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A Floating Community: a 'Platform' for Future Sustainable Development

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A FLOATING COMMUNITY

LIVING ON THE WATER, A 'PLATFORM' FOR FUTURE SUSTAINABLE DEVELOPMENT

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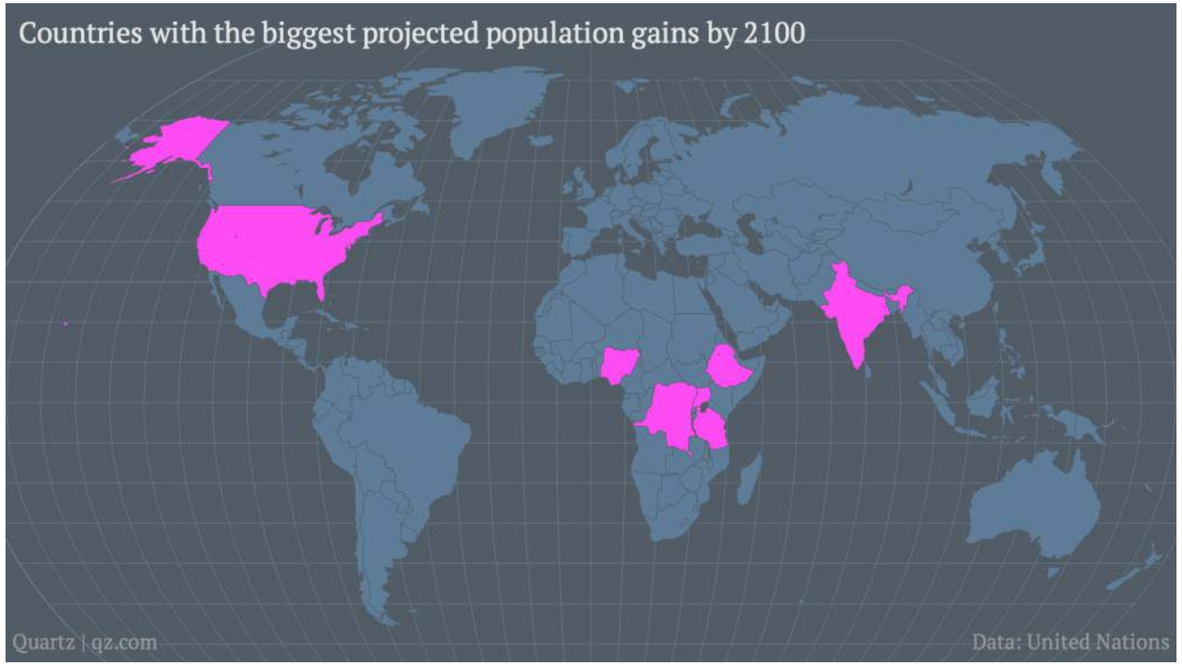
ABSTRACT

With the environment of our planet changing for the worse, there is a need for an economical and sustainable solution. As we become more aware of the effects our actions have on our ecosystem, we have the opportunity to implement ways to alleviate some of stress we are causing on our planet. The population is growing exponentially and, with climate change being felt around the world, sea levels are rising at an faster rate than ever before. With these two situations alone, we are faced with an extreme complication; where do 'we' put all of these people and how do we deal with the flooding of coastal regions and the extreme weather conditions such as hurricanes and tsunamis?

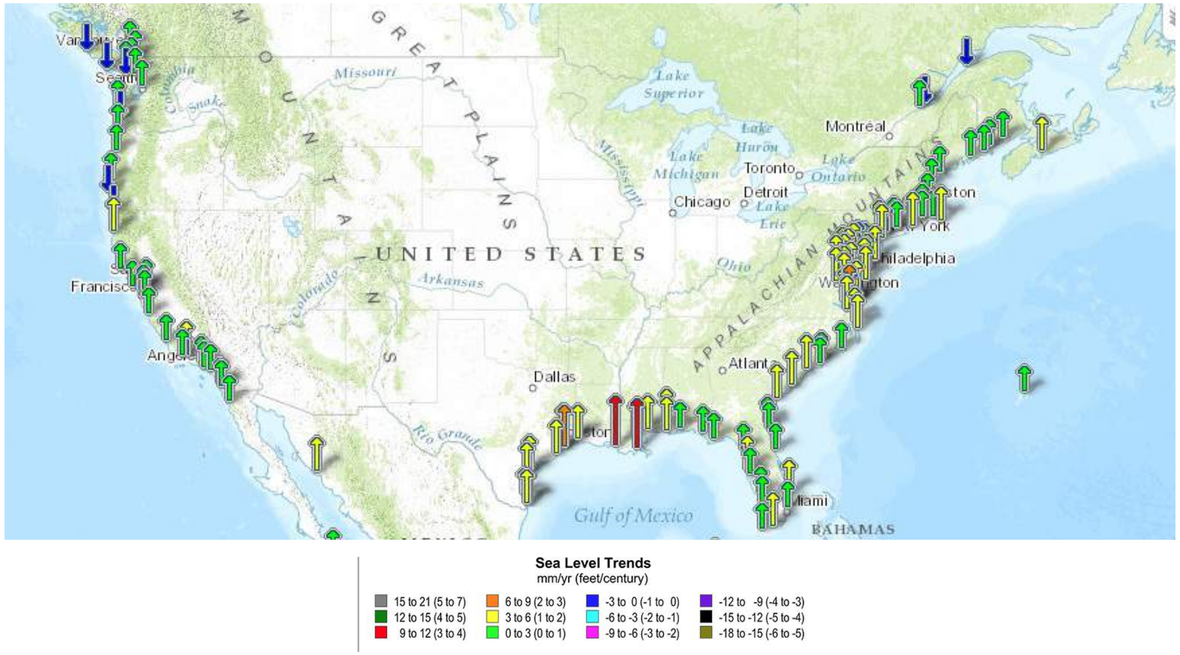
In this book you will find one, completely sustainable, and completely feasible solution to these two big issues we are facing as a planet. As population grows and land decreases due to flooding risks, especially along the coasts, we have the opportunity to inhabit a place that covers almost 70% of our planet and a place that we haven't taken full advantage of inhabiting yet, the ocean!

"Understanding the demographic changes that are likely to unfold over the coming years, as well as the challenges and opportunities that they present for achieving sustainable development, is key to the design and implementation of the new development agenda."

-United Nations Department of Economic and Social Affairs



"Global sea level rise (SLR) has been a persistent trend for decades. It is expected to continue beyond the end of this century, which will cause significant impacts in the United States (US). Over eight million people live in areas at risk to coastal flooding, and many of the nation's assets related to military readiness, energy, commerce, and ecosystems are already located at or near the ocean."
-NOAA Technical Report



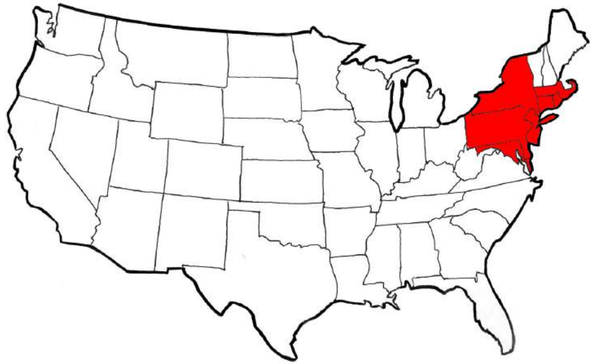
INTRODUCTION

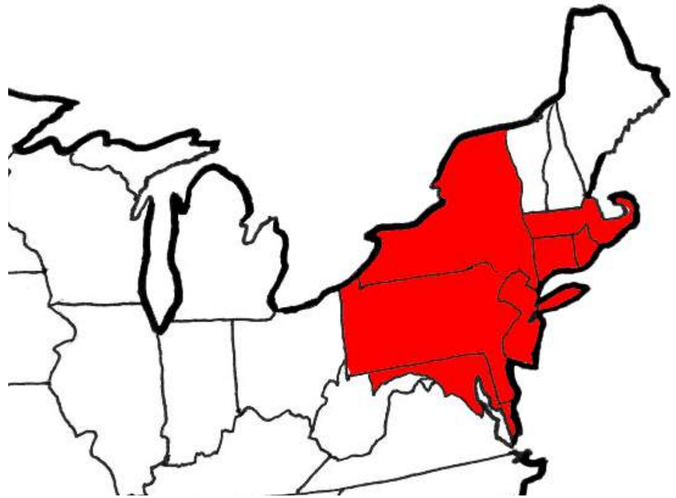
INTRODUCTION

As we become more and more educated about the consequences of our actions on the planets environment, we are faced with more questions than answers. How do we deal with depleting resources? How do we save what we have left? Can we reverse some of the damage we have done? Population of the planet is growing exponentially and will continue to do so--projected to grow by more then one (1) billion according to a report by the UN DESA. With this comes more land occupation, more pollution, more resources being used, and more damage to our planet. While there is no one solution for this problem--we cannot stop people from reproducing--there are ways to alleviate some of the damage we are doing to our planet. As we burn fossil fuels, pollute the air with chemicals, we are warming the atmosphere, causing polar ice-caps to melt, ultimately raising sea levels. With the population growing and sea levels rising, that leaves even less room for development and for living. So, besides space, what is one place that we do not take full advantage of living? The Ocean! The ocean covers almost 70% of our planet, and we still do not take advantage of everything it offers. Wave currents provide free energy, nutrients in the ocean can help crops grow and vegetation thrive, the water itself can be used as a solar panel, capturing and storing heat and energy. It is much easier to build on the water then it is in space, and in fact we do it already just not at a large scale. Oil Rigs, some man-made island, small villages around the world, and of course cruise ships, are all examples of a 'living community on the water'. The next step in ocean development is a whole community that lives and thrives out at sea.

A large portion, today, already live in developed urban cities, with that number increasing rapidly. With more people and this need to live in an urban area, brings about larger expansion of cities, which in hand produces more pollution and harm to the environment. Horizon, in their article *Future Issues for Development*, state that "by 2035, 60 percent of the world population will live in urban areas. Most cities in developing countries already experience difficulties providing basic services such as transport and waste treatment."

The East Coast of the United States is a prime spot for the development of this Floating City. As sea levels rise and population grows, cities such as New York and Boston will be affected greatly. The idea is to create a new urban development out at sea, that will provide all of the essentials, services, and amenities of a modern urban city today.





PROBLEM STATEMENT

Land is running out and waters levels are increasing. In just 20 years, we plan to see an increase in population by almost 2 billion people. So where are these people going to live, eat, work, play? The best way to save the little habitable land we live on today is to simply not build on it. The idea is to start building out to sea, a place that is much easier and more feasible then living in the air or space. These structures would provide a place of comfort, a place of living, a place of learning and a place of sustainability in which we, as a population, can thrive.

Many regions around the world would benefit from a community like this, as a lot of coastal regions are experiencing extreme flooding and damage done to personal property. Being such a new, outrageous almost, idea, it is necessary to show the world that this is feasible and that everyday living in this floating community will be no different from the way one lives now in, lets say, a typical urban environment.

New York City, and much of the tri-state, northern Atlantic region, experienced one of the most deadliest and most destructive hurricanes in history back in 2012, Hurricane Sandy. FEMA completely underestimated the power of the hurricane, and the people/structures at risk if such a natural disaster did occur. As we continue to do more and more damage to our planets ecosystem, we are only increasing our risks of such an disastrous event to happen again. Moving off the land and onto the ocean would not only help the flooding risks of living on the coast (or near it) but would have the opportunity to help save some of the coastal regions we have left.

