COASTAL HAZARDS OVERLAY DISTRICT GUIDEBOOK

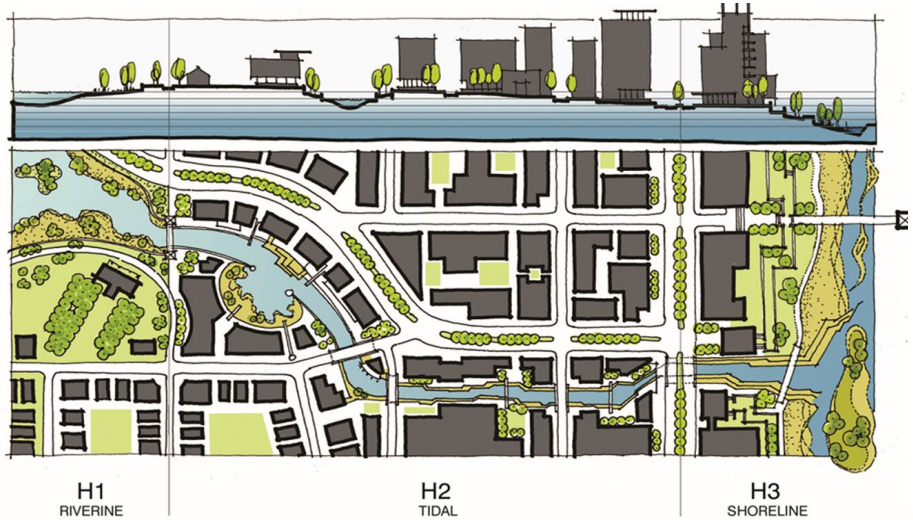
BACKGROUND / ORIGIN

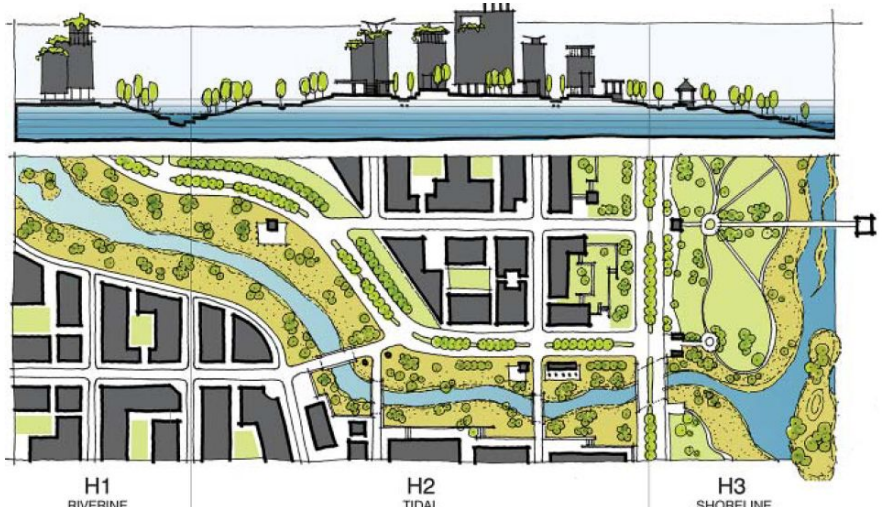
- Post-Katrina Charrettes / Mississippi Renewal Forum

- Hazard Transect Overlay Article: Smith, Gavin, Allison Anderson and David Perkes. 2021. New Urbanism and the H-Transect: Improving the Integration of Disaster Resilience and Design in Coastal Areas. Landscape Journal, 40(1): 35-47.

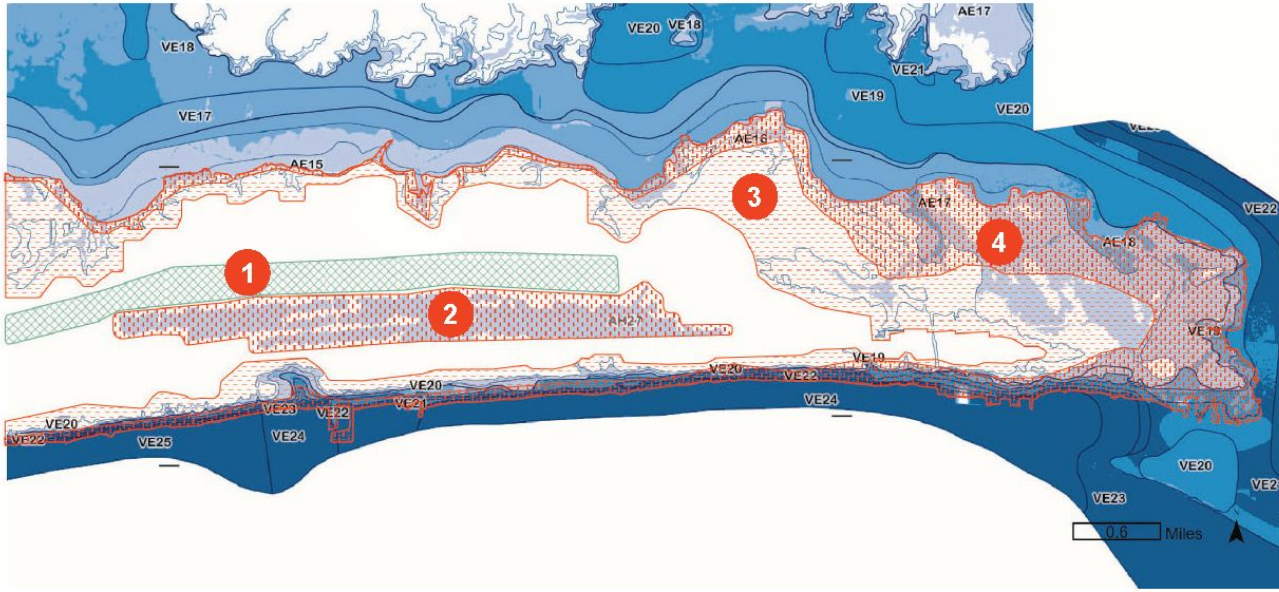
CONCEPT

- The Coastal Hazards Overlay District will apply resilient design and adaptation principles across various zoning designations and development patterns to assist current and future development to be more resilient to coastal climate hazards





WHAT IS A COASTAL HAZARDS OVERLAY DISTRICT?



see: Overlay District

Hazard Overlay Districts are developed by mapping established risk data (Flood Insurance Rate Maps, Sea Level Rise projections) and unique local conditions (such as areas subject to nuisance flooding as a result of development). The mapping above combines FIRMs and flood depth data (elevation subtracted from Base Flood Elevation values) to visualize hazard risk, informing the boundaries of a Growth Ar (1) and multiple Hazard Overlay Districts (localized hazard [2], moderate hazard [3] and high hazard [4]). Overlay Districts can be modified accommodate dynamic local conditions and hazards of varying types and intensities. The Hazard Overlay District provides city officials wi an adaptable and flexible tool that can help guide development decisions.

1 **Growth Area**; characterized by minimal risk and other conditions favorable to development. Higher elevations and proximity to critical infrastructure can be considered alongside local development goals to inform delineation of Growth Areas. New development is encouraged in Growth Areas.

