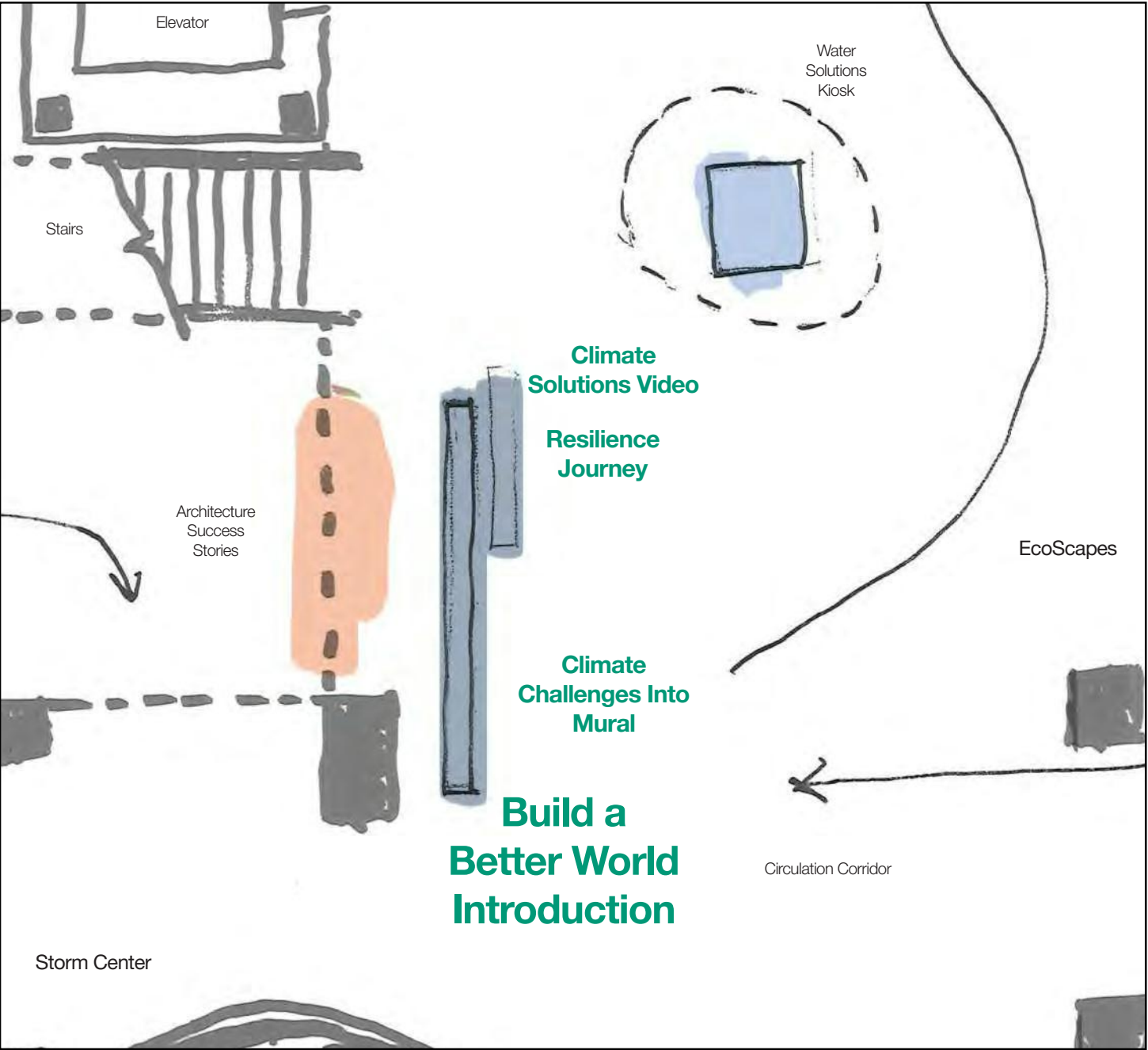
Funding Shortfall - The cost of multimodal transportation needs in the three-county region exceeds funding by an estimated \$7 billion between today and

Climate Challenges Mural

The eye-catching fabric mural will introduce visitors to the climate challenges facing the people of Broward County. These challenges include sea level rise, salt water intrusion, increased population, extreme weather, and unequitable access to resources.

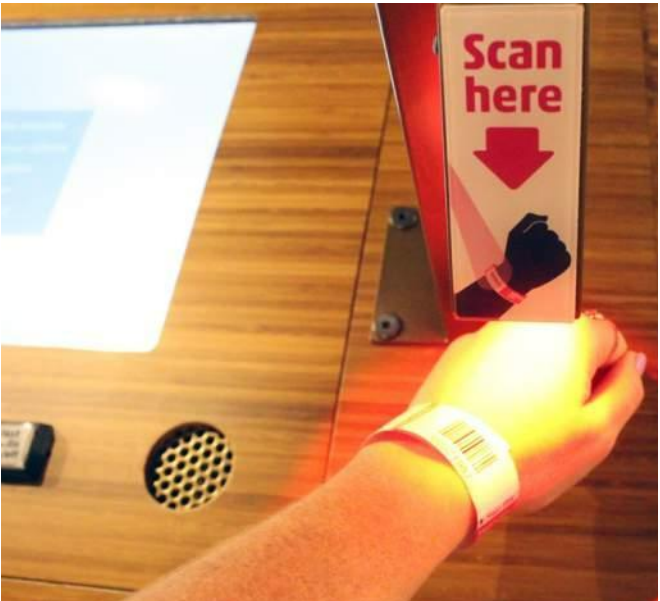
Climate Solutions Video

A nearby video will explain that although we have many challenges, we are already on the path to finding solutions. Through looking to nature for inspiration and through technological advances, we have solutions to our climate challenges. The video will have a motion sensor and will repeat from an attract screen when the sensor is activated.

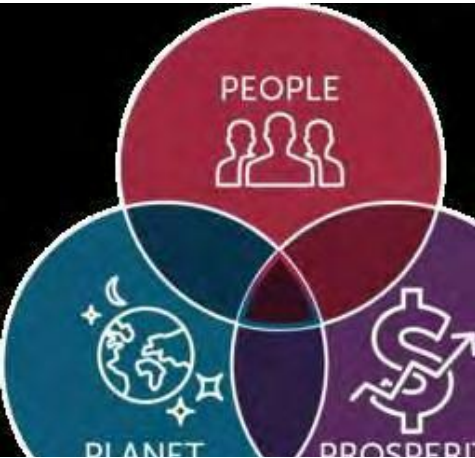


Resilience Journey Challenge UPC Armband

Visitors will be invited to join us on a resilience journey. At various stations throughout the exhibit, they will scan a personal identifier of some kind, possibly like the UPC armband shown here. They will see which stations they have visited and will be able to see their answers to specific questions as well as answers of other visitors broken out by South Florida residents, US citizens, and people from other countries. At each station, visitors will make decisions by weighing the impact of each decision against the triple bottom line measure of economic growth, sustainability, and quality of life. This framing will help visitors see the complexity of these decisions and favor decisions that have co-benefits in two or three of the triple bottom line categories.



Hall of Human Life Exhibit, MOS Boston



Triple Bottom Line of “People, Planet, Prosperity” is conveyed in *Broward Vision: The Path to 2100* as “Quality of Life, Sustainability, Economic Growth”

Exhibit Elements

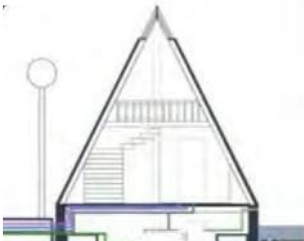
Water Solutions

Water Solutions Learning Goals

In this area visitors will be introduced to the many ways that water effects the communities and ecosystems of South Florida. The high levels of rain water, the oceans and rivers, the Everglades and the porous aquifer beneath our feet create an environment surrounded by water. All this water makes South Florida the beautiful place that it is, though with many challenges. We will see how people and nature in South Florida deals with flooding and storm surges, how we protect our drinking water from pollution and salt water intrusion, what solutions we are developing around sea level rise.

Water Solutions Kiosk

This kiosk introduces the solutions that are being developed around protecting our clean water supply in South Florida. The kiosk will feature a “Water Advocacy Hero,” discuss where our water comes from and talk about the how climate change and population growth are both affecting our clean water supply. A resilience journey station here will discuss issues such as nutrient pollution, untreated sewage, leaking septic tanks, inadequately treated storm water and animal waste. We will highlight recent clean water solutions we have learned from observing natural systems including improving sanitation through natural processes such as black soldier flies larvae feeding on organic waste.