NYC FLOODING RISK

Projections suggest that the extent of flooding in New York experienced with Hurricane Sandy could become a regular occurrence (every two years) by 2100 if rapid sea level rise occurs

Nearly 290,000 New Yorkers in the five boroughs of New York City were unexpectedly flooded by Sandy's storm waters

Flooding covered 49.2 square miles, an area 65 percent larger than the flood-vulnerable area identified by FEMA's outdated maps

-16,000 children under 5 years old

-43,000 people 65 years and older, who must rely on others to help them get safely out of harms way in emergencies

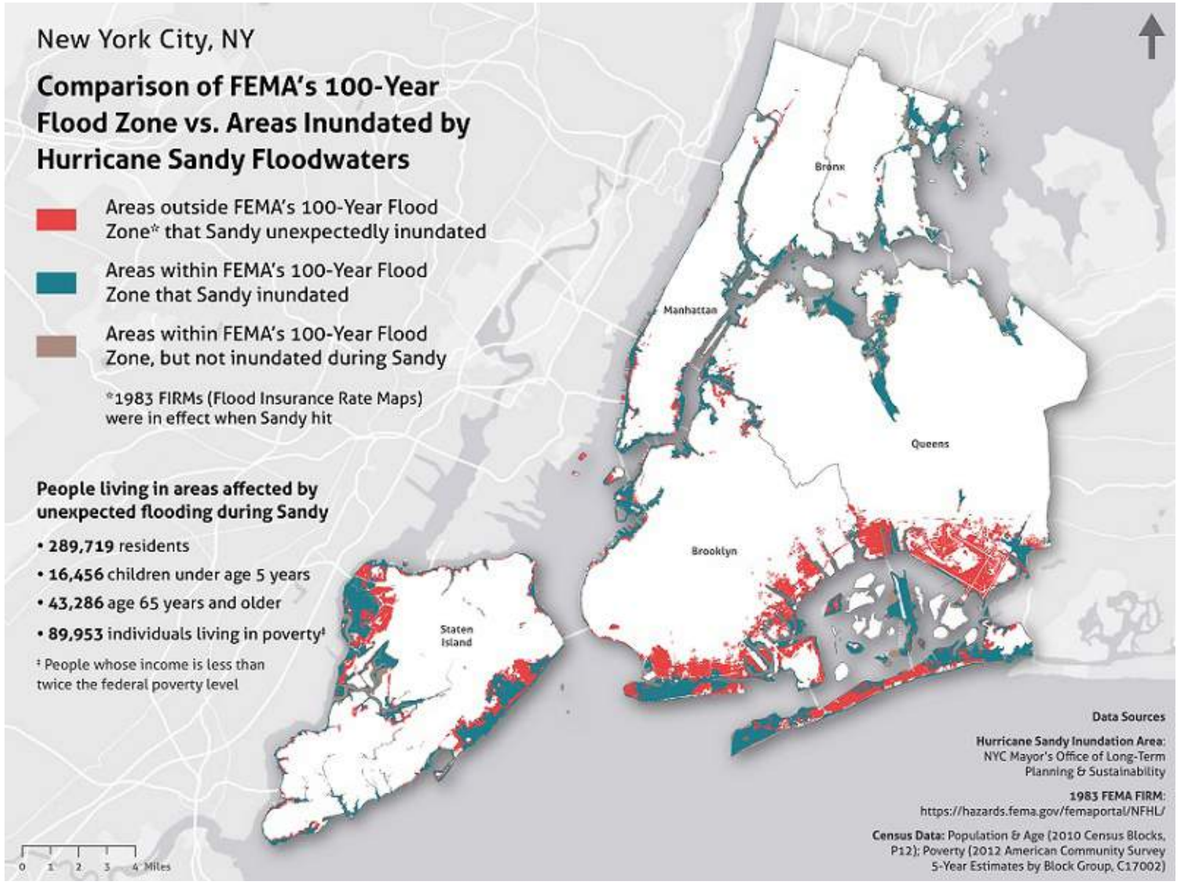
-More than 121,000 New Yorkers lived in public housing developments that were flooded within the flood risk zones

Rainfall during the 21st-century, currently averages 43-50 inches a year; by the 2080's, it will rise by 5 percent to 13 percent

Rainfall has already increased by 70 percent in New York over the past 50 years

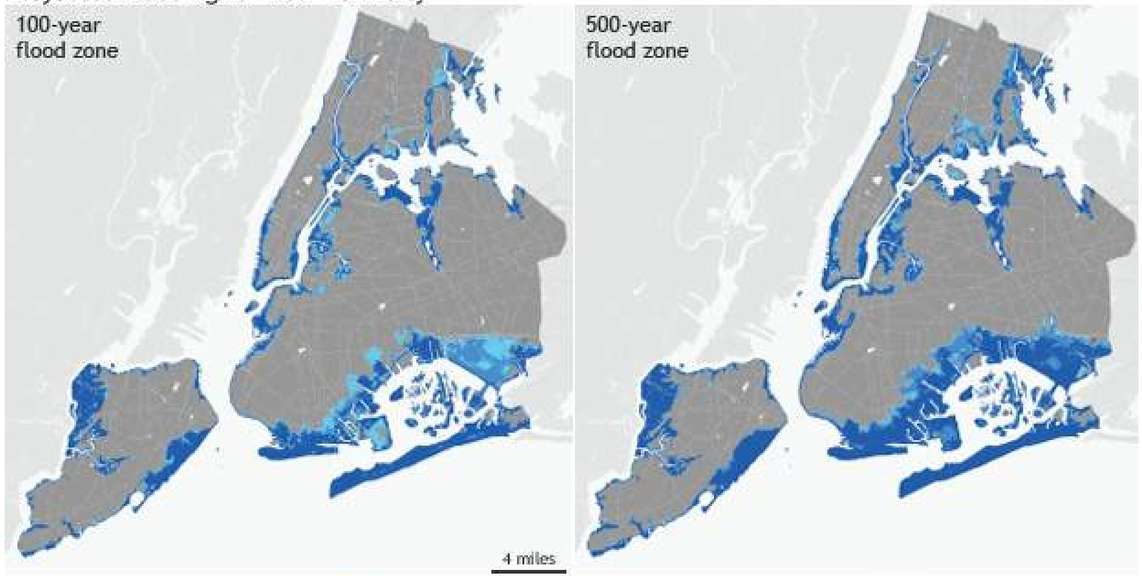
Heat waves will occur more often by the 2080's, with yearly mean temperatures climbing by 5.3 degrees to 8.8 degrees Fahrenheit

Sea levels around the city have already risen by 1.1 feet since 1900, nearly twice as fast as the global rate



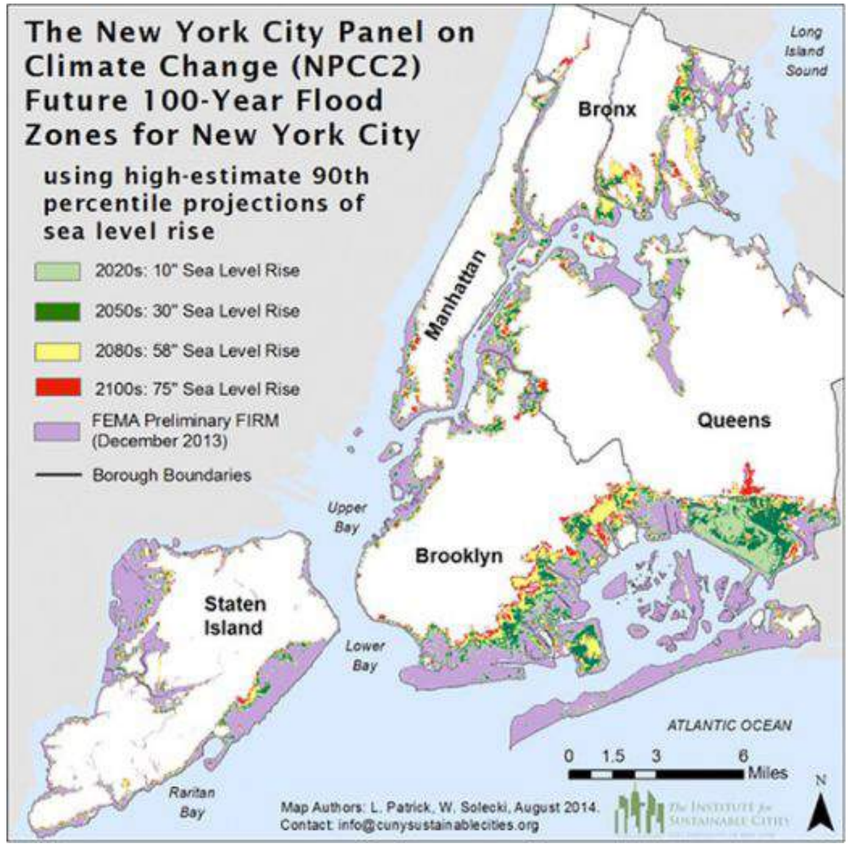
NYC FLOODING RISK

Projected flooding for New York City



This map shows flood zones for the area taking into account sea level rise from both ocean warming and ice sheet melt, and they factor in local conditions such as vertical land movement and regional variations

By the 2020s, the middle range of projections is 4 to 8 inches and the high estimate is around 11 inches. By the 2050s, the middle range of projections is 11 to 24 inches, and the high estimate is 31 inches



PROJECT STATEMENT

This thesis is meant to educate, sustain, and provide an alternative living environment for the people by being a benchmark for future development of the land we are used to. With people being affected by rising sea levels, overpopulation and resources carcity, this floating city will provide a community that will help alleviate some of the hardships of climate change. The broad idea is to create a community in an area that we have not developed yet, the ocean, where resources are plentyful. This city will be a world educational center, showing how living out at one of these seastead communities, can be beneficial, easy, and simply possible. The ability for the city to expand is a key component, as it will start at a small scale, and as more and more people become interested and the idea becomes more well known, will be able to expand to the needs of the community.

Seasteading Idea

Water is very different from land. It is a blank slate, if you will, of unclaimed area by existing governments. The idea is to create a "floating jigsaw puzzle', where you can easily float some where else if you do not like the place you are in, as opposed to having to move from your land/home completely. Seasteading will innovate both technology and systems of community, law and governance together in an affordable and profitable way.

Major Objectives

1) Establish evidence of market demand for a realistic and alternatively governed seastead
2) Produce designs and conduct feasibility studies for the structure itself
3) Find host nations to harbor and offer substantial political autonomy to the seastead without their protected, territorial waters

Things To Consider

-Mobility
-Design
-Financial Aspects
-Structure
-Comfort
-Modularity
-Seakeeping
-Wave Characteristics (tides, nutrients, ocean depth, thermal energy, etc.)

SITE CONTEXT

THE EAST COAST

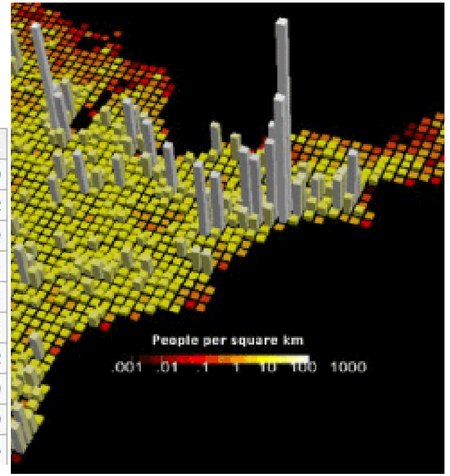
EAST COAST

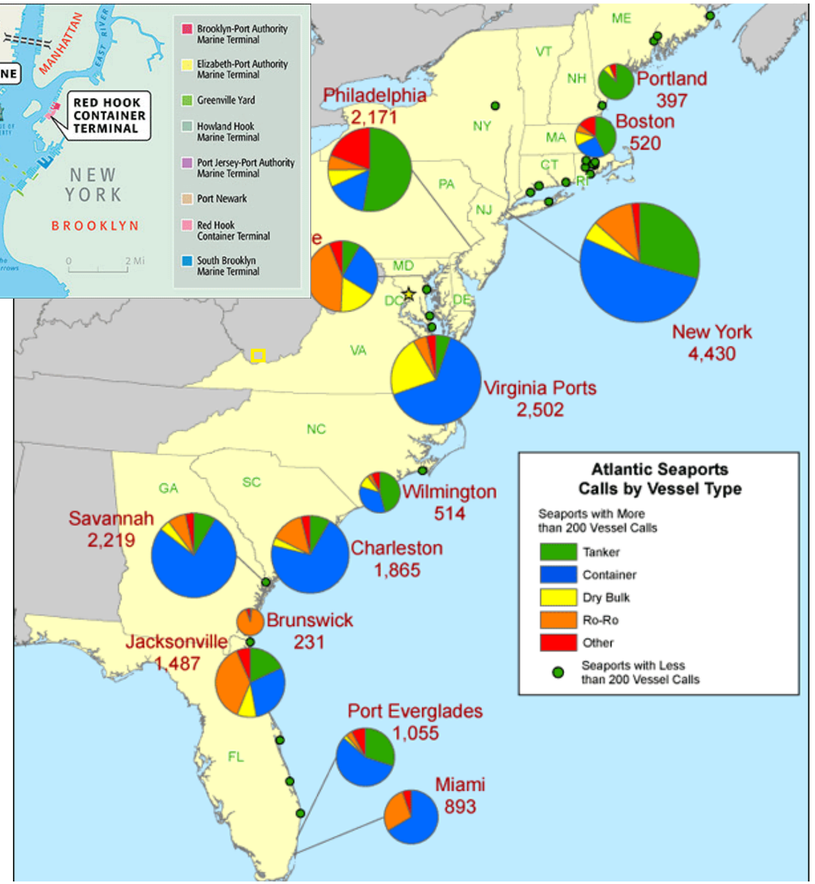
The East Coast of the United States is the section of land that runs along the Atlantic Ocean. The states that have shoreline on the East Coast are, from north to south, Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, and Florida. In 2010, the estimated population of the states which have a shoreline on the East Coast was 112.6 million people (about 36% of the country's total population).