2 **Localized-Hazard Overlay District**; identifies an area subject to storm-related flooding because of the nearby railroad tracks.

3 **Moderate-Hazard Overlay District**; encompasses areas where any risk is present or projected. Development may be permitted with some stipulations in Moderate-Hazard areas (see: Protect/Accomodate).

4 **High-Hazard Overlay District**; New development is discouraged in High-Hazard areas (see: Managed Retreat and Avoidance).

GUIDE OUTLINE

- Section 1: Introduction, Purpose, Principles, and Audience
- Section 2: Developing a Coastal Hazards Overlay District
- Section 3: Coastal Hazards Overlay District Terms and Definitions
- Section 4: Adaptation Design Standards and Planning Techniques (52 strategies)
- Section 5: Case Studies
- Section 6. Summary and Conclusions
- Section 7: Appendices

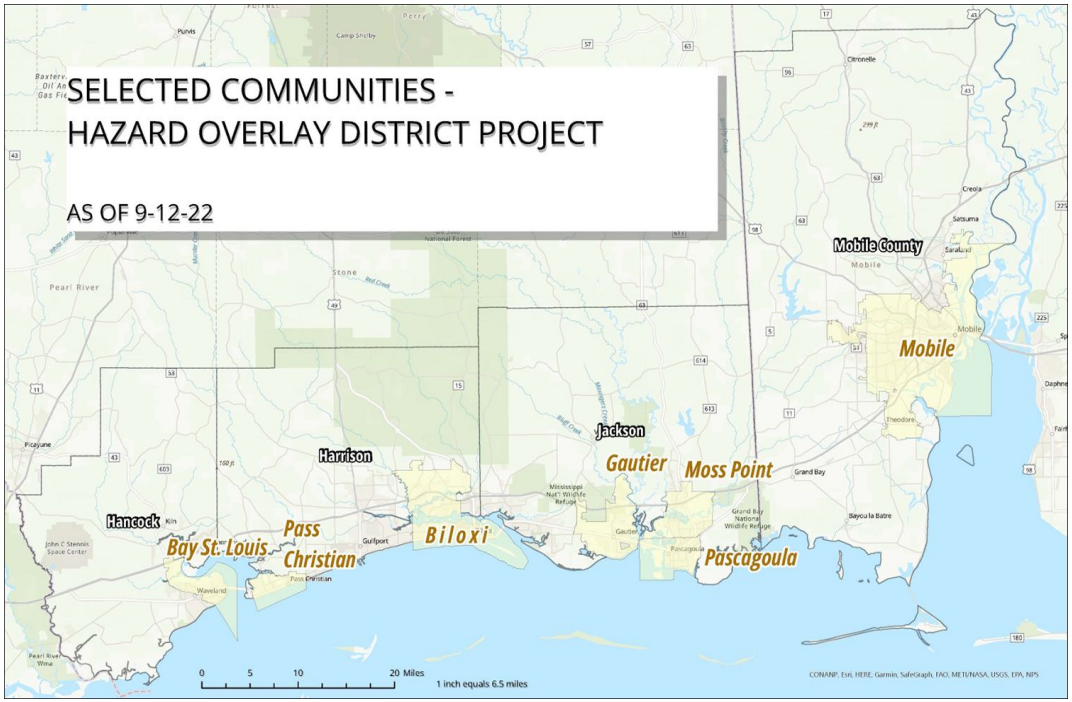
PRECEDENT

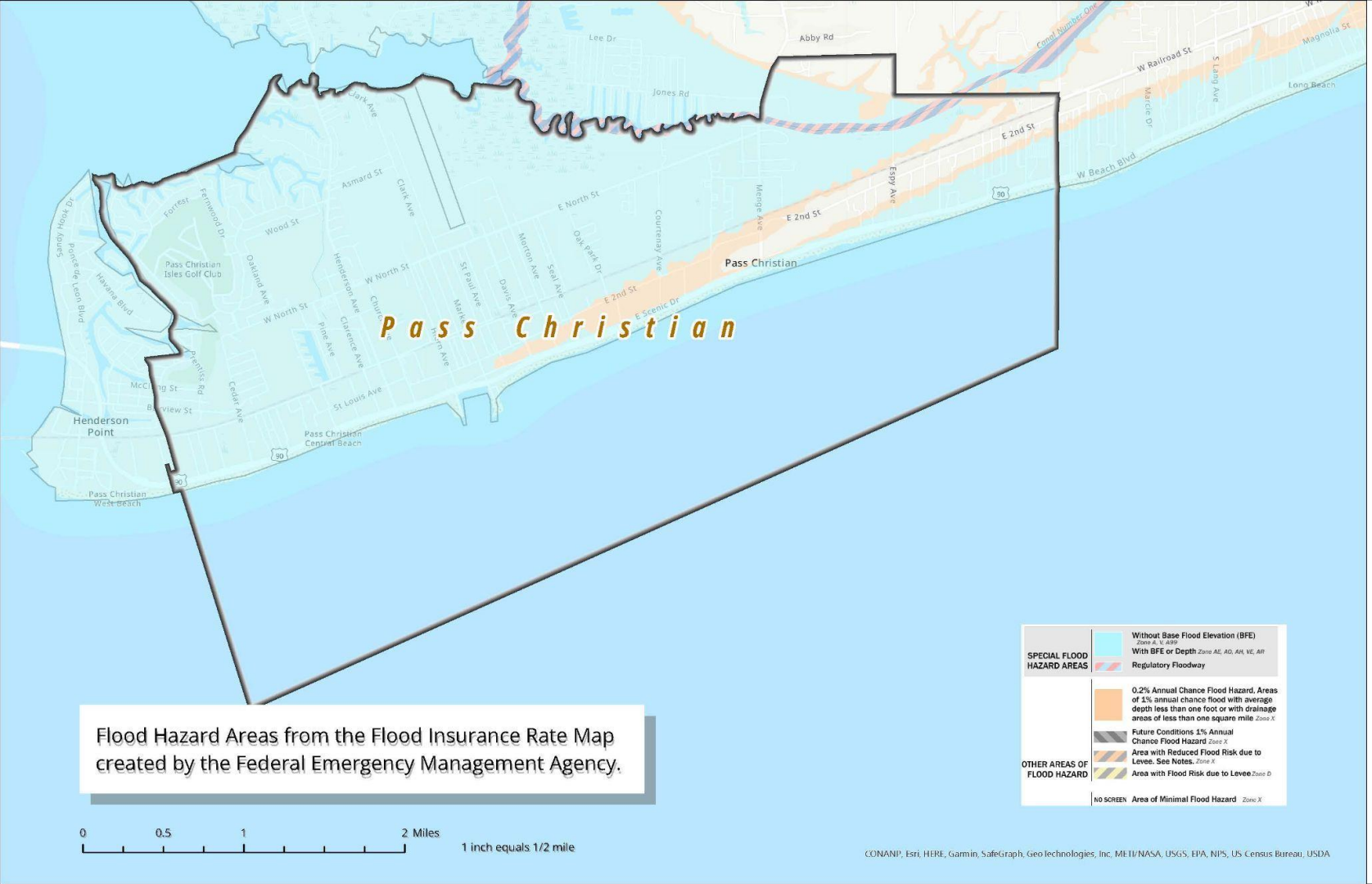
Coastal Hazards Overlay District

- Incentivizes development in upland areas of the community
- Imposes resilience requirements for projects within hazard-prone zones