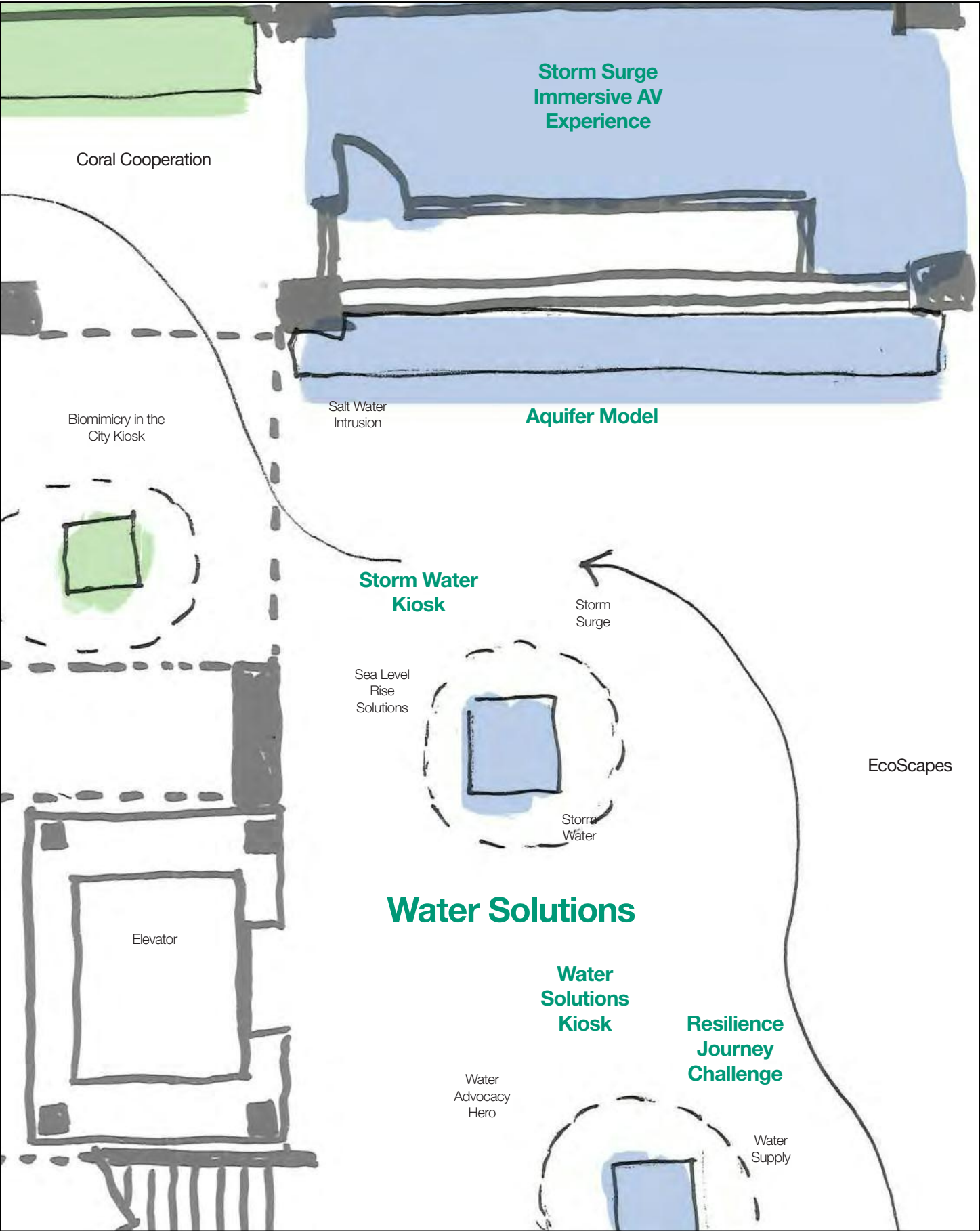


Storm Water Kiosk

This kiosk discusses solutions for collecting and dispersing storm water in an environment that regularly receives 60 to 70 inches of water per year. We will ask questions such as “How do we handle storm surges and flooding when the intensity of severe storms is increasing?” This area will feature an interactive with a proposed floating house or a similar storm water solution. Other possible solutions include restoring living sea walls using mangrove, sea grass and oyster ecosystems along coast lines, smart rooftops that collect and disperse water, and urban forests.

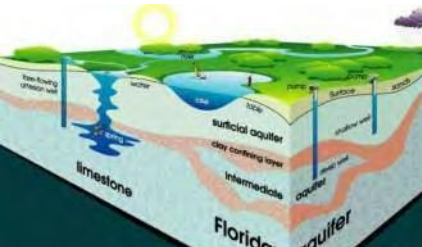


CambridgeSeven



Aquifer Model

This model will be approximately 28'-0" wide and 6'-0" tall and will show visitors how the Florida aquifer absorbs water and pollution from the surface and see the physics of salt water intrusion. The model will be based on a much loved aquifer model at MODS and will use real water and quick dissolving dyes to show how water and pollutants move through the aquifer. The top of the aquifer will show some recognizable features of Fort Lauderdale. Visitors will be able to make it rain and release pollutants into the aquifer.



Storm Surge Immersive AV Experience

This 24' x 7' space is darker than most of the day lit space and will serve as an immersive media experience where visitors will experience a king tide storm surge in Fort Lauderdale as projected into the future as sea levels rise. Fans and light water misting may be part of this immersive experience.



Current Northern Lights Exhibit in this space, MODS

Exhibit Elements

Coral Cooperation

Water Solutions Learning Goals

Coral reef communities show us a clear example of small city-like ecosystems where nature shows us that cooperation works as a survival strategy. Plants and animals help each other to form a community that is better for all. Coral reefs also use carbon as a building block using what we have seen as an unwanted, dangerous waste product as a resource. This section will use coral reefs as a case study to show how these ecosystems have been threatened by human activity and what we are now doing to help them recover and thrive again.

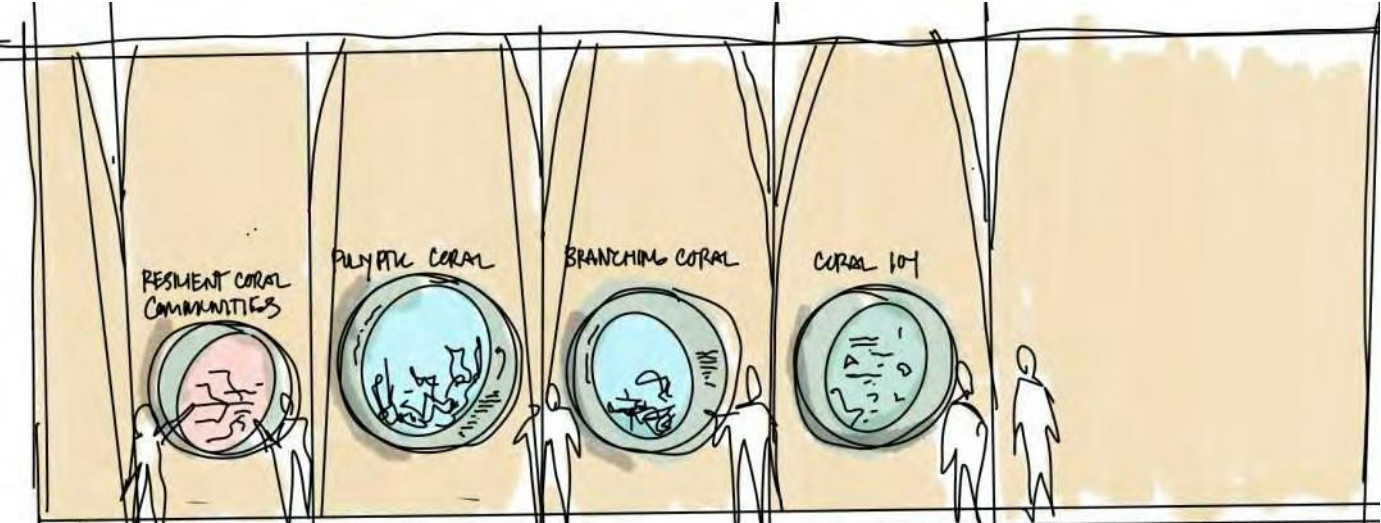
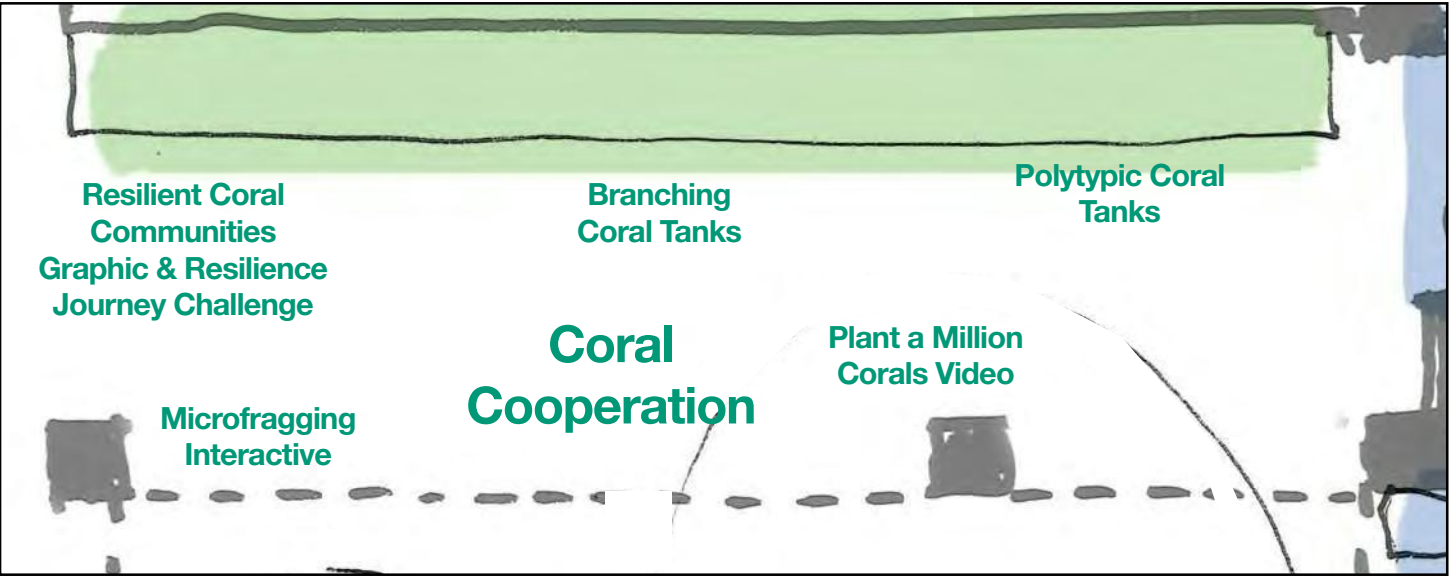
Resilient Coral Communities Graphic & Resilience Journey Challenge