Below shows some of the denses place in the united staes, more than half of them located on the east coast, and even more so in the northeastern region of the U.S.

The graphs on the right show some of the major ports, and their significance, in both the entire east coast and, more specifically, the New York/New Jersey region.

Rank	State	10,000+ places	Densest incorporated place	Density
1	New Jersey	33	Guttenberg	56,012.0
2	California	33	Maywood	23,887.2
3	New York	23	New York City	26,402.9
4	Pennsylvania	13	Millbourne	16,557.1
5	Florida	7	North Bay Village	20,267.1
6	Massachusetts	7	Somerville	18,868.1
7	Illinois	7	Stone Park	15,378.2
8	Kentucky	1	Poplar Hills	17,036.0
9	Rhode Island	1	Central Falls	15,652.0
10	Maryland	1	Mount Rainier	13,038.5





THE NORTH EAST

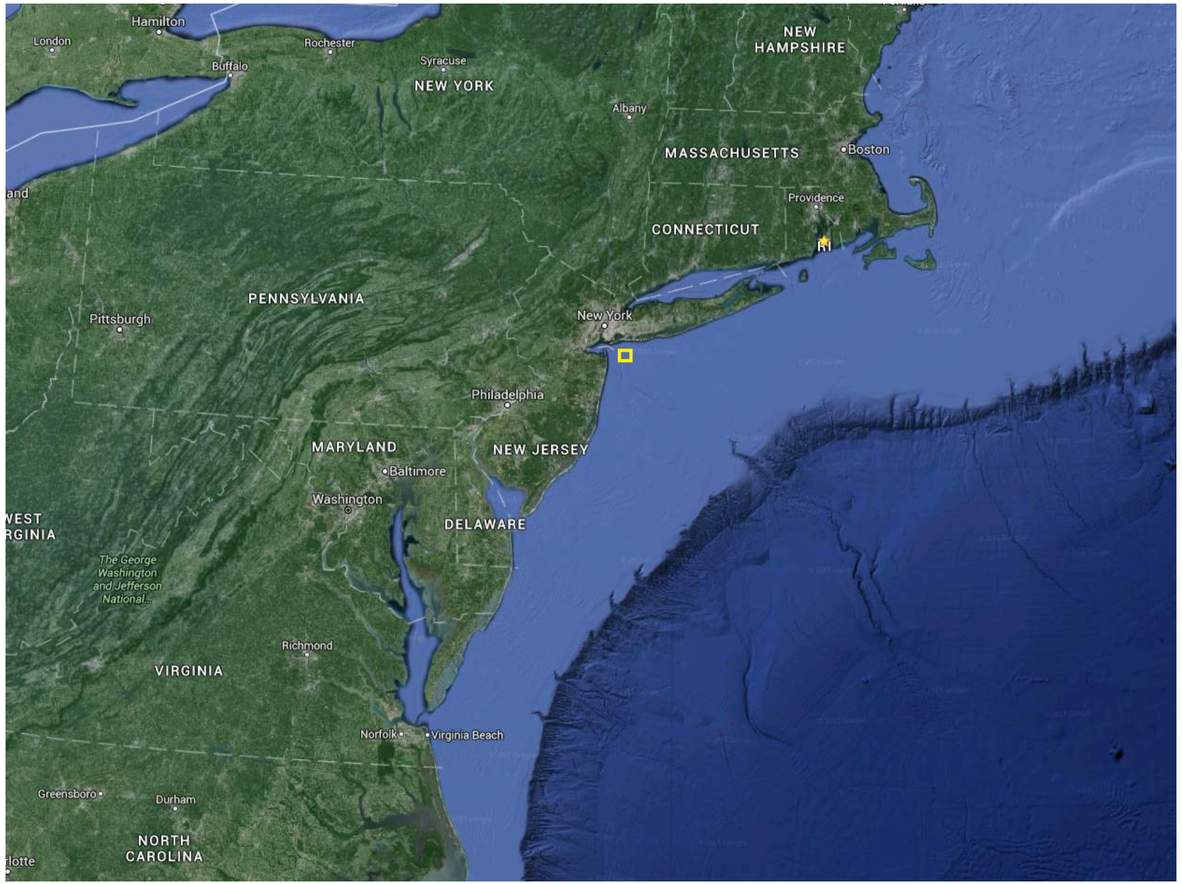
NORTHEASTERN UNITED STATES

The north-east region of the United States is bounded, to the north, by Canada, to the east by the Atlantic Ocean, to the south by Southern United States, and the west by Midwestern United States. It is a total area of 181,324 square miles, consisting of, according to The Census Bureau, nine states: the New England states of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont; and the Mid-Atlantic states of New Jersey, New York, and Pennsylvania. As of July 2013, the estimated population of the North East region was approximated at 55.9 million people.

As of 2007, forest-use covered approximately 60% of the Northeastern states, which is about twice the national average. On the other hand, the Northeast has more urbanized land than any other region in the U.S.A., about 11%. This proves to be a major issue, especially as climates change, population grows, and sea level rises. Not only are there more and more people moving to a more urban fabric community, the North East has the most densely packed environment than any other region in the U.S. (2.5 times the amount) being an average of 345.5 people per square mile.

Population, land area and density

Rank[c]	State Division/Region	Population (2013 est.)	Land area (sqmi)	Density (sqmi)	Geog. sort
2	Rhode Island	1,051,511	1,034	1,017.1	NEng
3	Massachusetts	6,692,824	7,800	858.0	NEng
4	Connecticut	3,596,080	4,842	742.6	NEng
21	New Hampshire	1,323,459	8,953	147.8	NEng
31	Vermont	626,630	9,217	68.0	NEng
38	Maine	1,328,302	30,843	43.1	NEng
2	**New England**	**14,618,806**	**62,688**	**233.2**	**NEast**
1	New Jersey	8,899,339	7,354	1,210.1	MdAtl
7	New York	19,651,127	47,126	417.0	MdAtl
9	Pennsylvania	12,773,801	44,743	285.5	MdAtl
1	**Mid-Atlantic**	**41,324,267**	**99,223**	**416.5**	**NEast**
1	**Northeast**	**55,943,073**	**161,912**	**345.5**	**USA**



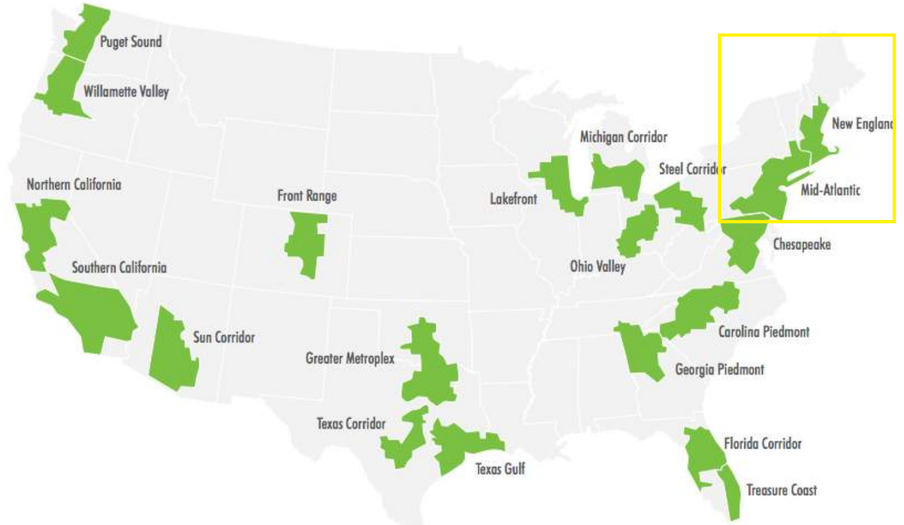
THE NORTH EAST

Below are the ten most metropolitan statistical areas, and the ten largest cities, as defined by the Census Bureau. Several of these cities, located in a narrow strip along the seaboard, comprise the 'backbone' of the Northeast megalopolis.

As population grows, these cities will grow with them, running out of resources and room to house and support these people. With more of these resources being used, more negative affects on the environment ensure, causing sea levels to rise. To the right shows the 20 biggest metropolitan areas in the U.S. and the effect population growth will have on them.

Rank	Metropolitan Area	State(s)	Population (2010 Census)
1	New York City	CT, NJ, NY, PA	18,897,109
2	Philadelphia	DE, MD, NJ, PA	6,051,170
3	Boston	MA, NH, RI	4,552,402
4	Pittsburgh	PA	2,356,285
5	Providence	MA, RI	1,600,852
6	Hartford	CT	1,212,381
7	Buffalo	NY	1,135,509
8	Rochester	NY	1,054,323
9	Bridgeport	CT	933,835
10	Worcester	MA, CT	923,762

Figure 9: Metropolitan to Megapolitan: 60 Million New People in 20 U.S. Markets by 2040



Source: Virginia Tech Metropolitan Institute, 2013.

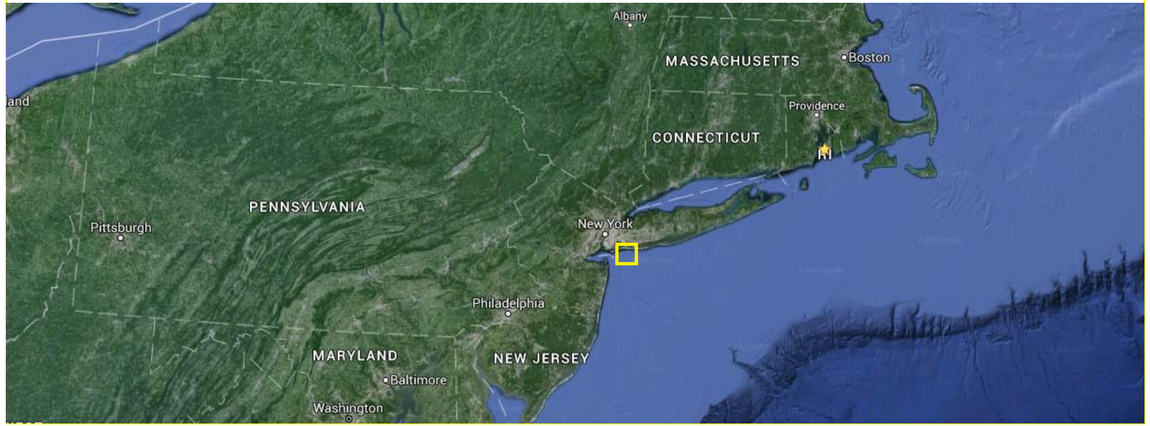
Between 2005 and 2040, the U.S. population is expected to grow by 100 million people—60 million of which are expected to reside within 20 markets characterized as "megapolitans." These megapolitan markets comprise cities and counties linked by synergies and connections such as shared transportation networks, labor markets and/or water supplies. The 20 megapolitan areas, which can be further combined into 10 clusters, are projected to house about two-thirds of the U.S. population by 2040. These areas will not only claim most new population and job growth, but they will also capture a large share of the total investment dollars spent on development and growth.