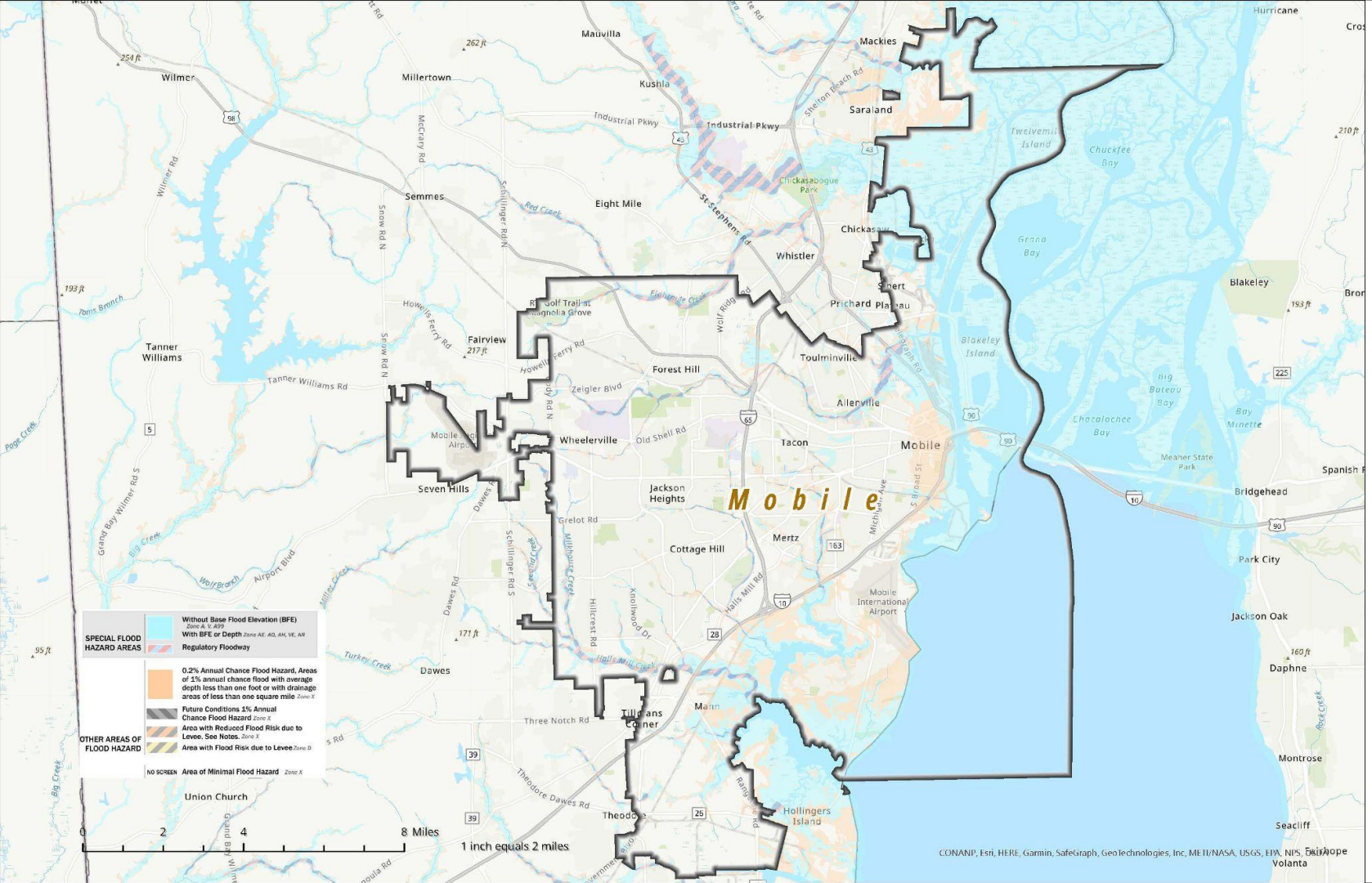
Community Selection Process

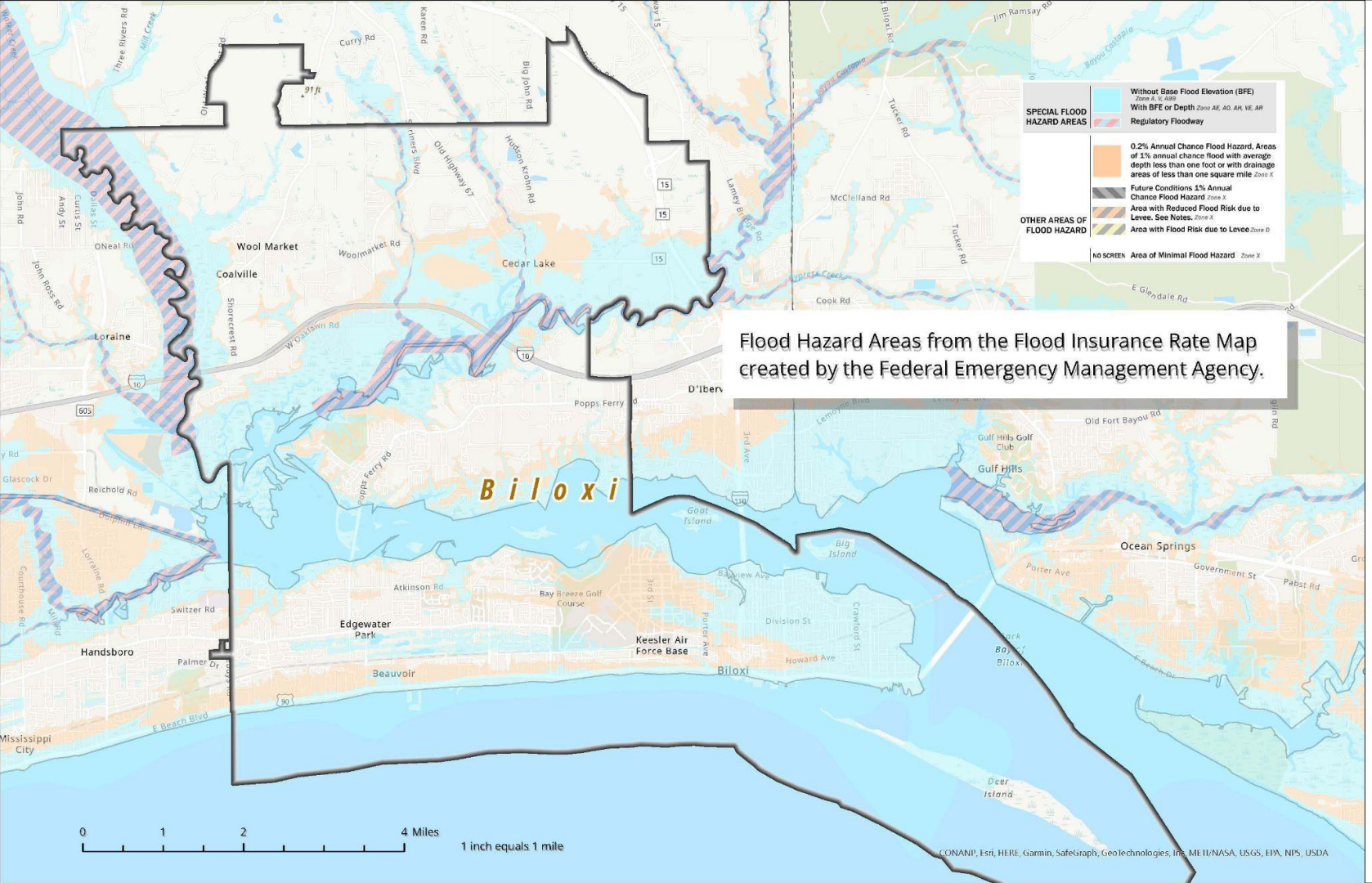
- Research Team analyzed coastal communities in Mississippi & Alabama to identify communities that:
  - Are exposed to current and future coastal climate hazards
  - Included a range of local development and environmental conditions
  - Mid- and small-sized communities
  - Deep connections with communities





