

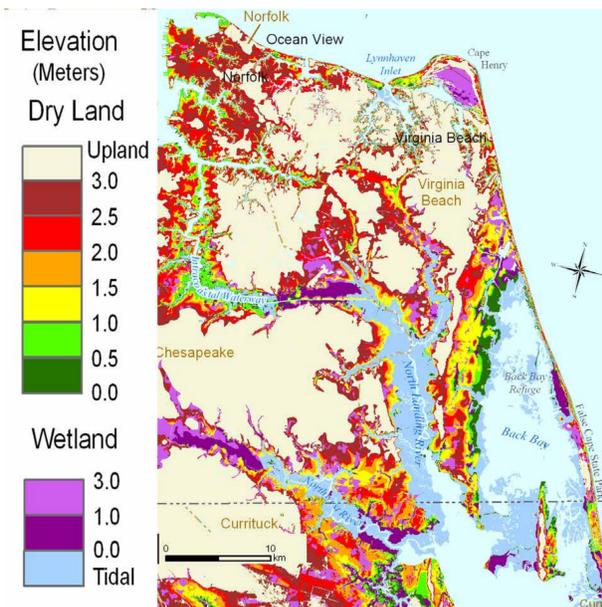


Virginia Beach city = 803 km²

DESIGNING THE FUTURE OF COASTAL VIRGINIA BEACH

The project uses the concept of Geodesign for creating a resilient design for dealing with flood elevation. The coastal city of Virginia Beach faces the problem of global climate change. Particularly, the sea level rises and increasing the storm intensity. Several sectors in the city are under serious threats such as: Military, residential, tourism, and agriculture....etc. The comprehensive plan for the city addresses the sea level rises without presenting plans for resisting the main challenges facing Virginia Beach. For example, Relocation of residents- particularly low-income neighborhoods/ protect environmentally sensitive areas/ managing stormwater; Quantity, Quality /Population increase/Military sustainability /Infrastructure and Soil quality/ Upgrade and modify policies. Geodesignhub is used as a base for the studio to evaluate scenarios for adapting to sea level rise in Virginia Beach.

NOTE: This project documents only **one main scenario (early adopter) and two time stages that looks ahead to 2050 and change the rules by 2020.**



Existing situation 2020



Early Adopter 2050

Weaving Reciprocal "Third Space"

Legend

- Hub
- Connector
- Agriculture
- Open Space
- Low density areas
- High density areas
- Commercial
- Institutional
- Mixed used
- Industrial

City Master Plan for a dynamic natural systems associated with sea level rise into the fabric of Virginia Beach

The plan for the city to thread the dynamic natural systems associated with sea level rise into the fabric of Virginia Beach. The plan enhance living quality of wildlife / vegetation promoting harmony between humans/ nature with an emphasis on public education / awareness about the environmental issues facing Virginia Beach.

Concept: "Hub" Interpretation

- a) Industry + Green Energy
- b) Tourism + Economy
- c) Commercial + Recreation
- d) Ecology + Education

Early Adopter 2050

Major Requirements by 2050

- 100,000 more people in the city (45,000 new household).
- Current population: 450,000 Total Population in 2050: 550,000.
- 30,000 New houses including 18,000 single family (5 du/ac) detached 8,000 town houses (12-14 du/acre), and 4,000 multi family housing - own (30-50 du/acre).
- 10,000 New apartments - rental (30/50 du/acre).
- Additionally, 45,000 people displaced by 3-ft sea-level rise requiring new housing.
- 3 Million sq ft of new office space
- 5,000 acre new commercial space
- Minimum 20,000 acre new parks, recreation and conservation
- Population over age of 65 or older will be 25% : 137

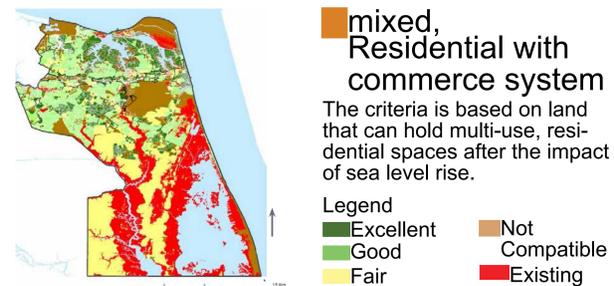
Major assumptions and innovations

- WAT 2050:** Considering the potential sea level rise when planning the water infrastructure.
- AGR 2050:** protecting agricultural lands
- GRN 2050:** focusing on the business district area when implementing green infrastructure
- ENE 2050:** Producing energy through a variety of methods, using both non-renewable and renewable sources.
- TRA 2050:** Improving connectivity.
- IND/COM 2050:** protecting the areas from the scope of Industry, Commerce, and Tourism from sea level rise.
- RES 2050:** providing a higher density residential housing in areas that are less at-risk for sea level rise flooding.
- MIX 2050:** expanding urban mixed-use districts.
- INS 2050:** Saving the military lands and the governments activities.

changes and impacts.