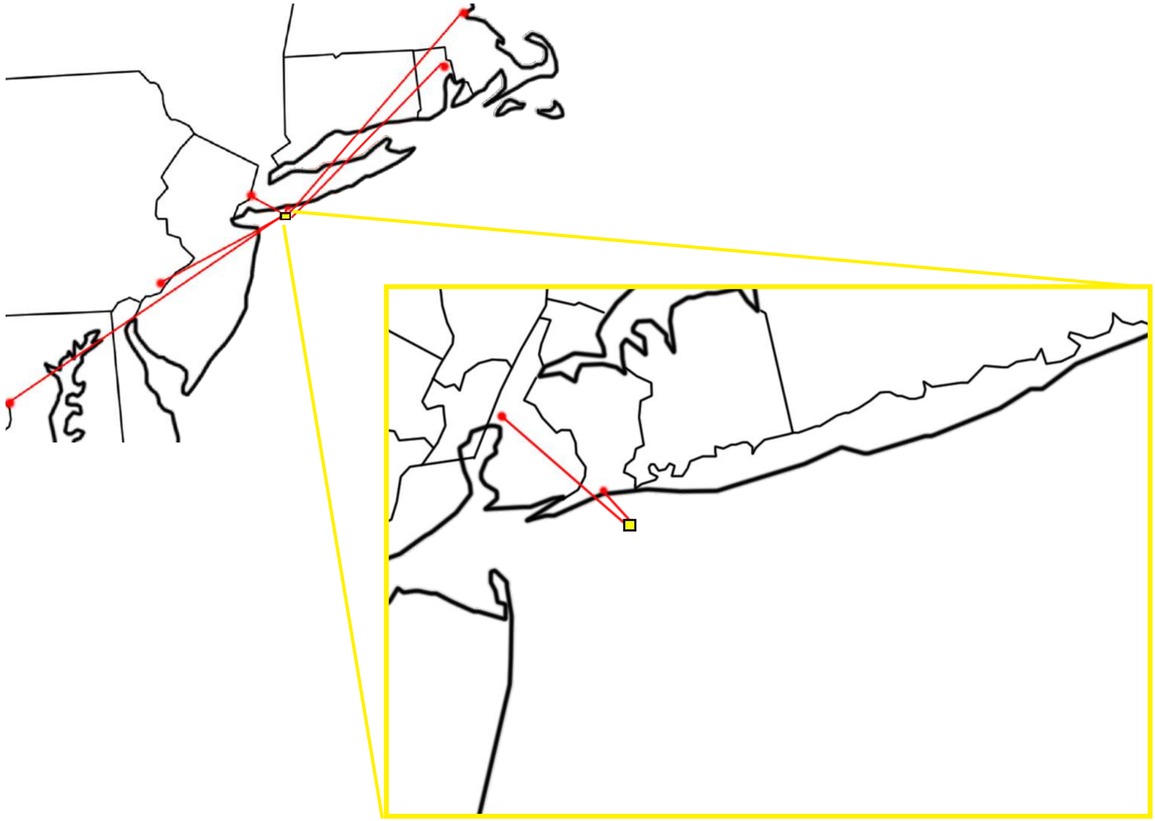
SITE LOCATION

The site is located off the coast of New York and New Jersey in the North East of the United States. It is located approximately 14 miles from New York City and just 6 miles off the coast of Long Island (the closest main-land to the city). It is approximately 180 miles from Boston, 224 miles from Washington, D.C., 102 miles from Philadelphia, and 140 miles from Providence.

The site is located in this area to not only serve some of the larger cities of the northeast, and some of the most densely packed areas on the United States, but also because of the mild weather patterns that this area is prone to. While of course, all future predictions of weather conditions cannot be fully defined, this area, the New York Coastal area, has proven over past centuries--minus a few incidences-to be a rather calm area.

The Floating Community, is located fairly close to land for the possibility of a causeway to connect it to the main land, making people not only more likely to want to stay in such a unique place, but also to have a direct connection to surrounding communities and resources.



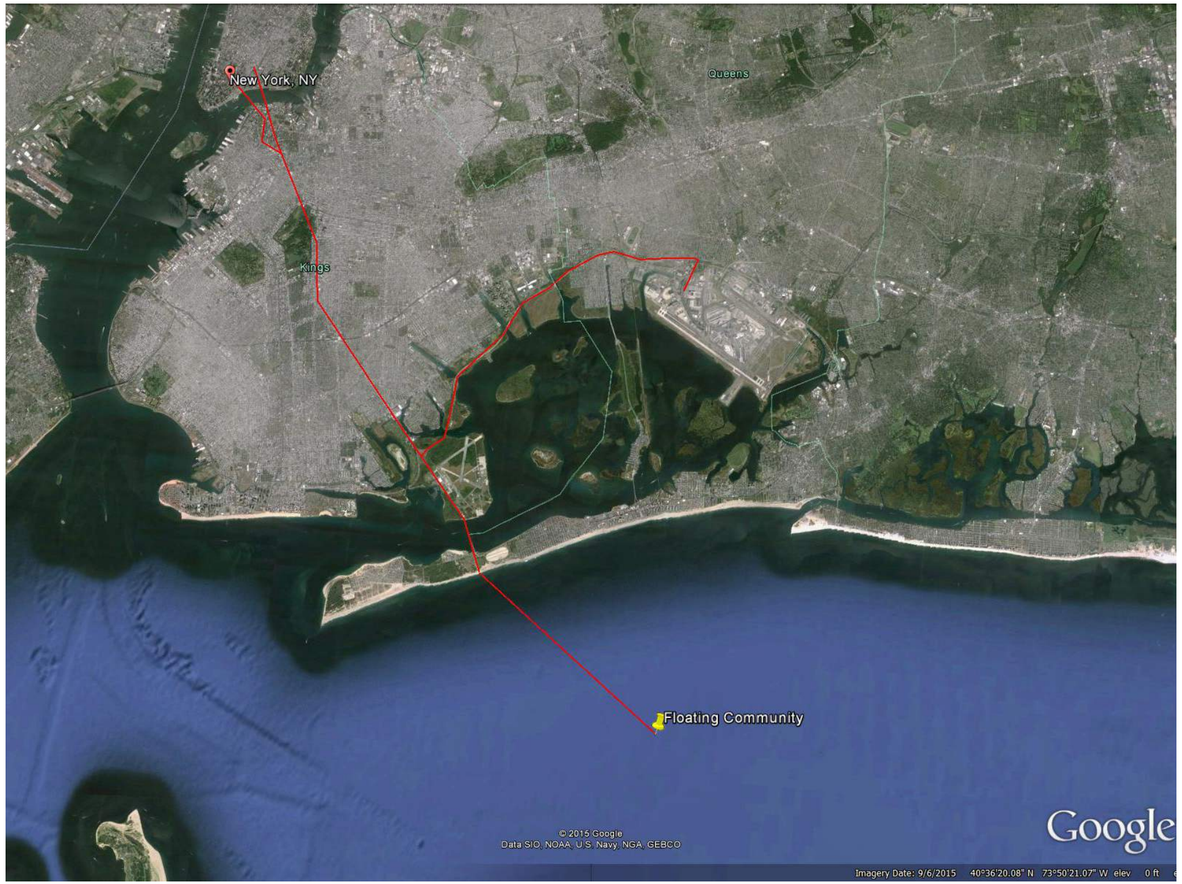


SITE LOCATION

The opportunity for having the city close to the main land is a good one. It allows for an easy connection back and forth for people who want to commute to work, go into the city for the day, or any other reason people usually travel. It also allows the opportunity for a break water wall that will protect the nearby shoreline from future natural disasters.

Being only 6 miles off the coast, it is possible to build a causeway that will connect the community to the main land, being only about 14 miles from the city and only 9 miles from John F. Kennedy Airport.

Many other public programs are located just a few miles from the floating community, such as schools, hospitals, restaurants, theaters, and recreational parks. This allows my community to stay on the smaller side, allowing the ability to travel back and froth for other events and activities one may want to do.



OCEAN TYPOGRAPHY

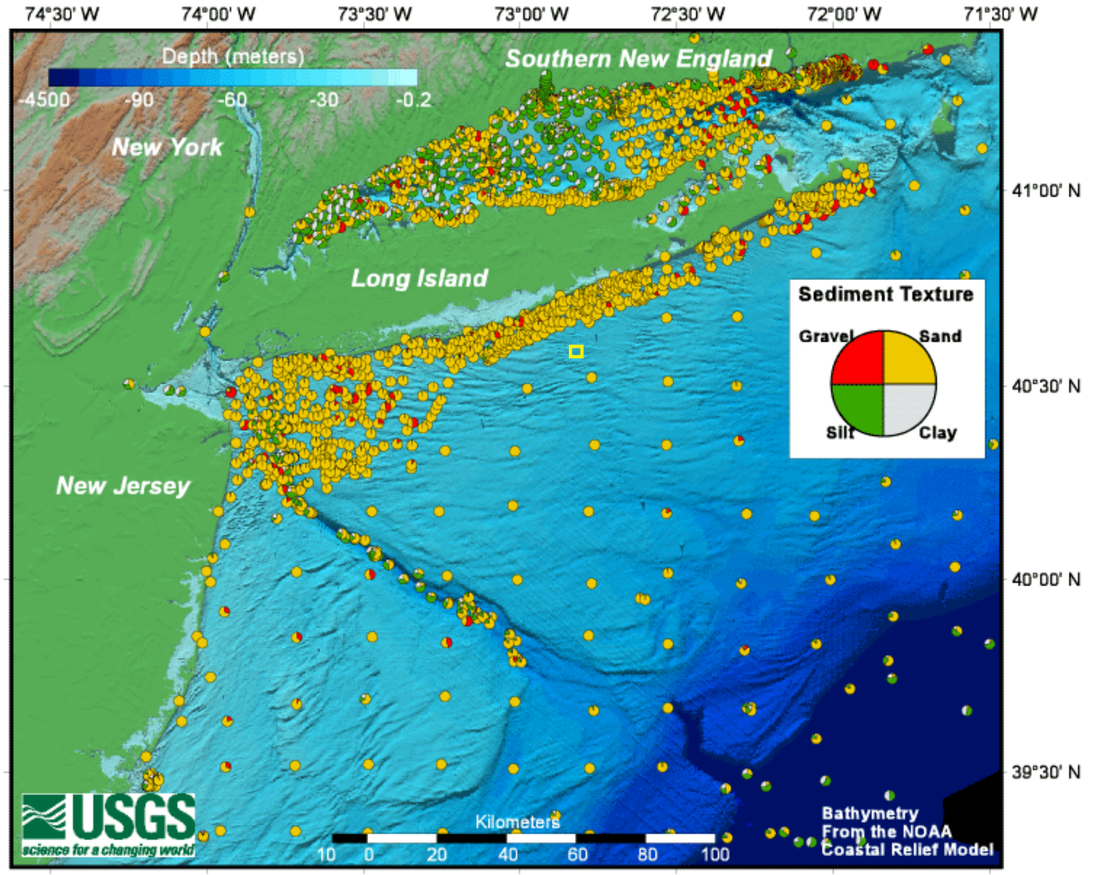
THE NEW YORK BIGHT

The ocean floor around the site is mostly sand and gravel. This is ideal for anchoring the platforms of the community to the ocean floor. Since the depth of the ocean, closer to shore, is less and less, it will require less anchorage and less construciton to do so.

The sea floor of the New York Bight consists largely of continental shelf and includes the Hudson Canyon, an undersea Pleistocene submarine canyon, which was formed by the Hudson River during the ice ages, when the sea level was lower.[6] The bight includes major shipping channels that access New York Harbor.

The geography of the bight has long been of major concern to meteorologists in the study of tropical storm patterns along the east coast, and is one of the primary reasons why the New York Metropolitan Area is considered a high danger zone for storm generated ocean-water surges, despite its northerly latitude. Specifically, in the presence of a hurricane off the coast of New Jersey, the easterly cyclonic winds along the northern edge of the storm could drive a strong surge to the west, laterally along the southern coast of Long Island and straight into Lower New York Bay. The angle bend of the New Jersey coast would leave little outlet for the surge, leading to widespread flooding throughout New York City, especially along the southern coast of Staten Island and Manhattan.

Examples of this phenomenon are the hurricane of 1893, in which storm surges of up to 30 feet (9.1 m) were reported, and Hurricane Sandy in 2012.