Flood Hazard Areas from the Flood Insurance Rate Map created by the Federal Emergency Management Agency.


Mobile
SPECIAL FLOOD HAZARD AREAS
Without Base Flood Elevation (BFE) Zone A, V, A99
With BFE or Depth Zone AE, AO, AH, VE, AR
Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD
0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
Future Conditions 1% Annual Chance Flood Hazard Zone X
Area with Reduced Flood Risk due to Levee. See Notes. Zone X
Area with Flood Risk due to Levee Zone D
NO SCREEN Area of Minimal Flood Hazard Zone X
0 2 4 8 Miles
1 inch equals 2 miles
CONANP, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, Esri Japan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Biloxi
Wool Market
Coalville
Cedar Lake
Loraine
Popps Ferry
Edgewater Park
Keesler Air Force Base
Handsboro
Beauvoir
Ocean Springs
Gulf Hills
Gulf Hills Golf Club
Bay Breeze Golf Course
Goat Island
Big Island
Deer Island
Mississippi City
0 1 2 4 Miles
1 inch equals 1 mile
CONANP, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA

PILOT COMMUNITIES

- Locate areas of concern and threats as well as local assets (environmental, historic)
- Identify Adaptation Strategies that they are using or would consider
- Discuss implementation process and potential barriers

HOW TO USE THE GUIDE

- Case Studies (East coast, Gulf coast, West coast; varied capabilities)
- Process Diagrams (e.g., Hazard Overlay District Process)
- Checklists (e.g., Stakeholders)
- Matrices (Design strategies – protect, accommodate, managed retreat, avoidance)
- Design and Planning Techniques (52 techniques spanning site, neighborhood, municipality, region)
- Call Out Boxes (e.g., Aligning Plans, Policies, and Programs)
- Appendices (e.g., legal issues, CRS and the CHOD, Stakeholders and their Roles)

HAZARDS OVERLAY DISTRICT CHECKLIST

☐ ASSESS

- What relevant hazard assessments have been done for your jurisdiction?
- What climate related destructive events have or could impact your jurisdiction?
- How do long-term stressors such as sea-level rise, coastal erosion, increasing high temperature impact your jurisdiction?
- How do destructive natural events and long-term stressors interrelate and what multiple benefits are possible with the application of an overlay district?
- What lessons were learned from previous events?
- What do your local officials such as flood plain managers know about flooding compared to the FEMA flood insurance rate maps?
- What do sea level rise projections look like for your jurisdiction?
- What is your jurisdiction's projected growth?
- Where is development happening and is projected to happen in your jurisdiction?

☐ REVIEW EXISTING PLANS

- Does your jurisdiction have a stand-alone resilience plan?
- How is resilience addressed in your current plans such as comprehensive plan, land development ordinances, hazard mitigations plans, etc.?
- Are there relevant regional or state plans that addressed resilience?

☐ DEFINE GOALS

- What are your jurisdiction's goals for a hazard overlay district?
- Each jurisdiction should have specific goals that address their unique land-use, environmental, social, and economic factors. The following general list of goals can be a guide:

  1. Fortify and strengthen existing development exposed to hazards
  2. Create higher standards for new construction in hazard prone areas.
  3. Guide new development to sites that are lower risk.
  4. Inform efforts of relocation to include the identification of resending area.
  5. Inform elected officials, builders, prospective home owners and others about the varied techniques that can be adopted to reduce coastal hazard loses.
  6. Limit density and/or uses in high-hazard areas.
  7. Provide a vehicle to draw from a range of design standards to achieve the broader aims of creating resilient communities.

- What are your jurisdiction's resilience priorities?
- Where are your jurisdiction's resilience priorities documented?
- What type of economic development is expected and/or planned for your jurisdiction?
- How does the threat of natural disaster affect your jurisdiction's economic development?
- How does the threat of natural disaster affect your jurisdiction's infrastructure?
- Does your jurisdiction have strategies to bring about planned economic development that will not happen with market driven development alone?
- What are your jurisdiction's housing goals?
- From a hazard consideration, what parts of your jurisdiction are high-risk and should have decreased development?
- What parts of your city, such as waterfront or downtown districts, have high economic importance but also have a high hazard consideration?

☐ DELINEATE HAZARD DISTRICTS

- What would a high hazard, medium hazard and low/no hazard delineation for your jurisdiction look like? For example: high flood hazard from the shoreline to a projected flood elevation that requires buildings to elevated around five feet above grade; medium flood hazard from the high flood hazard zone to a line beyond the current the flood zone; and a low/no risk district.
- Does your jurisdiction have different types of flooding? For example: storm surge, riverine, combined tidal and riverine, large rain event flooding?
- From the matrix of strategies given in this guide, which strategies apply to the different hazard overlay districts?
- How does the assignment of different resilient strategies to the overlay district inform and modify the delineation of the district's boundary?
- What other, non-hazard-related factors, shape the delineation of hazard overlay districts.

☐ DETERMINE HAZARD OVERLAY DISTRICT POLICIES AND DESIGN STANDARDS

- What resilient strategies will be implemented in the overlay district?
- Of the selected strategies, which are already being done? Which are within reach? Which will require significant work to implement?
- What it the legally required process from idea to implementation for your jurisdiction to create a hazard overlay district?
- What should be done to expand the stakeholder input in the process?
- What decision-makers should be included in the work to delineate your jurisdiction's hazard overlay districts?
- What opposition is anticipated toward the creation of a hazard overlay district?
- What is your plan for community engagement?

The collaborative planning process should be familiar to your jurisdiction. As a guide you can think of the involvement of three general groups and create a work plan that engages all three groups at key times in the planning process. The three groups are:

- ☐ **JURISDICTION OFFICIALS** who will create and be responsible to enact the policies of the overlay district.
- ☐ **STAKEHOLDERS** who will provide needed perspective and may need to adjust their actions to work with the overlay district.
- ☐ **THE GENERAL PUBLIC** who will be impacted and benefit from the increased resilience resulting from the overlay district.