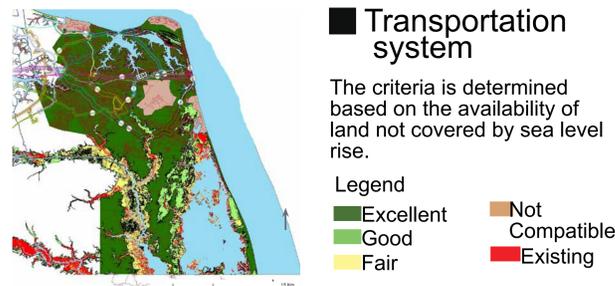
Existing situation 2020: Elevations are above spring high water, which is the average high tide during new and full moons, and approximately the inland boundary of tidal wetlands. Source: J.G. Titus and J Wang. 2008. "Maps of Lands Close to Sea Level along the Mid-Atlantic Coast". US Environmental Protection Agency. Link: http://maps.risingsea.net/VA/Virginia_Beach_half-meter_w_tidal.jpg

- Early Adopter 2050- Five Focus Areas**
- The plan shows five areas each has specific changes:
- Area 1:** A consolidated military district (central): Relocate the two northern coastal bases into the light industrial lands surrounding Oceana.
 - Area 2:** The urban growth/infill area (central): the current town center expands into more robust city center, and be connected by public transit. This area is the desired zone for the infill development due to its distance from rising sea level.
 - Area 3:** A new tourism district (north and northeast): build year-round and ecologically focused tourism.
 - Area 4:** The transitional "Green Village" zone (south-central): Build a transitional zone between rural lands and dense urban development.
 - Area 5:** Protected agriculture and expanded nature preserves (South): this area is receiving some of the worst flooding. Remove from agriculture use and incorporate into a stretch of nature preserves.



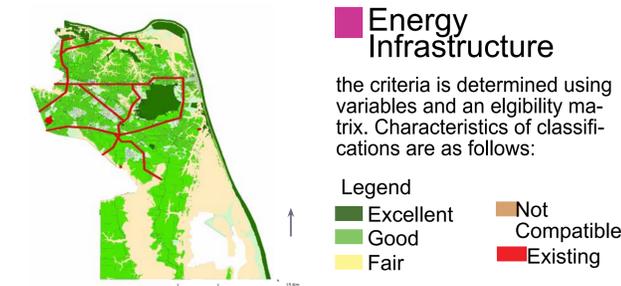
Evaluation and Impact Map

- EXCELLENT**
- Strategic Growth Areas
 - Unzoned land to be built on.
 - Areas with a 0.5 mile buffer from flood zones.
- GOOD**
- Areas with higher density, compact area - multi-use communities.
 - Slight Flooding affects area.
 - Available land to be built
 - Areas with a 0.3 mile buffer from flood zones.
- FAIR**
- Areas covered flood 10+ years.
 - Highly dense areas
- NOT COMPATIBLE**
- Low density, single homes.
 - Flooding affects the area.
 - Areas with a 0.1 mile buffer from flood zones.
- Worst**
- Flood area in next 10 years
 - Conservation lands- not applicable to be developed
 - Existing bodies of water and wetlands Represented in blue on larger map.



Evaluation and Impact Map

- EXCELLENT**
- Open Areas
 - high elevation areas
 - Areas for public transportation and high population
- GOOD**
- low density development
 - Very slight flooding area
 - Available land to be built on
 - Moderate population area
- FAIR**
- Higher density areas for small roads, not major road.
 - slight flooding area
- NOT COMPATIBLE**
- Areas covered by sea level rise through the next 10+ years
 - Conservation lands- no development
 - Area of water bodies and wetlands.
- Worst**
- Major roadways areas
 - Existing public transportation
 - Areas covered by sea level rise through the next 10+ years
 - low population areas



Evaluation and Impact Map

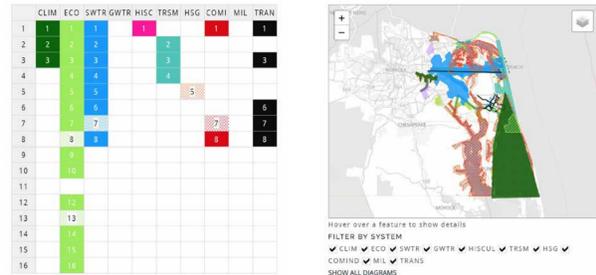
- EXCELLENT**
- Dams / spillways
 - Shoreline
 - Military base (if removed)
- GOOD**
- Agricultural lands
 - Residential/commercial zone
 - Modify building codes use guidelines (LEED)
- FAIR**
- South-facing slopes (passive-solar heating / cooling)
 - Current industrial land + retrofitted office space
- NOT COMPATIBLE**
- Flood plains
 - Preserved land of environmental significance
 - Existing waterbody / wetlands
- Worst**
- Utility lines
 - Power plants
 - Solar
 - Biomass
 - Petroleum (oil)