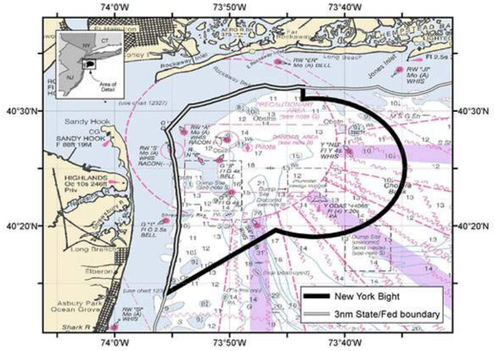
OCEAN TYPOGRAPHY

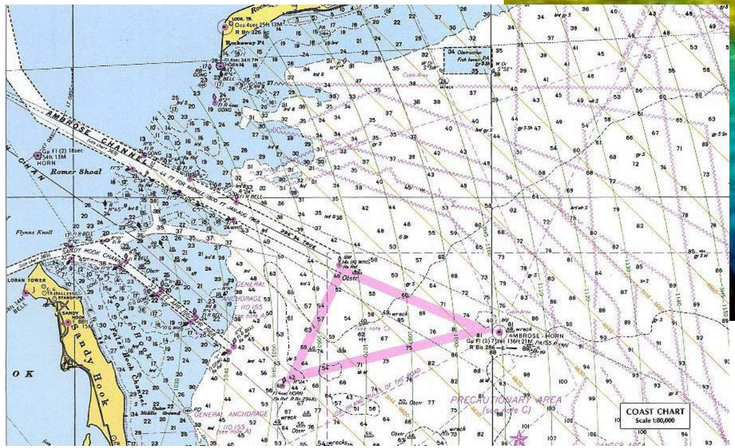
AMBROSE CHANNEL

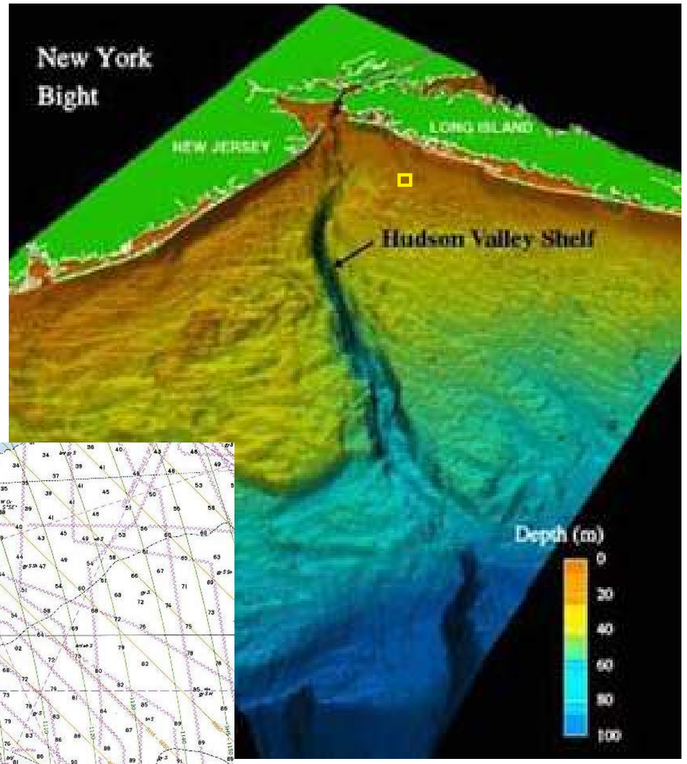
Ambrose Channel is the main shipping channel in and out of the Port of New York and New Jersey. The channel is considered to be part of Lower New York Bay and is located several miles off the coasts of Sandy Hook in New Jersey and Breezy Point, Queens in New York. Ambrose Channel terminates at Ambrose Anchorage, just south of the Verrazano Narrows Bridge, the gateway to New York Harbor, where it becomes known as the Anchorage Channel.

This area has a deep channel, more than 100m deep, and is where most of the major shipping lanes in and out of New York City and New Jersey are located.

To avoid these major channels and this major 'canyon' the community will be located just north-west of it closer to the shore of Long Island.







U.S. BOUNDARIES

The borders of every country is sub-divided into three categories of control. These determine where and how far each country has, outside of its coastal border, control and economic standings. These three zones and their distances are as follow:

Territorial Sea (TS)

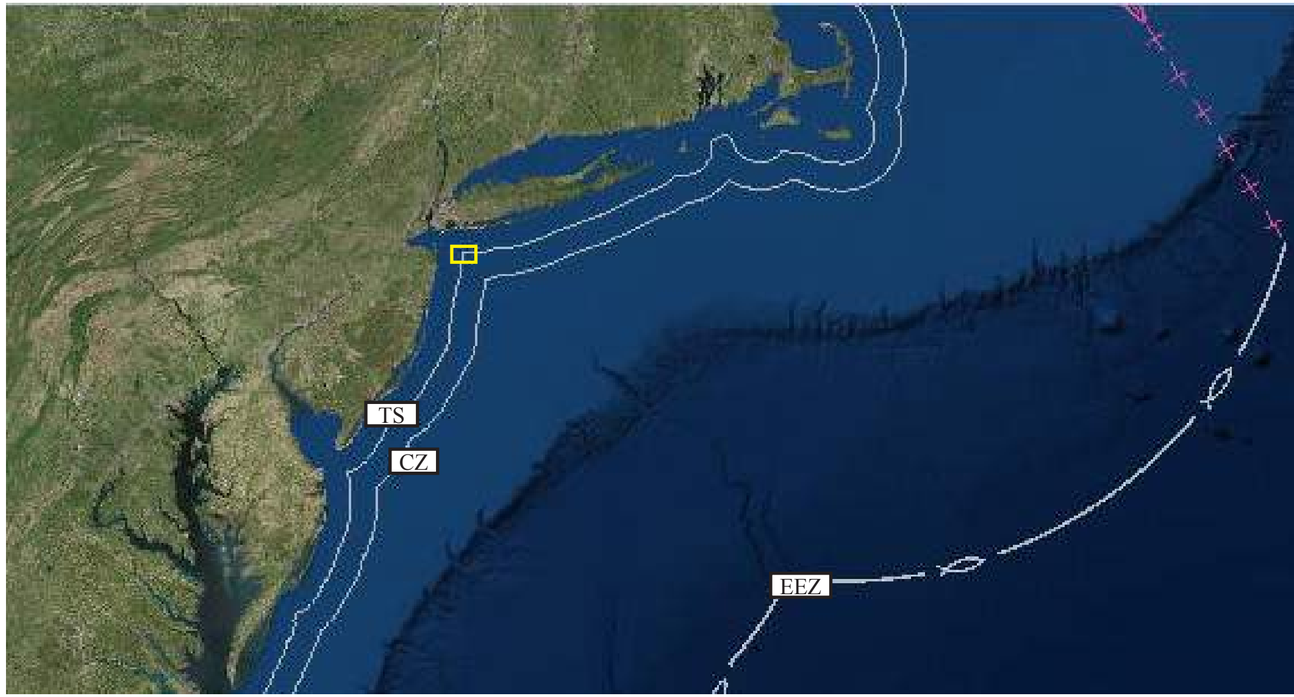
The territorial sea is a maritime zone over which the United States exercises sovereignty. Sovereignty extends to the airspace above and to the seabed below the territorial sea. The U.S. territorial sea extends 12 nautical miles from the baseline.

Contiguous Zone (CZ)

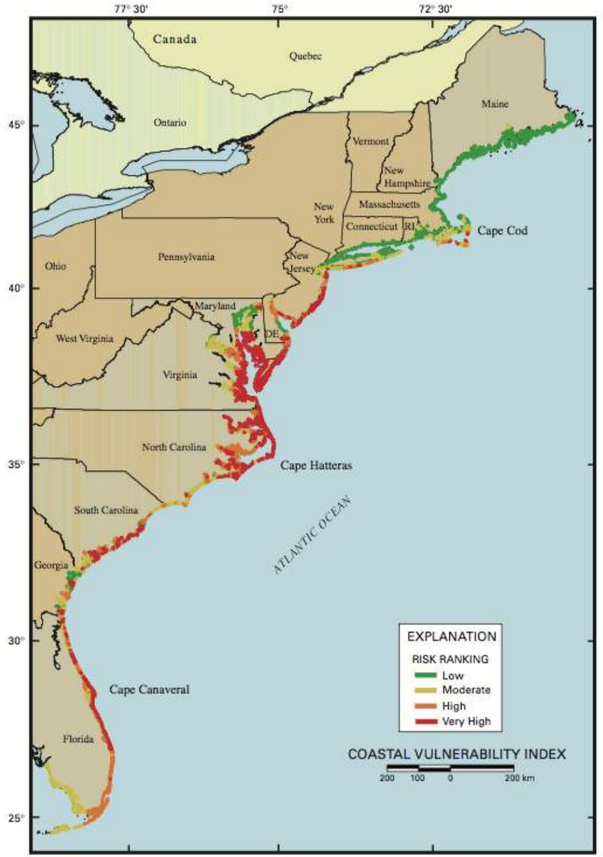
The contiguous zone of the United States is a zone contiguous to the territorial sea. In this zone, the U.S. may exercise the control necessary to prevent and punish infringement of its customs, fiscal, immigration, cultural heritage, or sanitary laws and regulations within its territory or territorial sea. The U.S. contiguous zone is measured 24 nautical miles from the baseline.

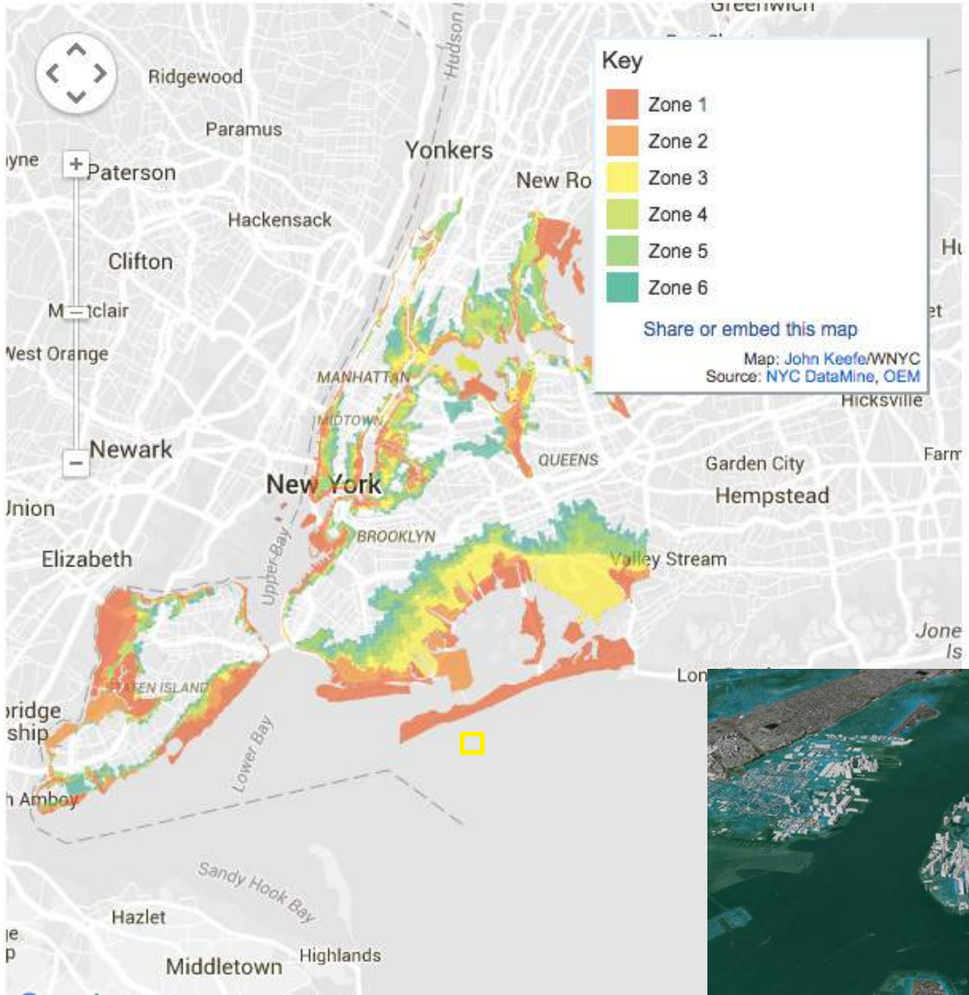
Exclusive Economic Zone (EEZ)

The exclusive economic zone (EEZ) of the U.S. extends 200 nautical miles from the territorial sea baseline and is adjacent to the 12 nm territorial sea of the U.S., overlapping the 12-24nm contiguous zone.



NY SEA LEVEL RISE





NY SEA LEVEL RISE

These tables show the likelyhood and the coastal flood heights of the New York City area. As stated before this area is prone to high sea level rise and natural occuring disasters. Because of these statistics there is a need for a new revamping of the coastal areas, especially around New York City, Long Island, and New Jersey.

Table 7. Qualitative Changes in Extreme Events

Projected direction of change by the 2050s, as well as likelihood associated with the qualitative projection. For these variables, quantitative projections are not possible because of insufficient information.