Stakeholders

ENTITIES AND INDIVIDUALS WHO MAY PARTICIPATE IN THE DEVELOPMENT AND MAINTENANCE OF A HAZARD OVERLAY DISTRICT.

Federal Government Agencies

- FEDERAL EMERGENCY MANAGEMENT AGENCY
- NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
- ENVIRONMENTAL PROTECTION AGENCY
- NATIONAL PARKS SERVICE
- U.S. ARMY CORPS OF ENGINEERS
- US DEPARTMENT OF AGRICULTURE
- U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

Non-Profits

- ENVIRONMENTAL GROUPS
- LAND TRUSTS
- SOCIAL JUSTICE GROUPS
- FAITH-BASED ORGANIZATIONS
- RECREATIONAL GROUPS

State Government Agencies

- STATE EMERGENCY MANAGEMENT
- STATE HAZARD MITIGATION OFFICER
- STATE FLOODPLAIN ADMINISTRATOR
- DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
- COASTAL MANAGEMENT
- SEA GRANT
- RESILIENCE COORDINATOR
- DEPARTMENT OF INSURANCE
- STATE FIRE MARSHAL
- DEPARTMENT OF ECONOMIC DEVELOPMENT
- STATE HISTORIC PRESERVATION OFFICE
- DEPARTMENT OF PUBLIC HEALTH

Professional Associations

- AMERICAN PLANNING ASSOCIATION
- AMERICAN SOCIETY OF LANDSCAPE ARCHITECTS
- AMERICAN INSTITUTE OF ARCHITECTS
- AMERICAN SOCIETY OF CIVIL ENGINEERS
- ASSOCIATION OF STATE FLOODPLAIN ADMINISTRATORS
- AMERICAN SOCIETY OF ADAPTATION PROFESSIONALS
- INSURANCE INSTITUTE FOR BUILDING AND HOME SAFETY

Local Government Officials

- TOWN / CITY / COUNTY COUNCIL MEMBERS
- MAYOR
- TOWN / CITY / COUNTY MANAGER
- ASSISTANT TOWN / CITY / COUNTY MANAGER
- TOWN / CITY PLANNER
- FLOODPLAIN ADMINISTRATOR
- LOCAL RESILIENCE OFFICER
- LOCAL BUILDING CODE OFFICIAL
- EMERGENCY MANAGER
- PUBLIC WORKS DIRECTOR/STORMWATER MANAGEMENT DIRECTOR
- GRANTS MANAGER
- PARKS AND RECREATION DIRECTOR
- COUNTY / MUNICIPAL ECONOMIC DEVELOPMENT DIRECTOR
- TOWN / CITY / COUNTY ATTORNEY
- STATE / COUNTY / MUNICIPAL PUBLIC HEALTH DIRECTOR
- COUNTY EDUCATION SUPERINTENDENT
- LOCAL GOVERNMENT OFFICIALS FROM OTHER COMMUNITIES

Regional Organizations

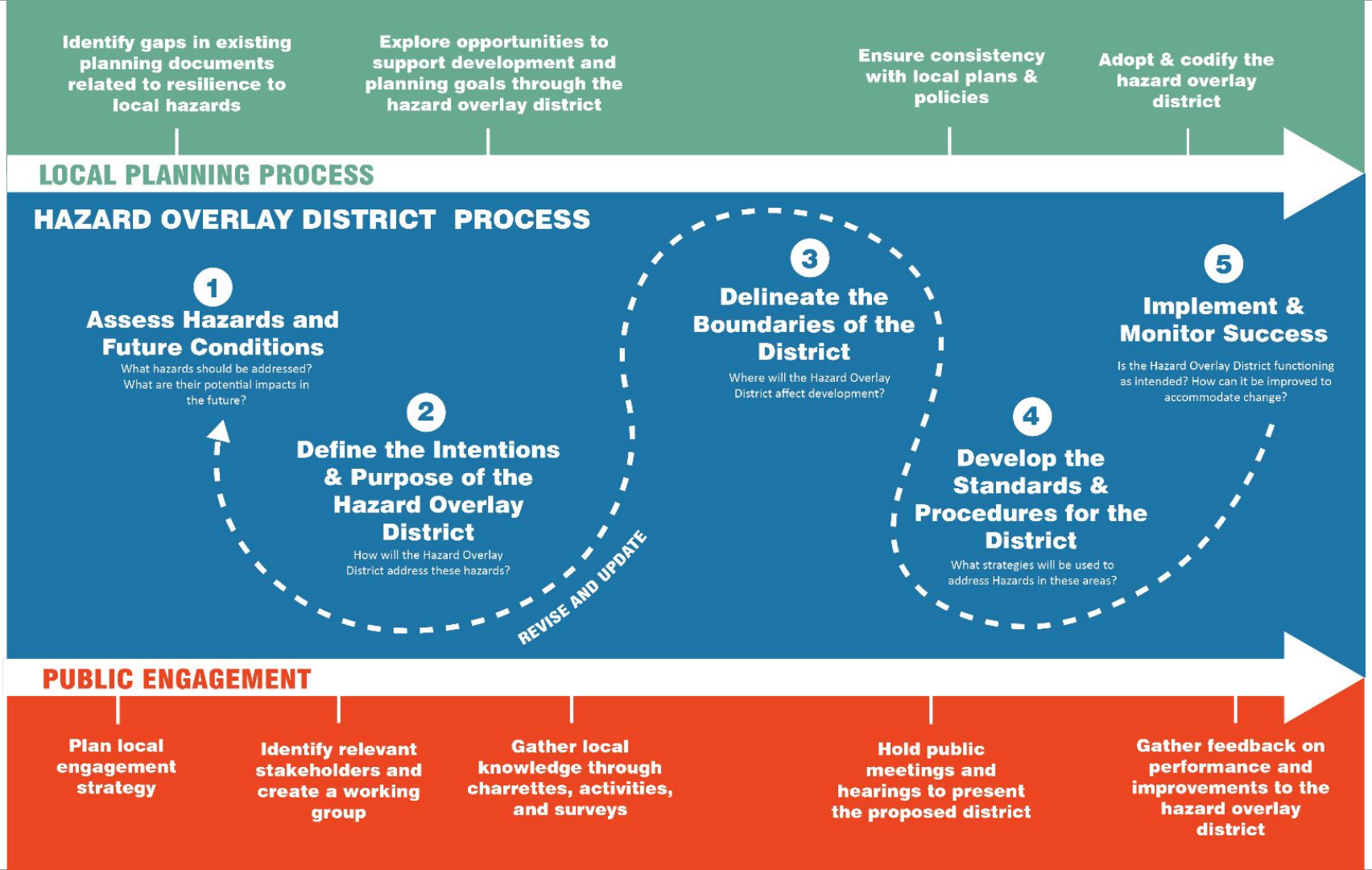
- REGIONAL PLANNING ORGANIZATIONS
- WATER / STORMWATER MANAGEMENT DISTRICT
- WATERSHED PLANNING DISTRICT
- SOIL CONSERVATION SERVICE
- REGIONAL ARBORETUMS
- COMMUNITY ORGANIZATIONS
- NEIGHBORHOOD GROUPS
- GARDEN CLUBS
- HISTORIC SOCIETY
- ARTS COUNCIL
- HOMEOWNERS ASSOCIATION
- INFORMAL GROUPS