Virginia Beach Coastal, Patrick Raymond McLaughlin, 2013



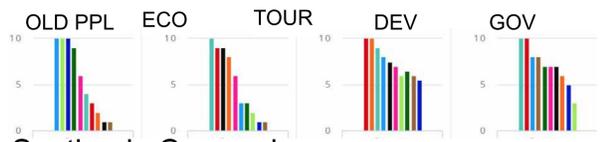
Virginia Beach, Va., beach and boardwalk. (Photo by Norfolk District)



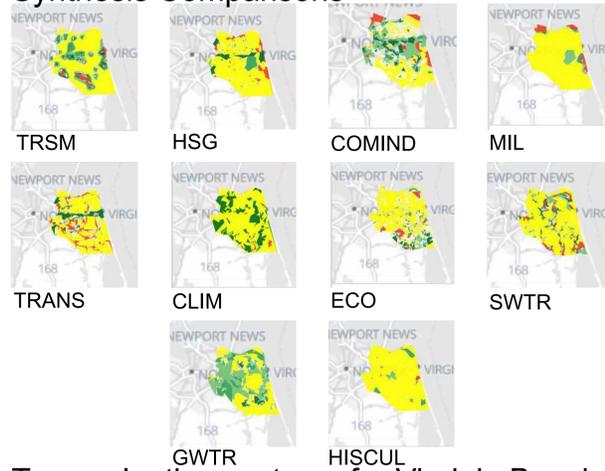
Negotiated Design



Design Timeline



Synthesis Comparisons



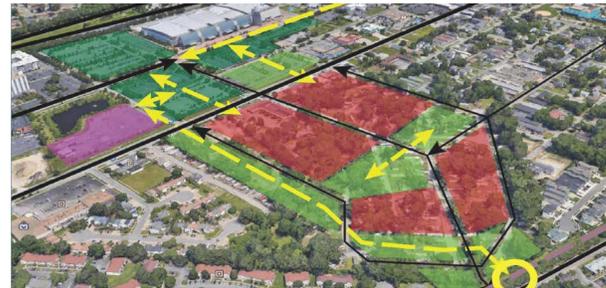
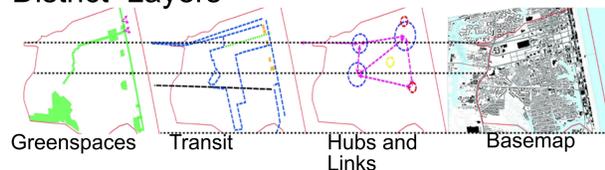
Ten evaluation systems for Virginia Beach



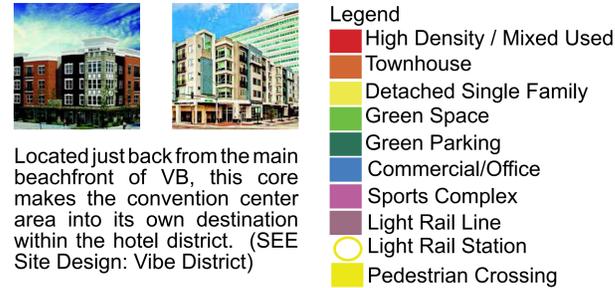
Existing District Zoning Plan

The existing condition of the area is mostly low density residential neighborhoods, with a run-down commercial area and a large hotel strip along the beachfront which divides residents from the beach and boardwalk.

District Layers



Vibe District Core Conceptual Zoning

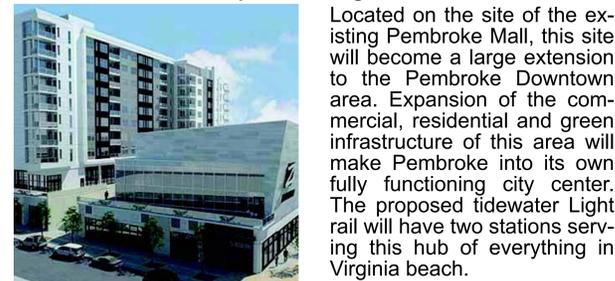


Located just back from the main beachfront of VB, this core makes the convention center area into its own destination within the hotel district. (SEE Site Design: Vibe District)