	Spatial Scale of Projection	Direction of Change by the 2050s	Likelihood	Sources
Heat Index	New York City area	Increase	Very likely	NPCC, 2010; IPCC, 2012; Fischer and Knutti, 2012.
Short duration drought	New York City area	Increase	More likely than not	Rosenzweig et. al., 2011
Multi-year drought	New York City area	Unknown	--	Dai, 2012
Ice storms/freezing rain	New York City area	Unknown	--	NPCC 2010; ClimAID 2011
Seasonal snowfall	New York City area	Decrease	Likely	IPCC, 2007, 2012; Liu et al., 2012
Downpours	New York City area	Increase	Very likely	IPCC 2012; USGCRP, 2013
Lightning	New York City area	Unknown	--	USGCRP, 2013; Price and Rind, 1994
Tropical cyclones				
Total number	North Atlantic Basin	Unknown	--	--
# of Intense hurricanes	North Atlantic Basin	Increase	More likely than not	USGCRP, 2013; IPCC, 2012
Extreme hurricane winds	North Atlantic Basin	Increase	More likely than not	USGCRP, 2013; IPCC, 2012
Intense hurricane precipitation	North Atlantic Basin	Increase	More likely than not	USGCRP, 2013; IPCC, 2012
Nor'easters	New York City area	Unknown	--	IPCC 2012; Colle et al. 2013

a. 2020s Coastal Flood Heights

	Baseline	Low-estimate (10th percentile)	Middle range (25th to 75th percentile)	High-estimate (90th percentile)
Stillwater Flood heights associated with 10-year flood	7.0 feet	7.2 feet	7.3 to 7.7 feet	7.9 feet
Flood heights associated with 100-year flood (stillwater + wave heights)	15.0 feet	15.2 feet	15.3 to 15.7 feet	15.8 feet
Stillwater Flood heights associated with 100-year flood	10.8 feet	11.0 feet	11.1 to 11.5 feet	11.7 feet
Stillwater Flood heights associated with 500-year flood	14.4 feet	14.6 feet	14.7 to 15.1 feet	15.3 feet

The percentiles in the top row refer to the values for projected sea level rise. Flood heights for the 2020s are derived by adding the sea level rise projections for the corresponding percentiles to the baseline values. Baseline flood heights associated with the 10-year, 100-year, and 500-year floods are based on the stillwater elevation levels (SWELs). For 100-year flood, height is also given for stillwater plus wave heights. Flood heights are referenced to the NAVD88 datum.

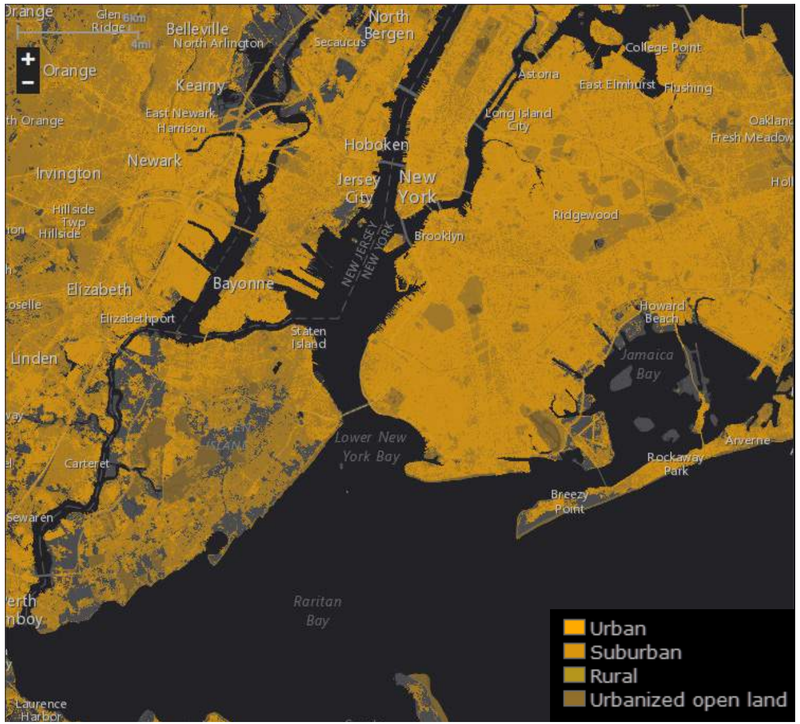
c. 2050s Coastal Flood Heights

	Baseline	Low-estimate (10th percentile)	Middle range (25th to 75th percentile)	High-estimate (90th percentile)
Stillwater Flood heights associated with 10-year flood	7.0 feet	7.6 feet	7.9 to 9.0 feet	9.6 feet
Flood heights associated with 100-year flood (stillwater + wave heights)	15.0 feet	15.6 feet	15.9 to 17 feet	17.6 feet
Stillwater Flood heights associated with 100-year flood	10.8 feet	11.4 feet	11.7 to 12.8 feet	13.4 feet
Stillwater Flood heights associated with 500-year flood	14.4 feet	15.0 feet	15.3 to 16.4 feet	17.0 feet

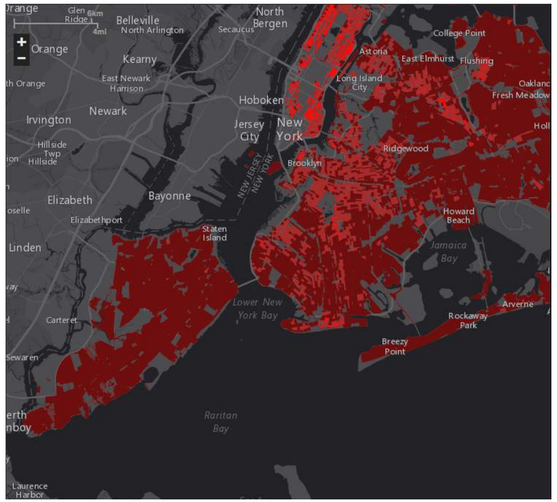
The percentiles in the top row refer to the values for projected sea level rise. Flood heights for the 2050s are derived by adding the sea level rise projections for the corresponding percentiles to the baseline values. Baseline flood heights associated with the 10-year, 100-year, and 500-year floods are based on the stillwater elevation levels (SWELs). For 100-year flood, height is also given for stillwater plus wave heights. Flood heights are referenced to the NAVD88 datum.

NY/NJ REGION

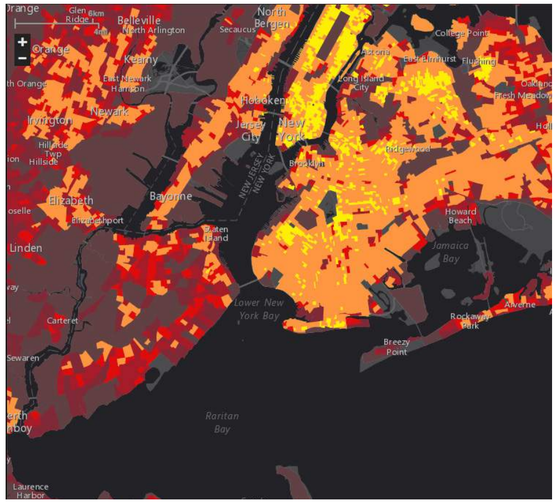
The following maps show specific demographics of the surrounding, nearby inland area of New York and Upper New Jersey.



Urban Development



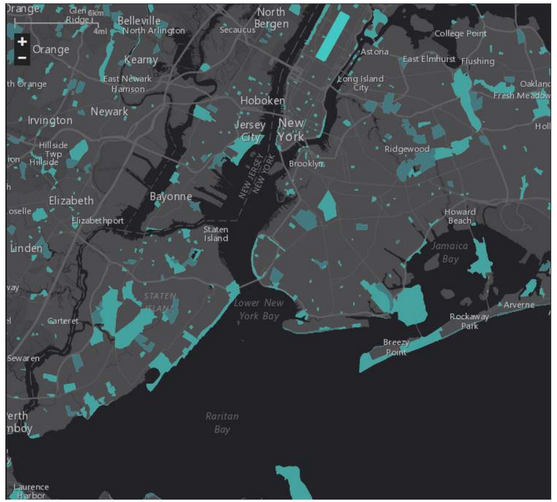
Housing Density



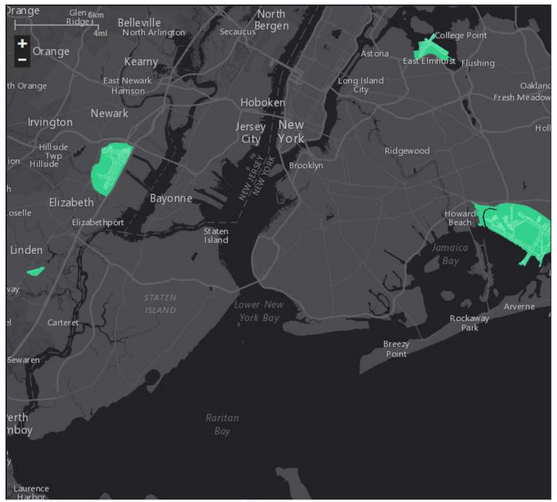
Population Density

NY/NJ REGION

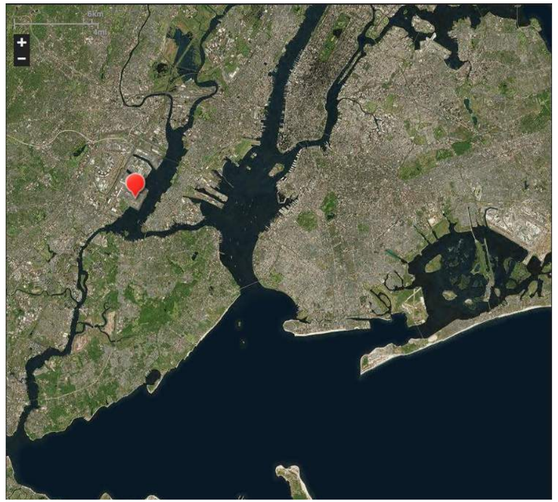
Flood Zone



Open Space



Airports



New York/New Jersey Port

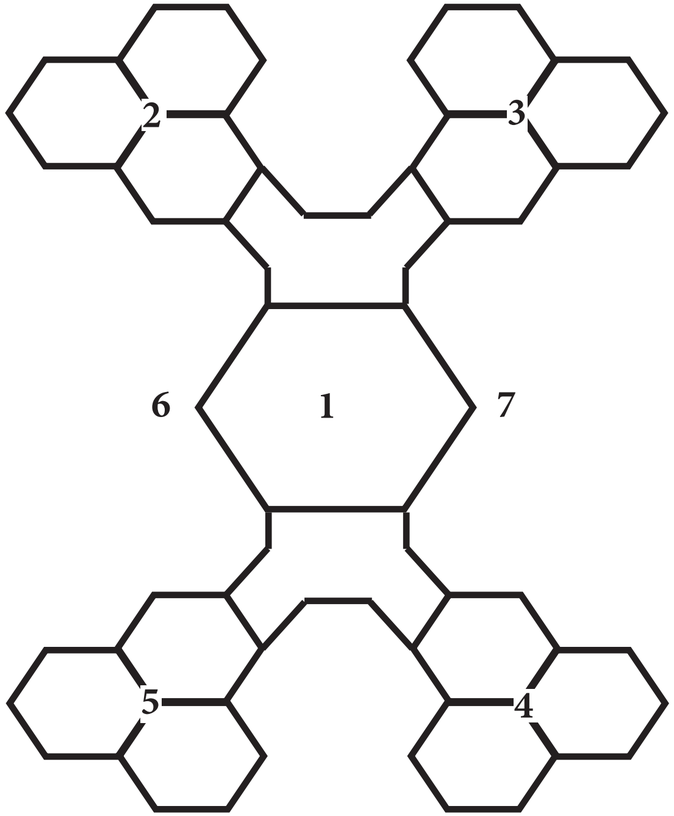
PROGRAM

INITIAL PROGRAMMATIC NEEDS AND IDEAS

The initial idea for this ‘community’ was to have several segmented areas within the overall community that would serve different purposes. These would be branches such as, the City Center, Housing, Entertainment, Industry, Sustainablility, and, of course, Ports/Helipads for transportation in and out. Each of these branches would connect to one another, all leading to the city center, where markets, city greenspace and public events would be held, just like any other large city parks/plazas (i.e. Central Park).