Private Sector

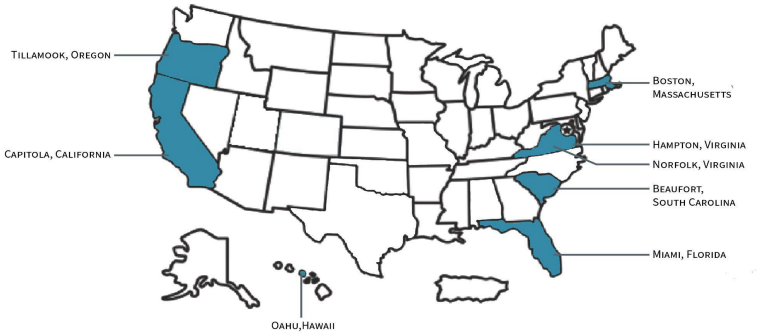
- LAND USE PLANNING CONSULTANTS
- LANDSCAPE ARCHITECTURE CONSULTANTS
- ENGINEERING CONSULTANTS
- ARCHITECTURE FIRMS
- BUILDERS AND DEVELOPERS
- HOME IMPROVEMENT CENTERS
- GARDEN CENTERS
- SMALL BUSINESSES OWNERS
- CORPORATIONS
- MEDIA

Universities

- LAND USE PLANNING DEPARTMENT
- LANDSCAPE ARCHITECTURE DEPARTMENT
- HORTICULTURE DEPARTMENT
- CIVIL ENGINEERING DEPARTMENT
- BUILDING CONSTRUCTION / SCIENCES DEPARTMENT
- ARCHITECTURE DEPARTMENT
- EMERGENCY MANAGEMENT & HOMELAND SECURITY DEPARTMENT
- PARKS AND RECREATION DEPARTMENT
- SOCIOLOGY AND ANTHROPOLOGY DEPARTMENT

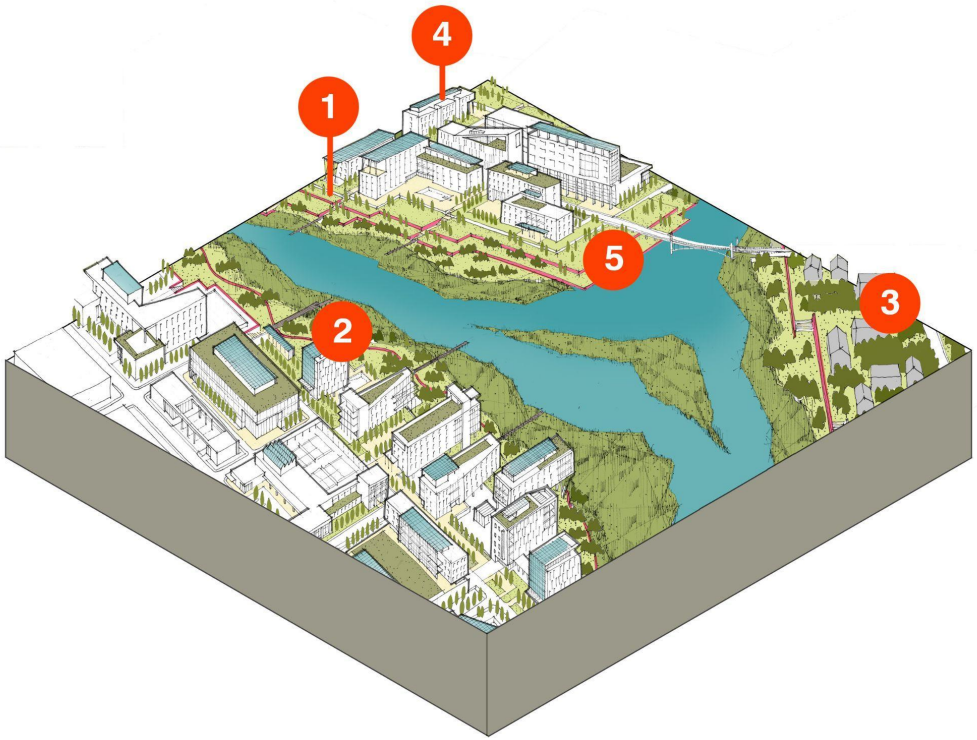

Identify gaps in existing planning documents related to resilience to local hazards
Explore opportunities to support development and planning goals through the hazard overlay district
Ensure consistency with local plans & policies
Adopt & codify the hazard overlay district
LOCAL PLANNING PROCESS
HAZARD OVERLAY DISTRICT PROCESS
1
Assess Hazards and Future Conditions
What hazards should be addressed? What are their potential impacts in the future?
2
Define the Intentions & Purpose of the Hazard Overlay District
How will the Hazard Overlay District address these hazards?
3
Delineate the Boundaries of the District
Where will the Hazard Overlay District affect development?
4
Develop the Standards & Procedures for the District
What strategies will be used to address Hazards in these areas?
5
Implement & Monitor Success
Is the Hazard Overlay District functioning as intended? How can it be improved to accommodate change?
REVISE AND UPDATE
PUBLIC ENGAGEMENT
Plan local engagement strategy
Identify relevant stakeholders and create a working group
Gather local knowledge through charrettes, activities, and surveys
Hold public meetings and hearings to present the proposed district
Gather feedback on performance and improvements to the hazard overlay district

CASE STUDIES



Illustrate different methods of implementing resilience strategies in an Overlay District

Case Studies focus on U.S. communities with two international examples of varied size, geographic distribution, and capability



EXAMPLE: RECEIVING AREAS

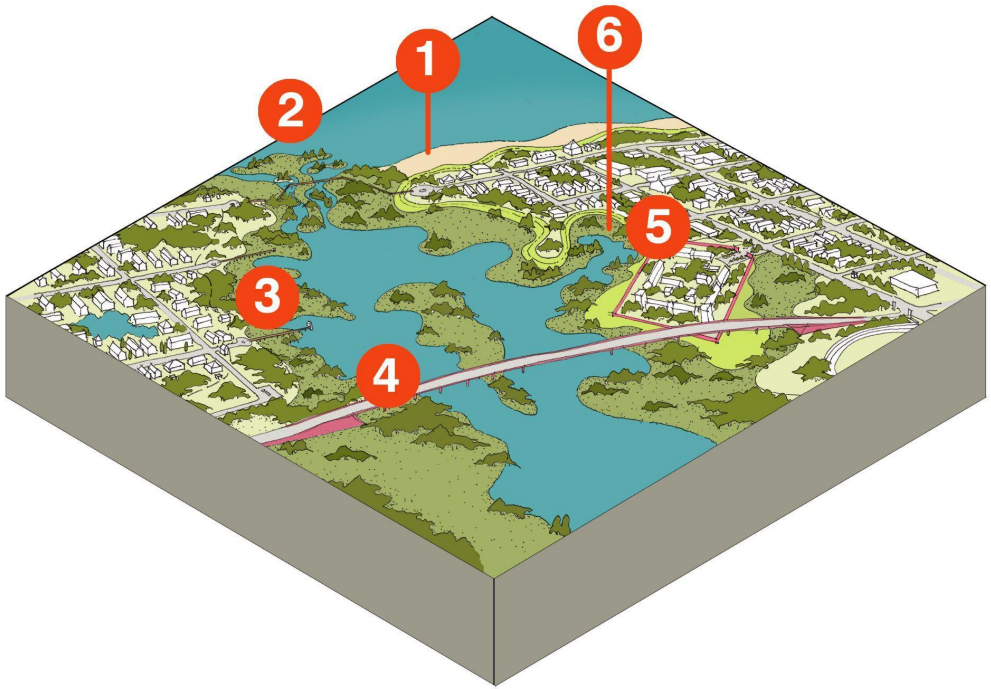
1 Transfer of Development Rights to areas on high ground, near downtowns or transit.