Infill Development Area-A



Pembroke Core Conceptual Zoning



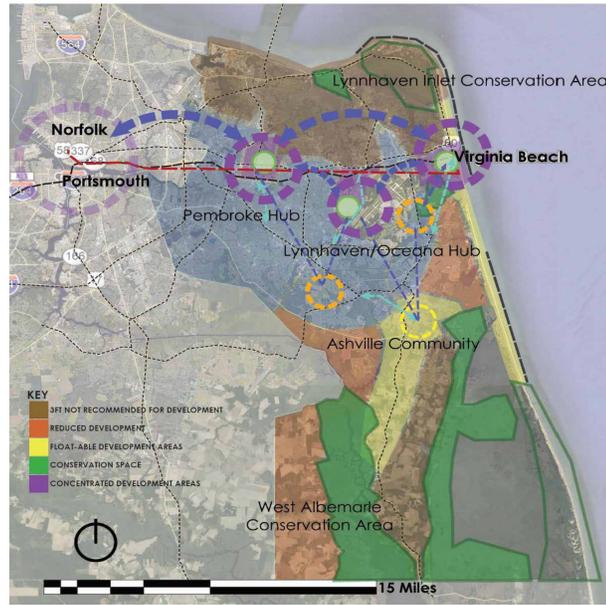
Infill Development Area-B



Hotel District Master Plan



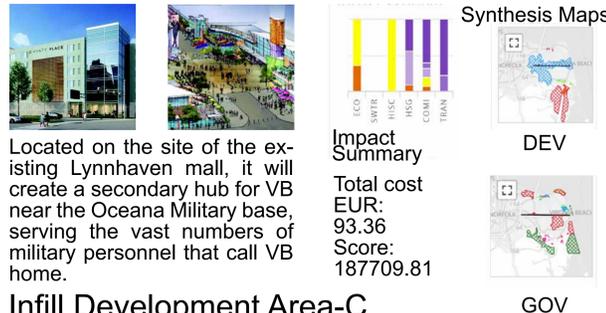
The vision for the district scale design is to expand and enhance the commercial and tourism areas through densification and introduction of new pedestrian focused streets and vantages through the wall of hotels along the boardwalk. The design also incorporates measures to protect the area from sea level rise and storm surge.



Conceptual Plan 2050



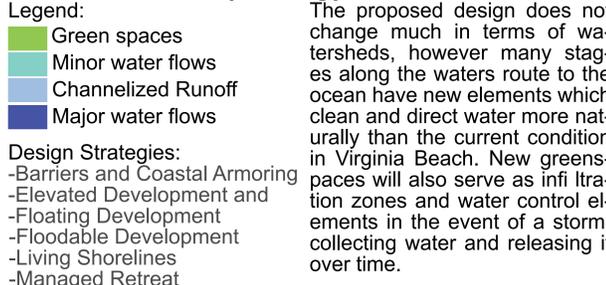
Lynnhaven Core Conceptual Zoning



Infill Development Area-C



District Scale Hydrology Plan



Fighting Back the Waves
 The overarching idea that has guided all decisions is to improve transportation and economic infrastructure to keep Virginia Beach relevant in the modern economic and recreational climate. We should also create a system which allows Virginia Beach to coexist with a continually rising sea level. The vision for this project is to transform Virginia Beach into the standard for resilience as it relates to the consequences of global warming and sea level rise. Focusing on improvements to transportation and economic infrastructure, this project seeks to create a more resilient Virginia Beach that is able to survive the effects of three-to-six feet of predicted rise in sea levels locally.

- Goals:**
- Improve water quality, conserve potable water.
 - Create a more healthy and safer environment for residents.
 - Establish systems used to offset the effects of sea level rise using methods that allow them to also become education tools.
 - Educate the community on the effects of global climate crises so that the community may become an educational resource for cities nation- and world-wide.
- Objectives:**
- Return identified portions of VA Beach to their natural states in order that they perform their essential environmental function.
 - Improve and redevelop infrastructure.
 - Relocate, redistribute, and increase housing and community needs in areas identified as environmentally stable.
 - Provide openly educational opportunities.

Design Concept
 The overarching idea was to select and expand upon a few existing cores within Virginia Beach and bring them up to a higher level of sustainability while restoring the natural environment and accommodating the continually growing population of Virginia Beach.

Virginia Beach Reimagined Cores
 Virginia Beach is a continually growing city with an continually shrinking amount of usable land, so the city overall must become much more dense in order to accommodate the rising population numbers. The **Shown maps are three examples of infill development turning under utilized malls and parking lots into high density mixed use core areas** providing jobs and housing opportunities to thousands of Virginia Beach residents.

-Programming Numbers

- Existing Population: 450,000
- Estimated Influx Population by 2050: 100,000
- Proposed Population in 2050: 550,000
- Displaced Population Due to Sea Level Rise: 45,000
- New Households: 43,531



This work is produced by
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