This introductory graphic will explain the importance of coral reefs to human life and how we can learn from the survival through cooperation model. We will discuss how plants and animals in coral reef ecosystems help each other to thrive. We will examine the triple bottom line of various methods of design for co-benefits with the Resilience Journey Challenge.



Branching and Polytypic Coral Tanks

These live animal coral tanks will showcase various kinds of corals in various stages of microfragmentation and regeneration.



Microfragging Interactive

A manual interactive will allow kids to handle and pretend to cut coral pieces into smaller pieces. A small replica of a band saw will “cut” the coral pieces which will be held together with magnets or Velcro. Visitors will move the Velcro pieces from one bucket or bin to another. Visitors will also see this same action being taken by scientists in a nearby video.



Plant a Million Corals Video

This 2 minute video features the work of Dr. David Vaughan and the Plant a Million Corals team with invitations to get involved in his work of coral reforestation. It will be activated with a push button.



Exhibit Elements

The Mangrove Tree

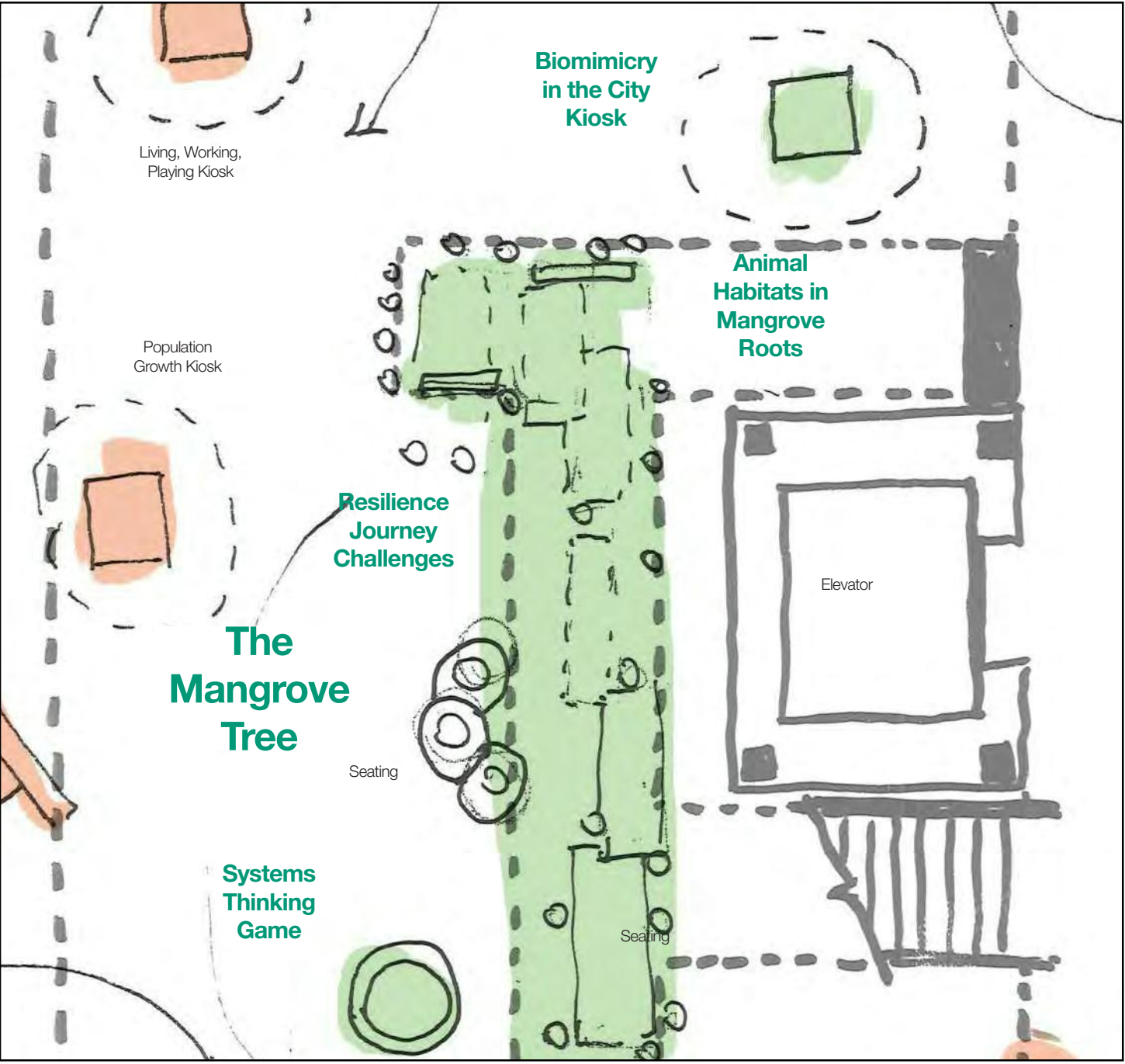
The Mangrove Tree Learning Goals

In this area visitors will see a monumental, full scale depiction of a red mangrove tree as a symbol of how nature teaches us how to be resilient. The mangrove tree calms waves with its roots, calms winds with its branches, they extract fresh water from the sea hoarding fresh water in its waxy leaves. They provide habitat for animals in its roots and in its canopy and they use carbon dioxide as a resource storing up to 10 times more carbon than forests.



Biomimicry in the City Kiosk

This kiosk will feature urban planning, infrastructure and architectural innovations that are being made where humans are learning from our oldest teacher, the living world that surrounds us. The graphics and interactives on this kiosk will tell stories where humans are learning from living beings such as scientists that are studying ant communities for efficient transportation, how nanoparticles in butterfly wings are teaching us to colorize objects with structure instead of with chemicals. Gecko feet are teaching us how to create non-toxic adhesives that use structure instead of toxic chemicals for adhesives. Nambian beetles condense fog into clean, fresh water. Mangrove trees are desalination factories, Spider silk uses natural, water based chemistry to create super strong fibers. Hospitals are using the nano structure of shark skin teach them how to create a anti-bacterial film that discourages bacterial growth by using structure instead of toxic chemicals. Companies such as Erlus is creating roof tiles inspired by lotus leaves have a photocatalytic coating that actively pulls nitrogen oxide pollution out of the air. Companies such as BluePlanet are using coral's recipe for using carbon as a building block to create carbon sequestering concrete. The structure and geometry of leaves are inspiring solar panel design. Scientists studying nature are moving away from processes that require heat and toxic chemicals turning more to natural chemistry that uses water as a solvent. The living world runs on sunlight. The natural world depends on the local, understands the limits and opportunities of place, depends on diversity, and rewards cooperation. The natural world wastes nothing and up-cycles everything.