The idea behind these branches and these hexongonal shapes, was derived from the Seasteading Institute, which has developed a plan for these floating, autonmous, cities that would be placed outside of territorial zones of climate change proun countires. These cities would be a refugee for people that would be affected drastically by climate change, or people who simply want to move off the main lands.

The Seasteading Institude has derived a perfect ‘shape’ and size for these platforms, which are shown diagrammatically to the right, which are 50m x 50m platforms that would be towed into place and hooked onto eachother via steel connection.



Overall Program Diagram

1) City Center
- -Community Space
- -Markets
- -Events
- -Approx 100 m on each side

2) Housing Branch
- -Unit housing for about 250-300 residences
- -Approx 50 m on each side
- -Modular design for mobility

3) Entertainment Branch
- -Theaters
- -Restaraunts/Bars
- -Multi-purpose arena
- -Playground/Outdoor Recreation area

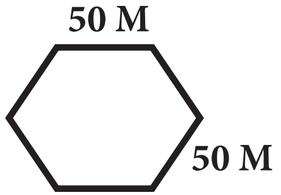
4) Industry Branch
- -Buisnesses
- -Hospitals
- -Infrastructure

5) Sustainable Branch
- -Solar Panel Farm
- -Aquaculture
- -Wind Turbines

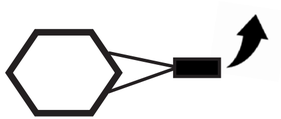
6/7) Ports/Access

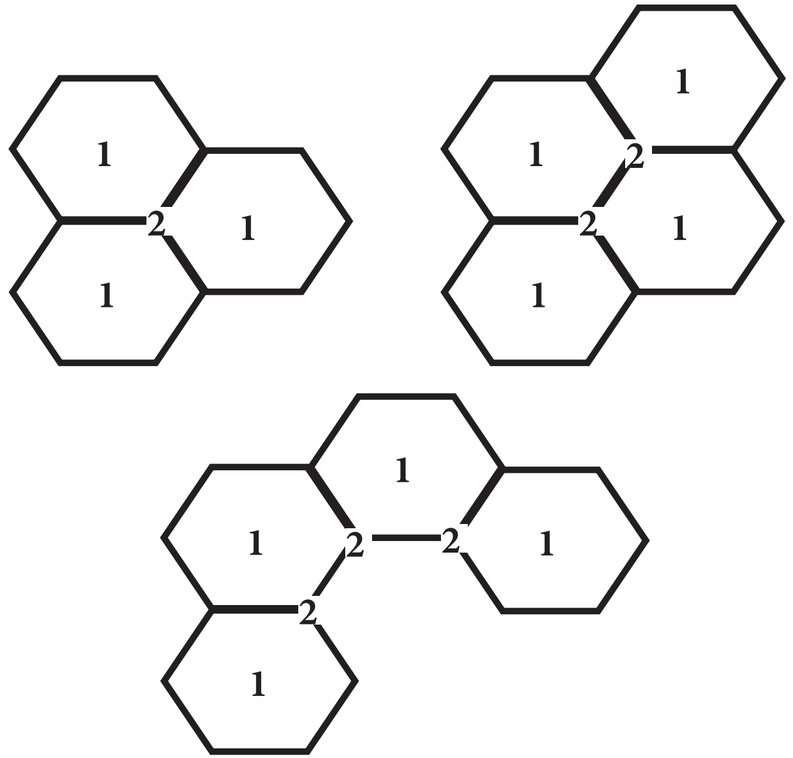
TYPICAL BRANCH

A typical branch in this city would consist of the modular 50m x 50m platforms. Depending on the program of the branch, each would revolve around a communal center space, either centralized or 'ocean' front. The actual structures, the buildings, on these platforms would be centralized also, allowing green space and circulation space to revolve around it.



Module





Typical Branch Layout

1 | 50 m x 50 m platform

2 | Communal Space

INITIAL PROGRAM

The program of the city will essentially consist of five branches; Housing Branch, Sustainability Branch, Entertainment Branch, Business/Industry Branch, and Miscellaneous Branch (i.e. the town center, ports, etc.). Each of these branches will all consist of their own program, with connections back to the city center, where the heart of the city lies. Mainly, I am focusing on the housing branch, as I want to show how convenient and probable it is to live on such a abnormal place.

The Housing Branch will consist of an apartment building(s), a hotel building, and multiple individual housing units. As of right now, there is approximately anywhere from 800-1400 residents. This includes the hotel, which will not always be full, and all apartments, even those for rent. At any given time there could be a maximum of 1400 residents in the city, with the possibility for more that are just visiting or vacationing.

Housing Branch

Apartment Building

Studio	50	450	22500	*rentable
1 Bedroom	150	750	112500	*rentable
2 Bedroom	100	1000	100000	*rentable
Gym	1	3000	3000	
Laundry Room	3	200	600	
Services/Mechanical	1	400	400	
Café/Kitchen	1	1500	1500	
Lounge	1	1000	1000	
Lobby	1	2000	2000	
TOTAL NSF			**243500**	

Hotel

1 Bedroom	50	700	35000
2 Bedroom	80	850	68000
Lobby	1	2000	2000
Plaza	1	1000	1000
Gym/Pool	1	7500	7500
Laundry	1	600	600
Services/Mechanical	1	1500	1500
Lounge/Library	1	2000	2000
Café/Kitchen	1	2000	2000
TOTAL NSF			**119600**

Individual Housing

2 Bedroom	10	1500	15000
3 Bedroom	15	2000	30000
4 Bedroom	10	2500	25000
TOTAL NSF			**70000**

Sustainability Branch

Solar Panel 'Farm'	1	30,000	30000
Aqua Farming	1	15,000	15000
Wind Turbines	1		0
Community Garden	1	15,000	15000
TOTAL NSF			**60000**

Entertainment Branch

Multipurpose Hall	1	3000	3000
Outdoor Athletic Stadium	1	7000	7000
Restaurant/Bar	2	1000	2000
TOTAL NSF			**12000**

Business/Industry Branch

Small Office Building	1		0
Shops/Markets/Stores	1		0
Medical Center/Facility	1		0
TOTAL NSF			0

Misc

Port	1		0
Helipad	1		0
Water Break Wall (circum)	1		0
City Center	1		0
TOTAL NSF			0

Total Net Area	505100
Total Gross Area (factor of __)	

1 persons per apartment	50	
1-2 persons per apartment	150	300
2-4 persons per apartment	200	400
Total	**400**	**700**

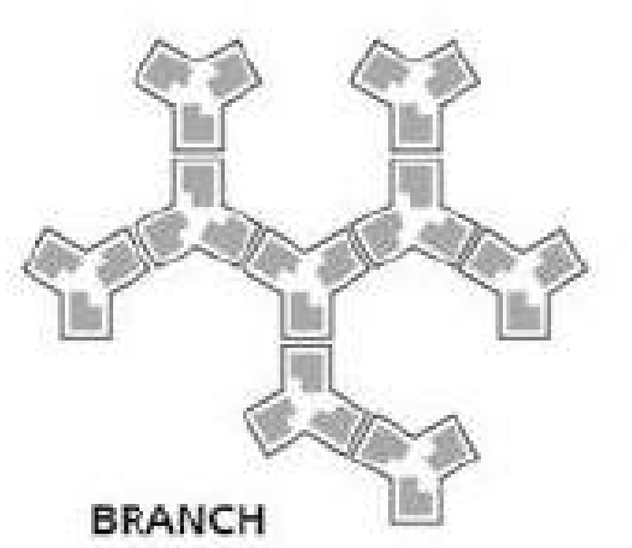
1-2 persons per hotel room	50	100
2-5 persons per hotel room	160	400
Total	**210**	**500**

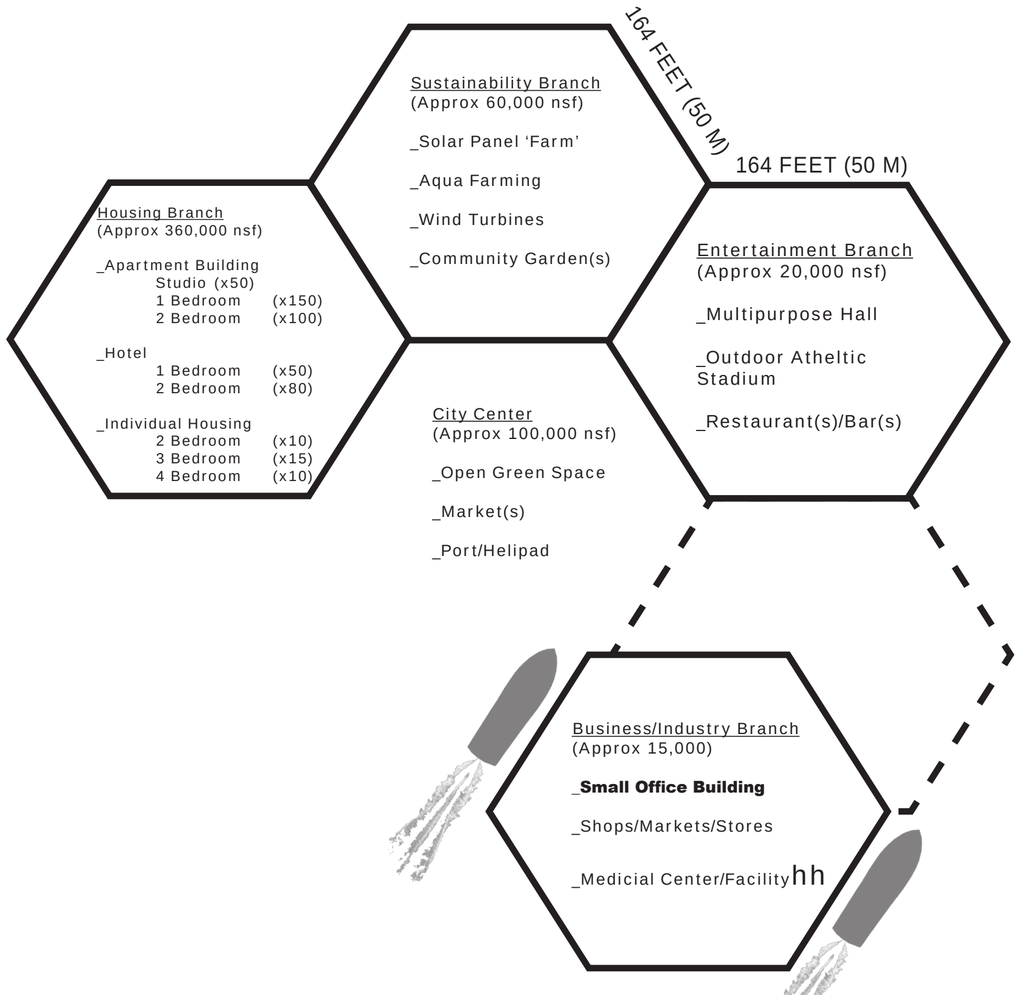
2-4 persons per house	20	40
4-6 persons per house	60	90
5-8 persons per house	50	80
Total	**130**	**170**