2 Transform impervious surfaces into infiltrative spaces with green roofs, permeable surfaces to increase stormwater capacity and conveyance.

3 Increase tree canopy to improve stormwater management + reduce heat island effects.

4 Apply mixed use zoning infill to match context + scale of existing neighborhood.

5 Use floodwalls/floodgates and dry floodproofing to protect critical infrastructure.



EXAMPLE: SOUND AREAS ACCOMMODATE, PROTECT & AVOID STRATEGIES

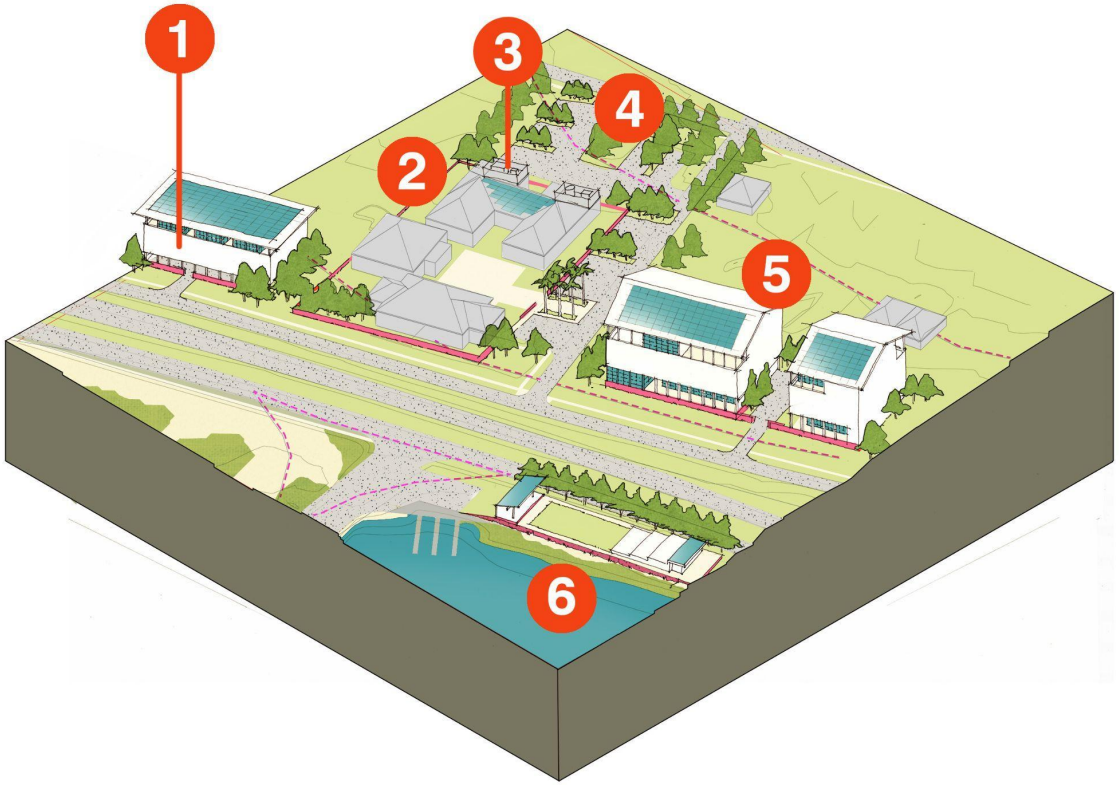
1 Implement beach nourishment program and enhance sand dunes.

2 Reconnect hydrology and widen outlets.

3 Expand setback requirements.

4 Harden and elevate infrastructure.

5 Protect historic structures with floodwalls.



EXAMPLE: ADAPTED INFILL

1 Transfer of Development Rights to areas on high ground, near downtowns or transit.

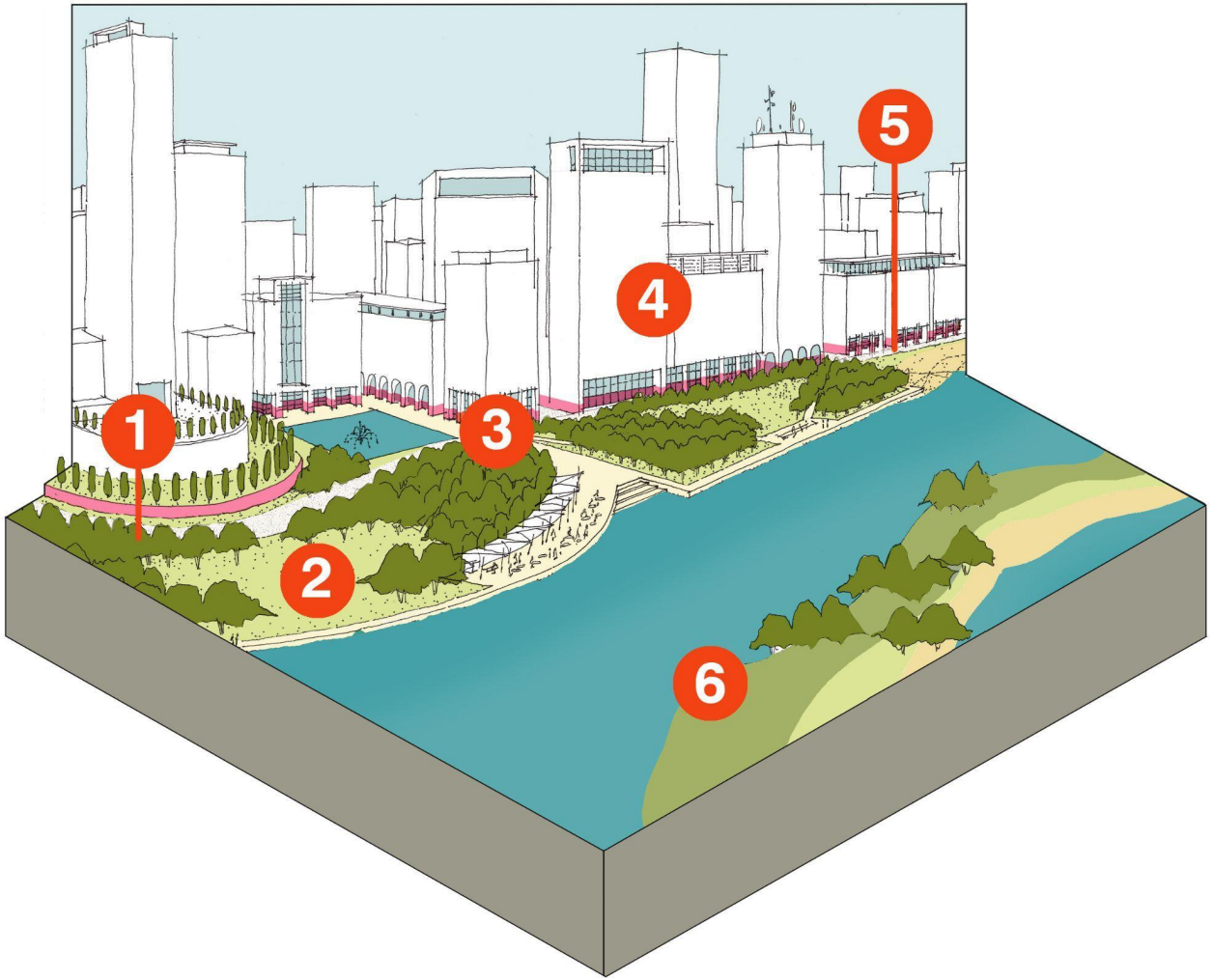
2 Mixed use zoning infill to match context + scale of existing neighborhood.