UConn Solar Tree Project



Tessa Miceli



Mangrove Root Climber

Among the roots of the mangrove tree children and adults will be able to climb up under the stairs among beautiful mangrove root replicas. The climber will be adorned with artwork from salvaged materials and graphic cutouts of animals found in mangrove root nurseries. Lizard, crab, shark and fish live animal habitats will also be housed on the ground floor of the mangrove climber.



RMSC, CambridgeSeven



SciQuarium, CambridgeSeven

Mangrove Canopy Experience

From the second floor, daring visitors will be able to climb up a series of ladders and platforms to sit above the EcoDiscovery Center atrium in a giant net where they will feel like they are in the mangrove canopy. From the atrium they will be able to hang out and relax, view the rooftop solar panels or green roof plantings. They will see mangrove tree leaves suspended below them which will move slightly as people navigate the tightly strung net. From this view of the Build a Better World gallery, visitors will primarily see the planters at the top of the kiosks. This helps to emphasize how humans can minimize their impact on the natural world when we are inspired by natural design.



Second Floor Rails

Visitors using the elevator or the stairs will feel as if they are climbing the trunk of the mangrove tree and ascending into the canopy. Graphic rails placed on the second floor give a birds-eye view of the gallery for visitors who choose not to climb the ladder to the Mangrove Canopy Experience. The exhibit content and the activities provided in the mangrove canopy will be replicated here. Indoor trees will be planted near these rails to help these visitors feel they are part of the atrium mangrove canopy.

Exhibit Elements

The Mangrove Tree

Resilience Journey Challenges

The resilience journey challenge activities in the mangrove tree roots and the mangrove canopy will emphasize the resilient properties of the mangrove tree. One station in the canopy will discuss how mangroves act as a wind break in severe storms. Another will discuss how mangrove roots protect communities from storm surges and flooding. A third resilience journey station will discuss the super carbon sequestering abilities of the mangrove tree. This activity will help define a “carbon sink,” and teach about how it is important. As all the resilience journey challenges, visitors will evaluate the triple bottom line of increasing natural coastal mangrove forests. Analogies may be drawn between natural systems and bio-inspired designed infrastructures.



Systems Thinking Game

In this game, visitors will engage in an urban tree planting project. They will have a budget and will decide how many and where they will plant urban forests in their communities. During this game, they will learn about the impact that urban forests have on carbon capture, storm water management, heat island effect mitigation as well as social impacts of having green spaces in a community. They will see how our communities are interconnected and that the solutions that are the best value are the solutions that affect our communities in many different ways.



Seating

We will provide seating in this area for caregivers who want to watch their kids in the mangrove root climber or who otherwise wish to take a break and take in their surroundings.



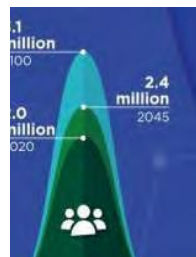
Living, Working, Playing

Learning goals for this area include helping visitors see a vision for what our houses and neighborhoods will need to look like when planning for a more resilient future. We will look at some elements in more depth in the Architectural Solutions exhibit area and the Transportation exhibit area, but here we will focus on infrastructure and the challenges on Florida infrastructure from the unprecedented population growth seen here. People love South Florida and more and more people are choosing to join us here. What do we love about South Florida and how do we retain that in towns and cities that provide us with all the things we need to live, work and play?

This kiosk features graphic panels and simple manual interactives that help visitors understand how increasing resiliency in roads, sidewalks, homes, office buildings and parks will improve their lives. The kiosk will focus on burying power lines, elevating transit and roads. Solutions for increasing the resilience of buildings such as breakaway first floors and improving the resiliency of water supply and wastewater infrastructure.



The Population Growth kiosk graphics explain through graphs and imagery the rate that south Florida is growing and discusses how Broward county is investing in preparing for that growth through land use and smart urban design with a focus on equity. A large scale population growth graph will be mounted to a nearby wall and made of repetitive discarded items such as soda cans so that it can be edited over the years for accuracy.



Current Research

Future City Model

Urban Planning Game

Living, Working, Playing

Living, Working, Playing Kiosk

Population Growth Kiosk

Population Growth - Dimensional Graph

Mangrove Root Climber

Seating

Biomimicry in the City Kiosk

Elevator

N

Scale: $\frac{3}{16}'' = 1'-0''$

Working with the American Society for Civil Engineers (ASCE) we will develop a model of a city grid with some recognizable features of Fort Lauderdale that will show how multi-modal transit, higher density land uses would change the look of Fort Lauderdale for the better. This could be made from several glass panels layered on top of each other with LED lights that make the different layers visible. We would explore using salvaged glass from the current MODS facade replacement project. This table will be approximately 10'-0" wide by 6'-0" deep.



Denver Botanical Gardens, Razorfish

This table top game will include movable tiles with embedded electromagnetic sensors. Visitors will need to accomplish a defined development goal and will need to make decisions about low-density, high-density development, green space, and agriculture are allotted space in their city. This game will be about 10'-0" wide by 6'-0" deep. This game will also have another component where visitors can brainstorm various urban planning solutions by thinking with Lego blocks.



Dalton Discovery Center, Naples, CambridgeSeven



MIT Media Lab's CityScope



Broad DN Atrium, Cambridge, CambridgeSeven

A touchscreen monitor will feature news stories and short video clips from researchers discussing the latest research on resiliency for the built environment. These will be presented through a content management system that will be easily updated by MODS staff from news articles or YouTube style video clips made by researchers.

Exhibit Elements

Built Environment

Built Environment Kiosk

This kiosk will focus on the how to build resilient buildings and will feature many of the resilient efforts were put into building this exhibit including using local and salvaged materials, building for deconstruction and reuse, low energy power and lighting solutions and low carbon materials. The kiosk will discuss super airtight and insulated construction in South Florida. The importance of high density housing, breakaway first floors, hurricane resistant construction and other essential features of resilient buildings.



ZeroEnergy Design, Portsmouth, RI

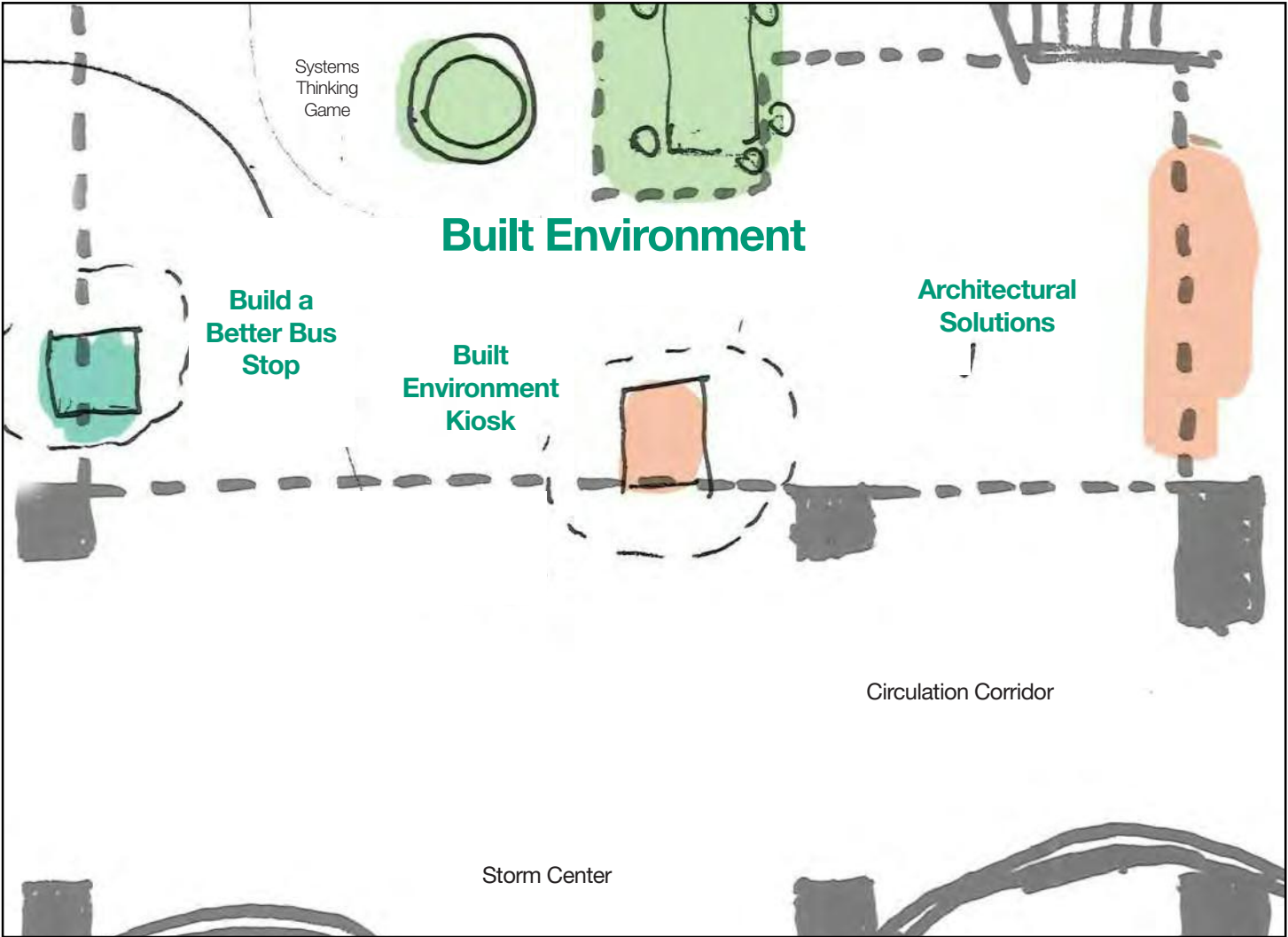
Architectural Solutions

This will be the back of the Intro Mural wall and will feature a dimensional collage of touchable building materials such as local oolitic limestone, Dade County pine, solar panels, green walls, and low carbon building materials such as modified wood, straw, wood fiber insulation, rammed earth walls, paper wool, reused bricks, hemp fleece, and linoleum.



BioHouse, Biobased Creations

CambridgeSeven



Scale: 3/16" = 1'-0"

Build a Better Bus Stop

This table, adjacent to the Built Environment Kiosk and the Urban Planning activity will focus on equity. It will ask visitors what they would like a future bus stop to look like. What amenities could it have in South Florida that would encourage more people to ride the bus?

Built Environment Resilience Journey

The Built Environment Kiosk will also include a resilience journey UPC station discussing equity in the Built Environment. How are policies made? Who makes them and for whom? How can you make your voice heard?

Architectural Solutions Adapted Species

The architectural solutions wall may also feature an animal that has successfully adapted to a human urban environment such as an iguana, box turtle, armadillo or an owl.



The Collectivity Project, Olafur Eliasson, Photo Credit: Keld Navntoft/AFP

Exhibit Elements

Transportation

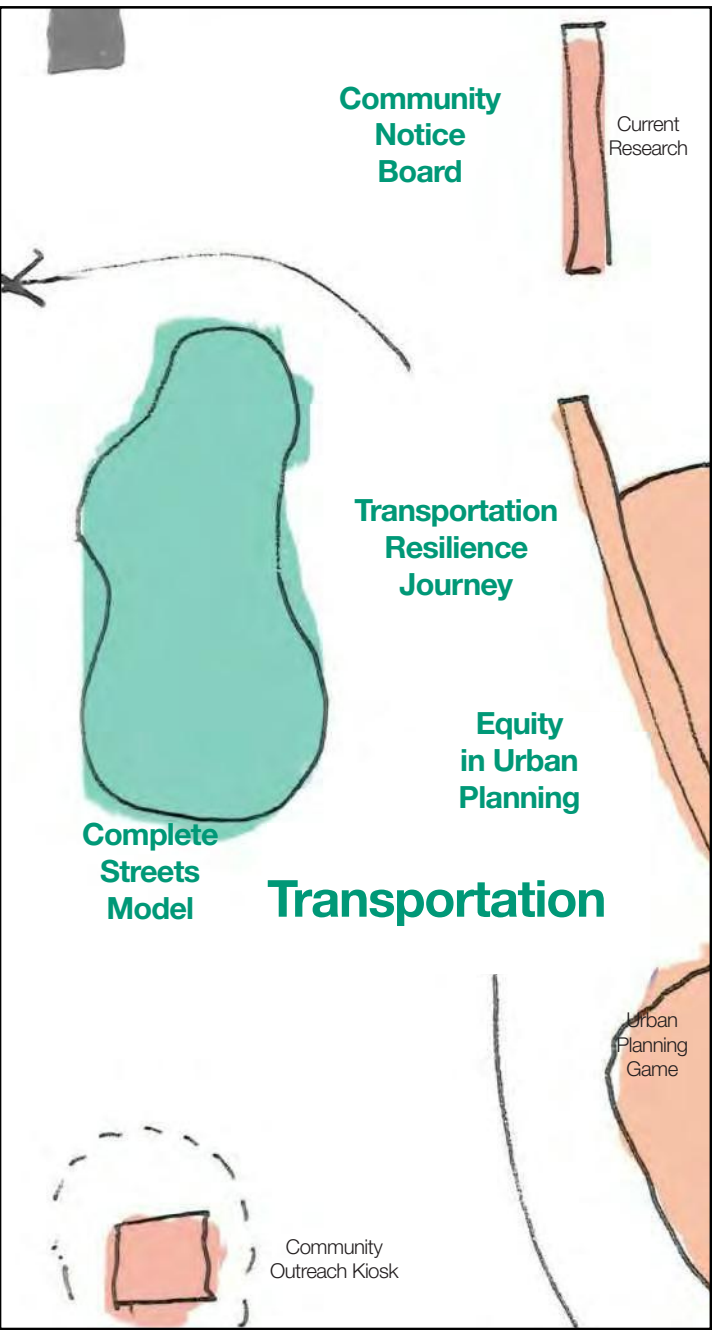
Transportation Learning Goals

In this exhibit area we will use transportation as a case study to explore equity in urban design. The Broward Vision 2100 discusses how there is a solution, but it isn't wider roads, it is a different system. We want to encourage visitors to think, plan, and grow differently than we have in the past. In 2100, we want our successors to look back and think "Wow, look what they began to accomplish early in the 21st century." Transportation also teaches how, systems thinking, design for co-benefits and cooperation can improve a community. The discussion of equity is closely tied to our goals to reduce energy use through improved public transportation, and improved walking and bicycling infrastructure.



Complete Streets Model

"Complete" streets is an approach to designing streets that enables safe access for the full spectrum of people who use them including pedestrians, bicyclists, motorists and transit riders of all ages and abilities. Complete streets is the antithesis to making highways wider and wider to make roads that only work for automobiles. Complete streets are being designed in urban environments all over the world, including in South Florida. Complete streets use designed learned from the natural world by including trees and plantings for more shading and water retention and using other natural water retention systems to encourage natural infiltration of storm water. This city model will be a smaller scale model than the future city model and will show our community at a neighborhood level to show how complete street improve the quality of living for all members of the community. The model will include graphic panels with push buttons that will use LED lights to identify various elements of complete streets. The model will be approximately 6'-0" wide by 14'-0" long, and will be on lockable casters so that it can be moved away for large events.



Scale: 3/16" = 1'-0"

Equity in Urban Planning

This touch screen interactive will feature stories of people who have advocated for improvements to their urban environment to create a community that works for all people. It will highlight some of the challenges to equity in urban planning and tips for advocating for a positive change.



Transportation Resilience Journey

This resilience journey kiosk will focus on low carbon transportation including bicycles, mag-lev trains, public transit and new innovations electrification and in low-carbon fuels.



Community Notice Board

This will be a cork notice board that people can use to pin up public events that are taking place in the area including public beach clean ups, service projects, grassroots community events, fund raisers, summits, lectures. The goal of this board is to help bring the Broward county community together and to increase awareness of community events and activities.



Exhibit Elements

Gathering Spot

Gathering Spot

This will be a small gathering place for tired caregivers group discussions. Classroom tours will be able to take advantage of this space for small group lectures or discussions. The seating will be designed to foster communication and will be adjacent to the urban planning game, the Make Your Mark interactive wall and the Custom Action Plan pledge station.