3 Transform impervious surfaces into infiltrative spaces with permeable surfaces to increase stormwater capacity and conveyance.

4 Increase tree canopy to improve stormwater management + reduce heat island effects.

5 Decentralized energy generation.

6 Use floodwalls/floodgates and dry floodproofing to protect critical infrastructure.



EXAMPLE: OCEANFRONT DOWNTOWN PROTECT, AVOID, MANAGED RETREAT & ACCOMMODATE

1 Harden or relocate infrastructure including roadways and utilities.

2 Establish oceanfront setbacks – relocate buildings and restore ground plane with absorptive greenspace.

3 Use setback space for temporary and mobile functions, recreation, stormwater storage.

4 Create a corniche along the waterfront with floodgates between structures.

5 Decommission the first floor or dry floodproof the lower level.

6 Living breakwaters nearshore to attenuate storm surge.

ADAPTATION STRATEGIES

Resilient Landscape Design

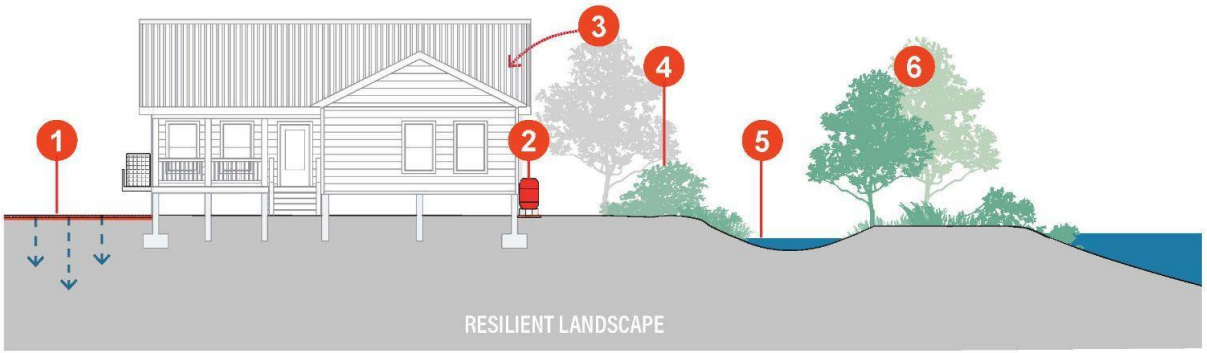
DEFINITION

Resilient landscape design consists of planting and grading decisions that increase resilience on individual properties and parcels.

APPLICATIONS

- Resilient landscape design principles can be implemented across a variety of scales, from residential lots to open public spaces.

MEASURES



1. Permeable paving allows water to infiltrate the ground on-site.
2. Rainwater catchment stores water and reduces runoff.
3. Care should be taken not to plant (or to remove) trees near built structures, as they can become a hazard in high wind events.
4. A vegetated buffer of native plants provides a soft line of defense.
5. A retention pond slows and stores storm and floodwaters.
6. Select salt-tolerant species where coastal flooding is a threat.

ADAPTATION STRATEGIES

Dry Floodproofing

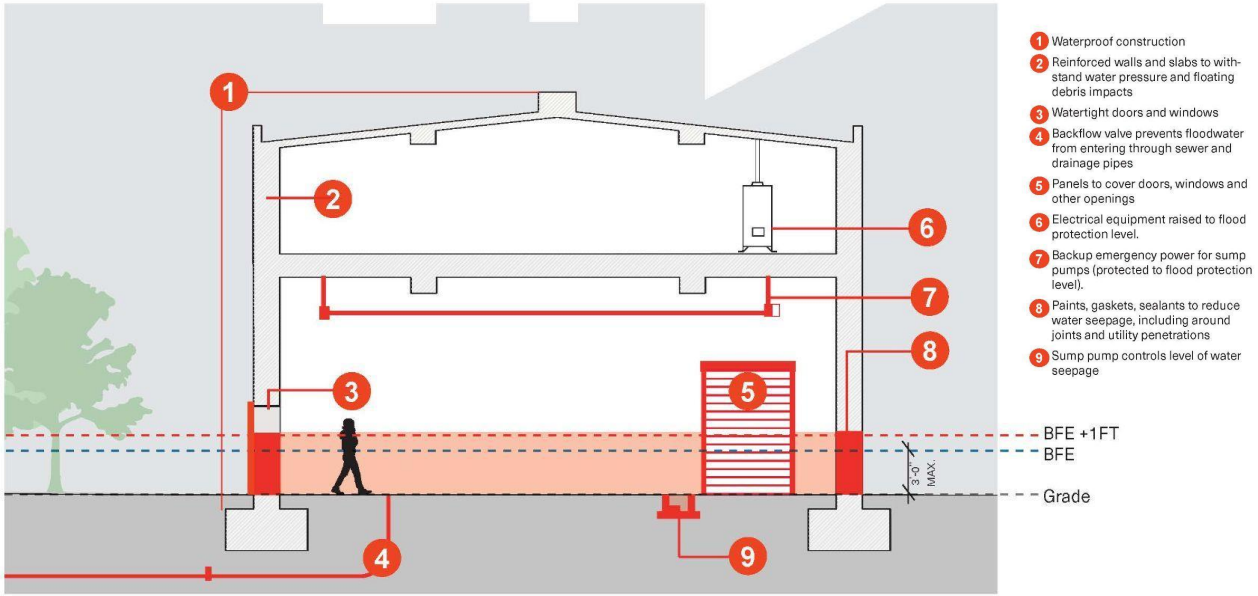
DEFINITION

A combination of measures that make a building and attendant utilities and equipment watertight and substantially impermeable to floodwater, with structural components having the capacity to resist flood loads (NFIP Technical Bulletin 3, FEMA, 2021).

APPLICATIONS

- New and substantially improved non-residential and non-residential portions of mixed-use buildings in Zone A. Not for residential buildings in Zone A or any building in Zone V.
- Not recommended more than 3' below the base flood elevation (BFE). Must extend 1' above BFE to meet flood insurance requirements.

MEASURES



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