Oleg Soroko

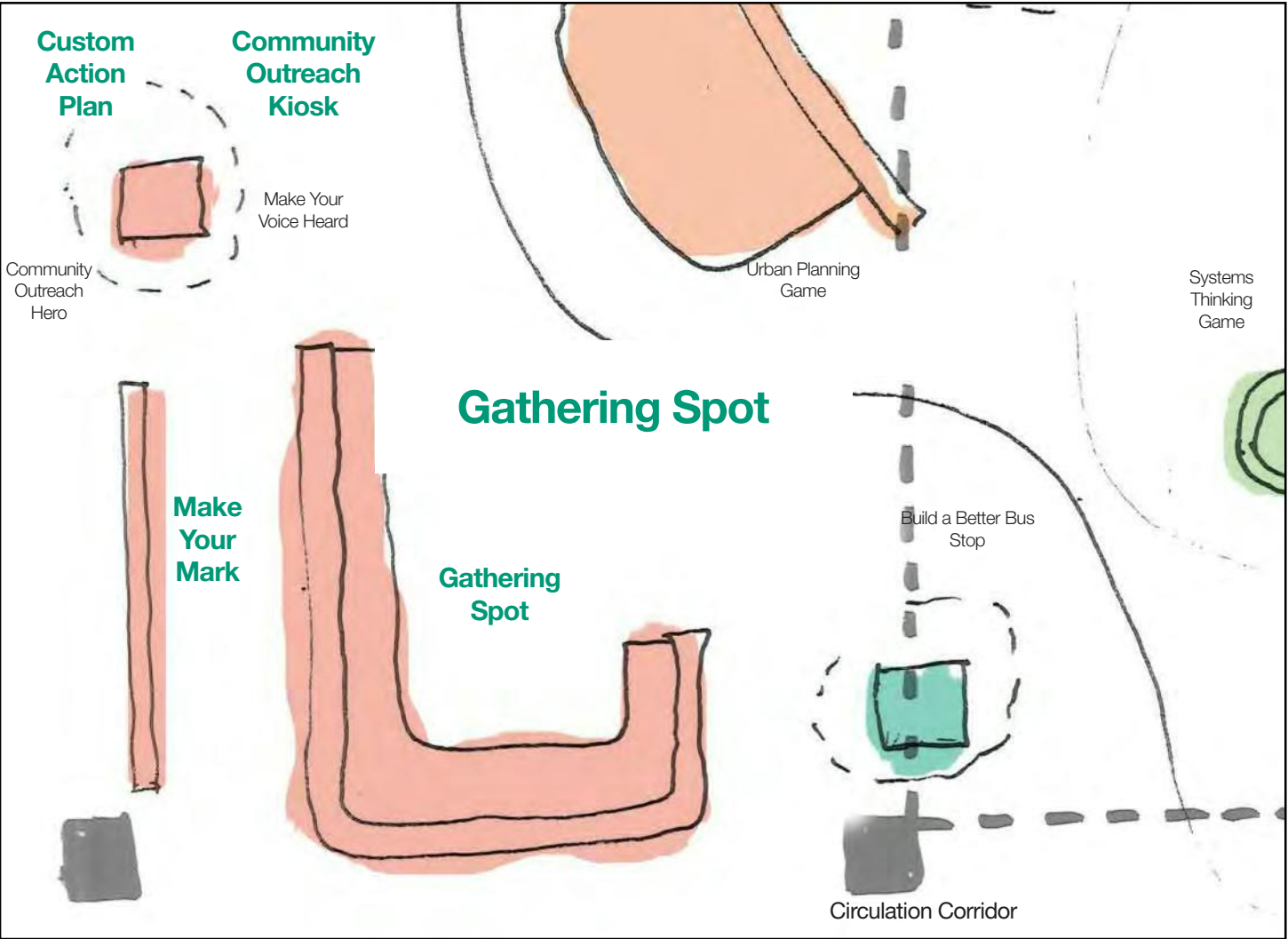


Bhumiputra Architecture



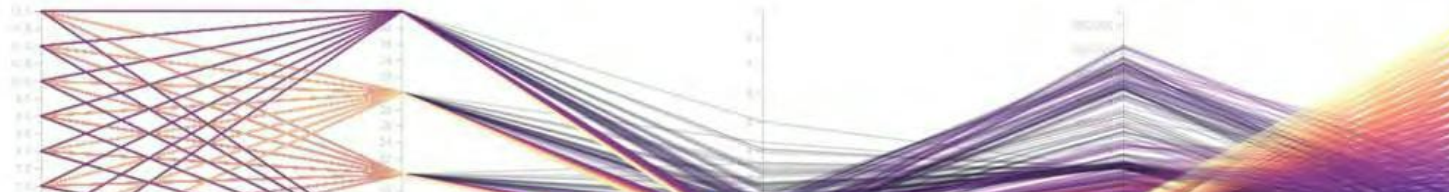
Dorota Gabkowska, Birmingham Made Me Design Expo

CambridgeSeven



Make Your Mark

This interactive wall will use colored threads to help visitors think about their priorities and resilience commitments and then leave behind a marker to show others that they were there. Visitors will be able to see trends that develop through time as more and more visitors make their mark on this interactive wall. We will ask questions about what actions visitors are willing to make to make their communities more resilient. Visitors will begin to see that although individual actions don't do too much, working together, we can accomplish great things.



Thornton Tomasetti's Thread Visualization Tool

Community Outreach Kiosk

This kiosk will feature a community outreach hero and discuss how policy is made and how community members and resilience activists can take a part in creating laws, ordinances and public policies that change our community priorities and the way our community works.



Custom Action Plan

This pledge station gather the information from the various resilience journey stations throughout the museum analyzing the triple bottom line of their choices. It will then ask visitors information about what community groups they belong to. The computer will then generate several ideas that the visitor can take to make a difference in creating a more resilient community. Visitors can email themselves a selfy with their pledge and choose if they want to publish it on a second monitor higher on the kiosk or possibly on the Museum's Social Media platform.



Additional Proposed Exhibit Updates

The exhibit updates listed here are being considered as part of this project. They will create a resilience theme and a resilience journey that visitors can engage with on the first floor of the building starting in the outdoor atrium and continuing through to the Science Park at the rear of the museum.



Existing Conditions

Build a Better World



Former emergency stairs



Lower stair landing



View from Storm Everglades Theater ramp to the East



Panoramic view from East side of atrium



Panoramic view from North side of atrium

Existing Conditions

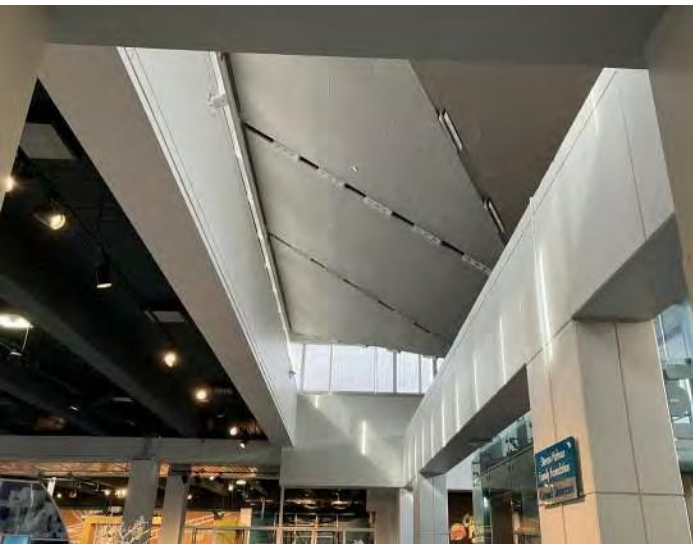
Build a Better World Atrium



2nd floor to upper stair landing



Elevator shaft from 2nd floor



View of space above 2nd floor elevator entry



View of atrium ceiling



1st floor elevator doors



Lower stair landing looking to Storm Center



View of elevator shaft from lower stair landing



View of upper stair landing from 2nd floor



View of Build a Better World space from lower stair landing

Existing Conditions

Surrounding Exhibits



Otters at Play



Florida Everglades Theater



Prehistoric Florida



Prehistoric Florida location for new computer interactive, possibly on core drilling



Panoramic of Science Park



Everglades Theater view towards entry gate to right of main screen (SW corner)



Everglades Theater view to NW corner



Everglades Theater view to NE corner



Everglades theater view of main screen (SE corner)



Storm Center



Storm Center location for new interactives, possibly Storm Prep & Youth Summit



Florida EcoScapes view from near elevator



Florida EcoScapes view from near escalators

Conceptual Exhibit Matrix

Name	Description	Sq Ft	AV Hardware
Intro			
Climate Challenges Mural	The eye-catching fabric mural will introduce visitors to the climate challenges facing the people of Broward County. These challenges include sea level rise, salt water intrusion, increased population, extreme weather, and unequitable access to resources.		
Climate Solutions Video	A nearby video will explain that although we have many challenges, we are already on the path to finding solutions. Through looking to nature for inspiration and through technological advances, we have solutions to our climate challenges. The video will have a motion sensor and will repeat from an attract screen when the sensor is activated.		45" monitor
Climate Journey Challenge Resilience Journey (UPC)	Visitors will be invited to join us on a resilience journey. At various stations throughout the exhibit, they will scan a personal identifier of some kind, possibly like the UPC armband shown here. They will see which stations they have visited and will be able to see their answers to specific questions as well as answers of other visitors broken out by South Florida residents, US citizens, and people from other countries. At each station, visitors will make decisions by weighing the impact of each decision against the triple bottom line measure of economic growth, sustainability, and quality of life. This framing will help visitors see the complexity of these decisions and favor decisions that have co-benefits in two or three of the triple bottom line categories.		21" touchscreen monitor monitor
Subtotal		250	
Water Supply			
Aquifer Model	This model will be approximately 28'-0" wide and 6'-0" tall and will show visitors how the Florida aquifer absorbs water and pollution from the surface and see the physics of salt water intrusion. The model will be based on a much loved aquifer model at MODS and will use real water and quick dissolving dyes to show how water and pollutants move through the aquifer. The top of the aquifer will show some recognizable features of Fort Lauderdale. Visitors will be able to make it rain and release pollutants into the aquifer.		
Floating House Interactive	Manual Interactive		
Water Solutions Kiosk	This kiosk introduces the solutions that are being developed around protecting our clean water supply in South Florida. The kiosk will feature a "Water Advocacy Hero," discuss where our water comes from and talk about the how climate change and population growth are both affecting our clean water supply. A resilience journey station here will discuss issues such as nutrient pollution, untreated sewage, leaking septic tanks, inadequately treated storm water and animal waste. We will highlight recent clean water solutions we have learned from observing natural systems including improving sanitation through natural processes such as black soldier flies larvae feeding on organic waste.		
Storm Water Kiosk	This kiosk discusses solutions for collecting and dispersing storm water in an environment that regularly receives 60 to 70 inches of water per year. We will ask questions such as "How do we handle storm surges and flooding when the intensity of severe storms is increasing?" This area will feature an interactive with a proposed floating house or a similar storm water solution. Other possible solutions include restoring living sea walls using mangrove, sea grass and oyster ecosystems along coast lines, smart rooftops that collect and disperse water, and urban forests.		
Water Advocacy Hero	Changeable Graphic Panel		
Graphic Panel Allowance			

Conceptual Exhibit Matrix

Name	Description	Sq Ft	AV Hardware
Resilience Journey (UPC) - Water Solutions	Touch Screen and wristband scanner		21" touchscreen monitor
Storm Surge AV Experience	This 24' x 7' space is darker than most of the day lit space and will serve as an immersive media experience where visitors will experience a king tide storm surge in Fort Lauderdale as projected into the future as sea levels rise. Fans and light water misting may be part of this immersive experience.		
Subtotal		950	
Coral Cooperation			
Intro Graphic - Resilient Coral Communities	This introductory graphic will explain the importance of coral reefs to human life and how we can learn from the survival through cooperation model		
Branching Coral Tanks	Live Animal - Wet		
Polytypic Coral Tanks	Live Animal - Wet		
Microfragging Interactive	A manual interactive will allow kids to handle and pretend to cut coral pieces into smaller pieces. A small replica of a band saw will "cut" the coral pieces which will be held together with magnets or Velcro. Visitors will move the Velcro pieces from one bucket or bin to another. Visitors will also see this same action being taken by scientists in a nearby video.		
Plant a Million Corals Video	This 2 minute video features the work of Dr. David Vaughan and the Plant a Million Corals team with invitations to get involved in his work of coral reforestation. It will be activated with a push button.		37" monitor
Graphic Panel Allowance			
Resilience Journey (UPC) - Coral Cooperation	We will discuss how plants and animals in coral reef ecosystems help each other to thrive. We will examine the triple bottom line of various methods of design for co-benefits with the Resilience Journey Challenge.		21" touchscreen monitor
Subtotal		700	
Mangrove Climber			
Elevator Theming			
Overhead Net Climb	From the second floor, daring visitors will be able to climb up a series of ladders and platforms to sit above the EcoDiscovery Center atrium in a giant net where they will feel like they are in the mangrove canopy. From the atrium they will be able to hang out and relax, view the rooftop solar panels or green roof plantings. They will see mangrove tree leaves suspended below them which will move slightly as people navigate the tightly strung net. From this view of the Build a Better World gallery, visitors will primarily see the planters at the top of the kiosks. This helps to emphasize how humans can minimize their impact on the natural world when we are inspired by natural design.		

Conceptual Exhibit Matrix

Name	Description	Sq Ft	AV Hardware
Biomimicry in the City Kiosk	This kiosk will feature urban planning, infrastructure and architectural innovations that are being made where humans are learning from our oldest teacher, the living world that surrounds us. The graphics and interactives on this kiosk will tell stories where humans are learning from living beings such as scientists that are studying ant communities for efficient transportation, how nanoparticles in butterfly wings are teaching us to colorize objects with structure instead of with chemicals. Gecko feet are teaching us how to create non-toxic adhesives that use structure instead of toxic chemicals for adhesives. Nambian beetles condense fog into clean, fresh water. Mangrove trees are desalination factories, Spider silk uses natural, water based chemistry to create super strong fibers. Hospitals are using the nano structure of shark skin teach them how to create a anti-bacterial film that discourages bacterial growth by using structure instead of toxic chemicals. Companies such as Erlus is creating roof tiles inspired by lotus leaves have a photocatalytic coating that actively pulls nitrogen oxide pollution out of the air. Companies such as BluePlanet are using coral's recipe for using carbon as a building block to create carbon sequestering concrete. The structure and geometry of leaves are inspiring solar panel design. Scientists studying nature are moving away from processes that require heat and toxic chemicals turning more to natural chemistry that uses water as a solvent. The living world runs on sunlight. The natural world depends on the local, understands the limits and opportunities of place, depends on diversity, and rewards cooperation. The natural world wastes nothing and up-cycles everything.		
Systems Thinking Game	In this game, visitors will engage in an urban tree planting project. They will have a budget and will decide how many and where they will plant urban forests in their communities. During this game, they will learn about the impact that urban forests have on carbon capture, storm water management, heat island effect mitigation as well as social impacts of having green spaces in a community. They will see how our communities are interconnected and that the solutions that are the best value are the solutions that affect our communities in many different ways.		
2nd Floor Rail Kiosks	Visitors using the elevator or the stairs will feel as if they are climbing the trunk of the mangrove tree and ascending into the canopy. Graphic rails placed on the second floor give a birds-eye view of the gallery for visitors who choose not to climb the ladder to the Mangrove Canopy Experience. The exhibit content and the activities provided in the mangrove canopy will be replicated here. Indoor trees will be planted near these rails to help these visitors feel they are part of the atrium mangrove canopy.		
Mangrove Climber	Among the roots of the mangrove tree children and adults will be able to climb up under the stairs among beautiful mangrove root replicas. The climber will be adorned with artwork from salvaged materials and graphic cutouts of animals found in mangrove root nurseries. Lizard, crab, shark and fish live animal habitats will also be housed on the ground floor of the mangrove climber.		
Salvaged Material Mangrove Art - Canopy			
Salvaged Material Mangrove Art - Trunk			
Graphic/Art Mangrove Animals	Graphic Allowance		
Seating	We will provide seating in this area for caregivers who want to watch their kids in the mangrove root climber or who otherwise wish to take a break and take in their surroundings.		
Resilience Journey (UPC) Mangrove Station - Wind Break	Touch Screen and wristband scanner		21" touchscreen monitor
Resilience Journey (UPC) Mangrove Station - Wave Break	Touch Screen and wristband scanner		21" touchscreen monitor

Conceptual Exhibit Matrix

Name	Description	Sq Ft	AV Hardware
Resilience Journey (UPC) Mangrove Station - Carbon	Touch Screen and wristband scanner		21" touchscreen monitor
Graphic Panel Allowance			
Bird Habitat ?	Live Animal Habitat - Dry		
Lizard/ Crab Habitat	Live Animal Habitat - Dry		
Insect Habitat	Live Animal Habitat - Dry		
Shark and Fish Habitat	Live Animal Habitat - Wet		
Subtotal		1200	
Built Environment			
Living Working Playing Kiosk	This kiosk features graphic panels and simple manual interactives that help visitors understand how increasing resiliency in roads, sidewalks, homes, office buildings and parks will improve their lives. The kiosk will focus on burying power lines, elevating transit and roads. Solutions for increasing the resilience of buildings such as breakaway first floors and improving the resiliency of water supply and wastewater infrastructure.		
Future City Model	Working with the American Society for Civil Engineers (ASCE) we will develop a model of a city grid with some recognizable features of Fort Lauderdale that will show how multi-modal transit, higher density land uses would change the look of Fort Lauderdale for the better. This could be made from several glass panels layered on top of each other with LED lights that make the different layers visible. We would explore using salvaged glass from the current MODS facade replacement project. This table will be approximately 10'-0" wide by 6'-0" deep.		
Urban Planning / Population Growth Game	This table top game will include movable tiles with embedded electromagnetic sensors. Visitors will need to accomplish a defined development goal and will need to make decisions about low-density, high-density development, green space, and agriculture are allotted space in their city. This game will be about 10'-0" wide by 6'-0" deep. This game will also have another component where visitors can brainstorm various urban planning solutions by thinking with Lego blocks.		
Built Environment Kiosk	This kiosk will focus on the how to build resilient buildings and will feature many of the resilient efforts were put into building this exhibit including using local and salvaged materials, building for deconstruction and reuse, low energy power and lighting solutions and low carbon materials. The kiosk will discuss super airtight and insulated construction in South Florida. The importance of high density housing, breakaway first floors, hurricane resistant construction and other essential features of resilient buildings.		
Architectural Solutions	This will be the back of the Intro Mural wall and will feature a dimensional collage of touchable building materials such as local oolitic limestone, Dade County pine, solar panels, green walls, and low carbon building materials such as modified wood, straw, wood fiber insulation, rammed earth walls, paper wool, reused bricks, hemp fleece, and linoleum.		
Population Growth Kiosk	The Population Growth kiosk graphics explain through graphs and imagery the rate that south Florida is growing and discusses how Broward county is investing in preparing for that growth through land use and smart urban design with a focus on equity. A large scale population growth graph will be mounted to a nearby wall and made of repetitive discarded items such as soda cans so that it can be edited over the years for accuracy.		
Built Environment Advocay Hero	Changeable Graphic Panel		

Conceptual Exhibit Matrix

Name	Description	Sq Ft	AV Hardware
Built Environment Adapted Species Habitat	The architectural solutions wall may also feature an animal that has successfully adapted to a human urban environment such as an iguana, box turtle, armadillo or an owl.		
Graphic Panel Allowance			
Resilience Journey (UPC) - Built Environment	The Built Environment Kiosk will also include a resilience journey UPC station discussing equity in the Built Environment. How are policies made? Who makes them and for whom? How can you make your voice heard?		21" touchscreen monitor
Subtotal		1350	
Transporation			
Complete Streets Model	"Complete" streets is an approach to designing streets that enables safe access for the full spectrum of people who use them including pedestrians, bicyclists, motorists and transit riders of all ages and abilities. Complete streets is the antithesis to making highways wider and wider to make roads that only work for automobiles. Complete streets are being designed in urban environments all over the world, including in South Florida. Complete streets use designed learned from the natural world by including trees and plantings for more shading and water retention and using other natural water retention systems to encourage natural infiltration of storm water. This city model will be a smaller scale model than the future city model and will show our community at a neighborhood level to show how complete street improve the quality of living for all members of the community. The model will include graphic panels with push buttons that will use LED lights to identify various elements of complete streets. The model will be approximately 6'-0" wide by 14'-0" long, and will be on lockable casters so that it can be moved away for large events.		
Build a Better Bus Stop Game	This table, adjacent to the Built Environment Kiosk and the Urban Planning activity will focus on equity. It will ask visitors what they would like a future bus stop to look like. What amenities could it have in South Florida that would encourage more people to ride the bus?		
Graphic Panel Allowance			
Equity in Urban Planning Touch Screen	This touch screen interactive will feature stories of people who have advocated for improvements to their urban environment to create a community that works for all people. It will highlight some of the challenges to equity in urban planning and tips for advocating for a positive change.		
Resilience Journey (UPC) - Transporation	This resilience journey kiosk will focus on low carbon transportation including bicycles, mag-lev trains, public transit and new innovations electrification and in low-carbon fuels.		21" touchscreen monitor
Subtotal		650	

Conceptual Exhibit Matrix

Name	Description	Sq Ft	AV Hardware
Community Outreach			
Notice Board			
Current Research	A touchscreen monitor will feature news stories and short video clips from researchers discussing the latest research on resiliency for the built environment. These will be presented through a content management system that will be easily updated by MODS staff from news articles or YouTube style video clips made by researchers.		
Community Outreach Kiosk	This kiosk will feature a community outreach hero and discuss how policy is made and how community members and resilience activists can take a part in creating laws, ordinances and public policies that change our community priorities and the way our community works.		
Make Your Mark	This interactive wall will use colored threads to help visitors think about their priorities and resilience commitments and then leave behind a marker to show others that they were there. Visitors will be able to see trends that develop through time as more and more visitors make their mark on this interactive wall. We will ask questions about what actions visitors are willing to make to make their communities more resilient. Visitors will begin to see that although individual actions don't do too much, working together, we can accomplish great things.		
Gathering Spot	This will be a small gathering place for tired caregivers group discussions. Classroom tours will be able to take advantage of this space for small group lectures or discussions. The seating will be designed to foster communication and will be adjacent to the urban planning game, the Make Your Mark interactive wall and the Custom Action Plan pledge station.		
Community Notice Board	This will be a cork notice board that people can use to pin up public events that are taking place in the area including public beach clean ups, service projects, grassroots community events, fund raisers, summits, lectures. The goal of this board is to help bring the Broward county community together and to increase awareness of community events and activities.		
Custom Action Plan - Resilience Commitment - Pledge Station	This pledge station gather the information from the various resilience journey stations throughout the museum analyzing the triple bottom line of their choices. It will then ask visitors information about what community groups they belong to. The computer will then generate several ideas that the visitor can take to make a difference in creating a more resilient community. Visitors can email themselves a selfy with their pledge and choose if they want to publish it on a second monitor higher on the kiosk or possibly on the Museum's Social Media platform.		45" touchscreen monitor
Resilience Journey (UPC) - Community Outreach	Touch Screen and wristband scanner		21" touchscreen monitor
Subtotal		600	
Storm Center Updates			
Storm Preparation Success Stories	Touch Screen Monitor		tbd
Youth Summit Stories	Touch Screen Monitor		tbd
Hurricane Preparation Game	Touch Screen Monitor		tbd
Wall of Wind Update			

Conceptual Exhibit Matrix

Name	Description	Sq Ft	AV Hardware
Tornado Rehabilitation			
WSVN Weather Desk Update			
Resilience Journey (UPC) - Resilient Weather	Touch Screen and wristband scanner		21" touchscreen monitor
New Graphic Panel Allowance			
Subtotal		500	
Everglades Theater Updates			
Gathering Space			
Invasive Species Habitats	Animal Habitats - Wet and Dry		
Otter Interactive Show			
Digitally Mapped media experience			
Carbon in the Everglades Wetlands	Computer Interactive		37" touchscreen
Resilience Journey (UPC) - Resilient Everglades	Touch Screen and wristband scanner		21" touchscreen monitor
New Graphic Panel Allowance			
Subtotal		1600	
Prehistoric Florida Updates			
Climate Change in the Past	Kiosk		
Resilience Journey (UPC) - Natural vs. Human Climate Change	Touch Screen and wristband scanner		21" touchscreen monitor
Carbon Analysis in Core Drilling	Computer Interactive		37" touchscreen
Natural vs. Human Caused Climate Change	Computer Interactive		37" touchscreen monitor
Change Ice block melt to live animal habitiat, Iguana? Bird? Armadillo?	Animal Habitat - Dry		
New Graphic Panel Allowance			
Subtotal		600	

Conceptual Exhibit Matrix

Name	Description	Sq Ft	AV Hardware
Otter Updates			
"North American River Otters" signage	Graphic Allowance		
Resilience and Clean Rivers	Kiosk		
Resilience Journey (UPC) - Clean Rivers	Touch Screen and wristband scanner		21" touchscreen
Added fish into otter tank			
Mammal Pathways Computer Interactive	Computer Interactives		
Otter Enrichment Games			
Subtotal		700	
Science Park Updates			
Urban Agriculture	Outdoor Play		
Resilience Journey (UPC) - Urban Agriculture	Touch Screen and wristband scanner		Outdoor 21" touchscreen monitor
Future Food Insects	Animal Habitat - Dry - Outdoor		
Turtle, alligator, gopher tortoise habitat			
New Graphic Panel Allowance	Outdoor Graphic Panels		
Subtotal		6000	
EcoScapes Updates			
Graphic Panel Allowance			
Subtotal		4000	
Lobby Updates			
Indoor/Outdoor Resilience Kiosk	Kiosk		
Resilience Journey (UPC) - Urban Agriculture	Touch Screen and wristband scanner		21" touchscreen monitor
Subtotal		400	

Conceptual Exhibit Matrix

Name	Description	Sq Ft	AV Hardware
Front Courtyard Updates			
Hydroponic Mangrove Trees			
Coastal Resilience Game	Manual Interactive		
Sea Level Rise Sculpture	Allowance		
Subtotal		700	
Building Infrastructure			
LEED O&M Costs			
Water Collection and Treatment	Allowance		
Energy Metering	Allowance		
Lighting and Hardware Installation			
Plumbing and Electrical Fixtures and Installation			