Total Population (Minimum)	**740**
Total Population (Maximum)	**1370**

PROGRAM DIAGRAM

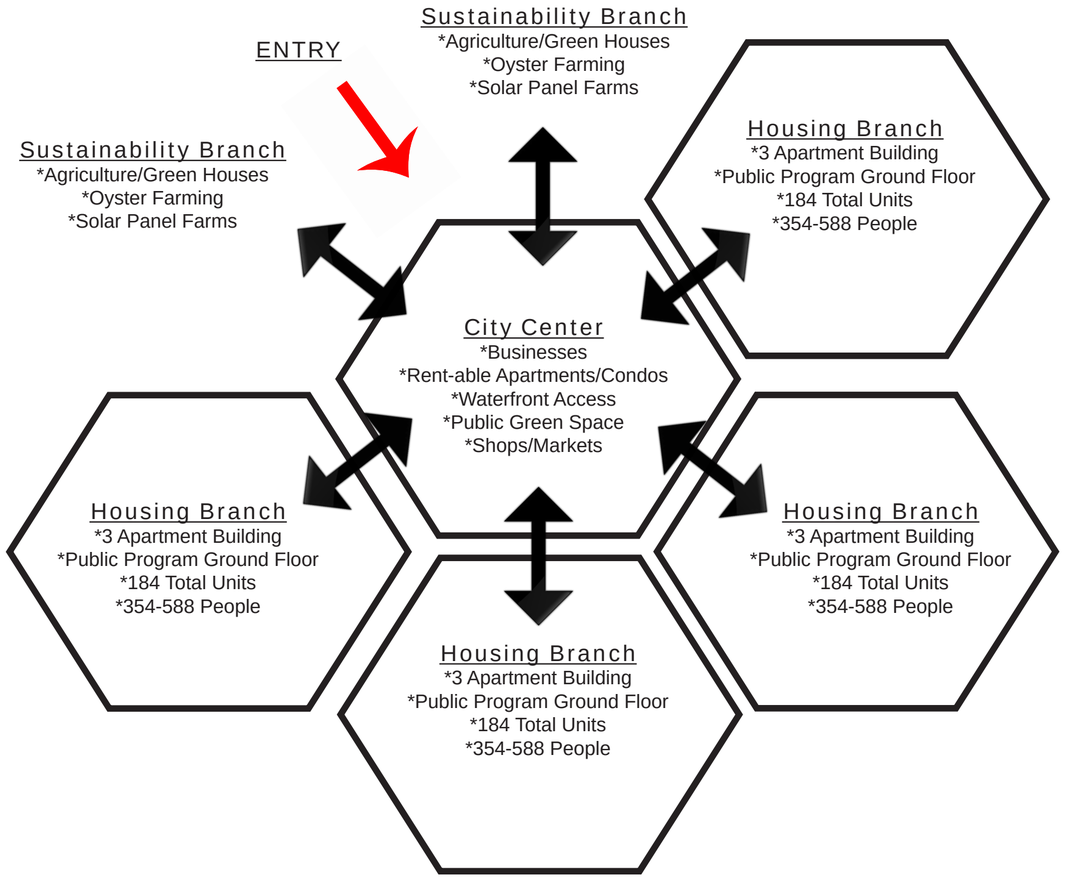
All branches of the city are focused around the City Center, where the 'heart' of the city lies. This City Center will be where we have open green space, temoprary markets and/or events, and, of course, access to the city either through a port for boats or a helipad. The possibility for manuverablility, rearragnment, and adding to the city is a big characteristic of the city. Each 'platform' is about 50m x 50m, an optimal size for anchoring/securing to the ocean floor and other 'platforms' and an optimal size for ships to tow into place and from one seasteading city to the next.





FINAL PROGRAM

The Final Program of the community still revolves around a City Center, the heart of the community if you will. This is where all of the public program, shops, markets, entertainment, large water-front access, and even rent-able office space/apartments, are available. Branching off of the city center, as you enter on a direct lineal access, are the housing complexes which each have three (3) apartment buildings with its own public and private program, and a private green space for each development. The entire community is surrounded by a 'live-ly' breakwater wall which contains wind and wave energy turbines and is meant to ease the rough seas as they encompass the city.



TECHNICAL SOLUTIONS

TECHNICAL SOLUTIONS

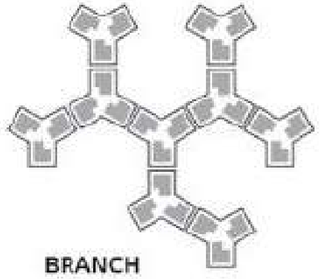
PLATFORMS

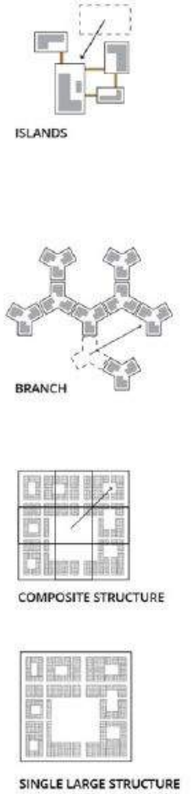
TYPE: BRANCH

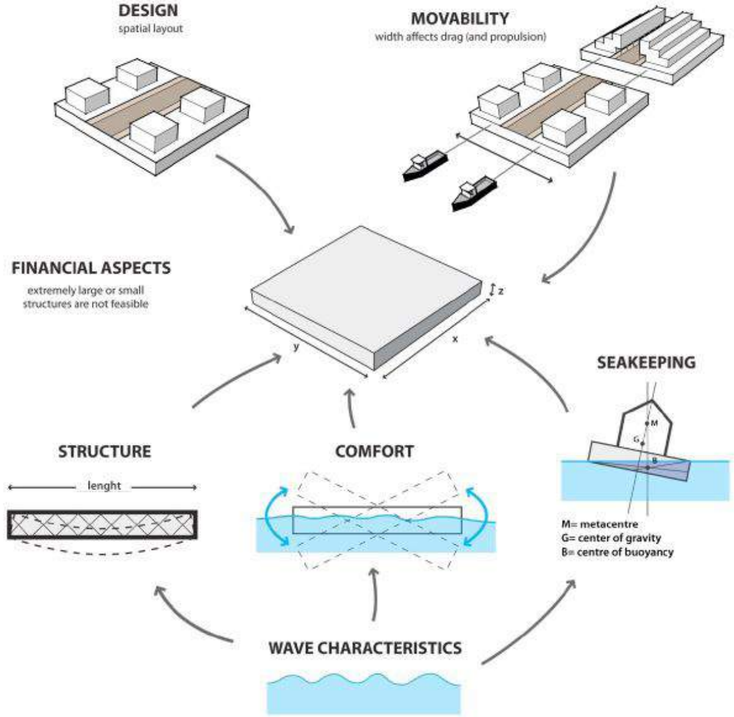
The floating structures consist of several houses or other buildings. The structures can be connected with hinged or rigid joints. (50m x 50m platforms)

Pros
-Easy to move (tow) away
-Less swell than 'islands'
-Very good water experience
-Intermediate stability

Cons
-No possibility to move a single house
-Structures need to be uniform to be able to fit together
-Large number of mooring constructions are needed
-Needs protection by berakwater, which may obstruct ocean vieww







TECHNICAL SOLUTIONS

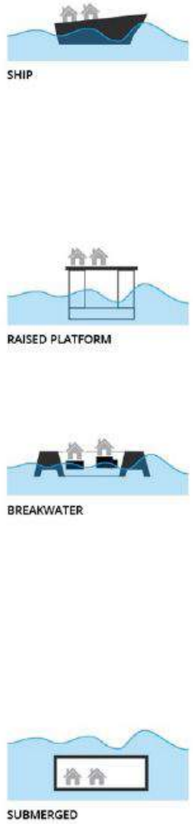
DEALING WITH WAVES

TYPE: BREAKWATER

An external structure is constructed to serve as a breakwater, and behind this the city can take any shape.

Pros
-Large design freedom
-Breakwater could be integrated into other systems or functions
-Creates calm water behind structure that could be used for aquaculture, recreation, etc.

Cons
-External structure needs additional mooring solutions
-Is not able to withstand every wave type, which would result in swell behind it under some circumstances.



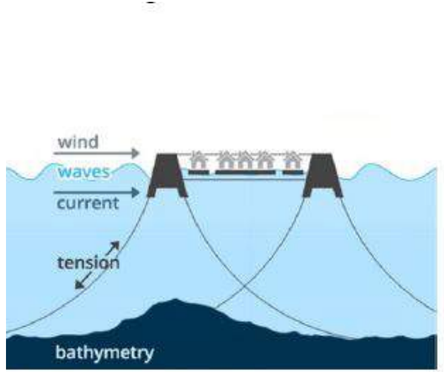


Figure 3.2 Structural aspects

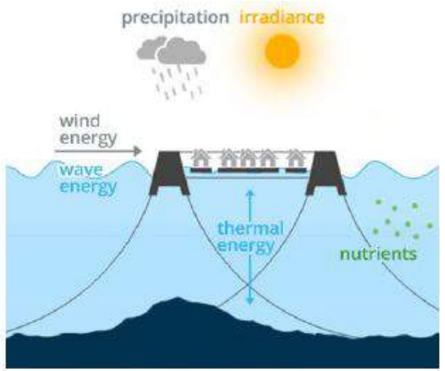
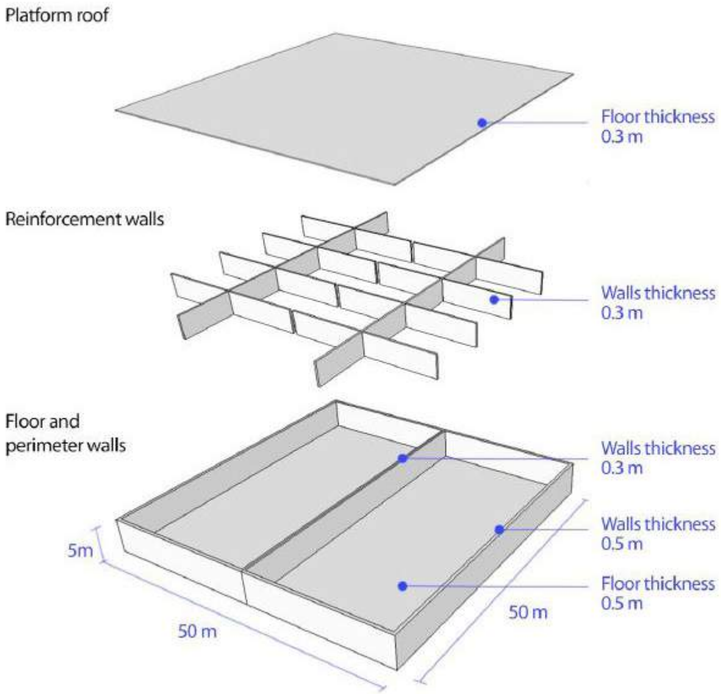


Figure 3.3 Energy and resources

PLATFORMS

THE STRUCTURE OF THE 50M X 50M PLATFORMS IS DISPLAYED IN THE DIAGRAM BELOW.



Model

The initial conditions for this calculation are a platform size of 50 x 50 m that is divided into 10% green space, 10% sidewalks and 80% ground that can be developed for rent or sale (issuable ground) (see table 6.1). The average building consists of three floors and has a gross/net space ratio of 0.78, which results in an average gross space of 3,000 m² and useable floor area of 2,340 m² per platform. We calculated a per person residential area of 75 m² and 25 m² of commercial area. This results in an average of 30 inhabitants per platform, although combining this with commercial space and hotel space will accommodate more people, which will lead to a rich and diverse environment.

Table 6.1

Distribution of ground space		
Platform	100%	2500 m^2
Sidewalks	10%	250 m^2
Green	10%	250 m^2
Issuable Ground	80%	2000 m^2
*Built-up Area**	50%	1000 m^2

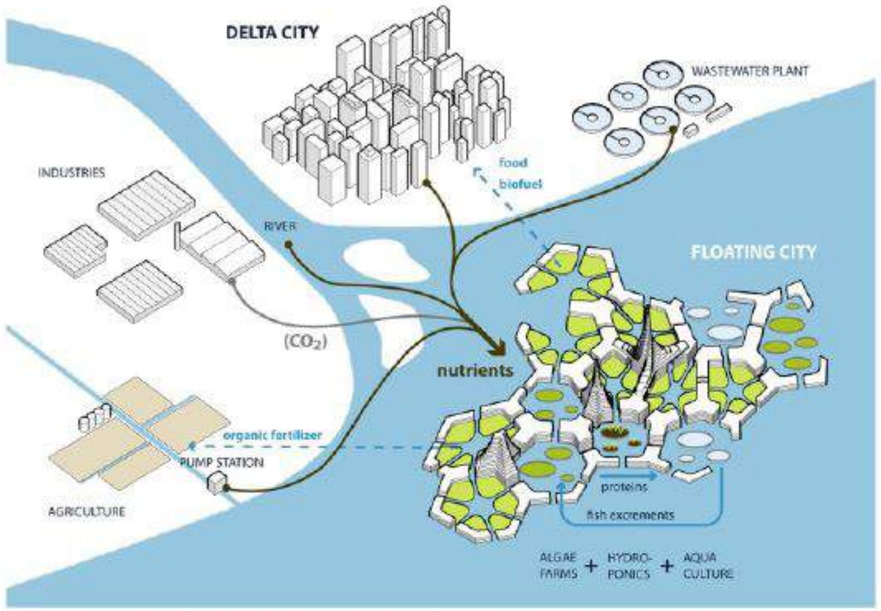


Figure 5.2 Scheme of nutrients and CO_2 flows within the floating city-delta city system. Waste from delta areas is used for energy and food production, creating a symbiotic relation between the land-based city and the floating city (Deltasync, 2012).

AQUACULTURE/NUTRIENTS

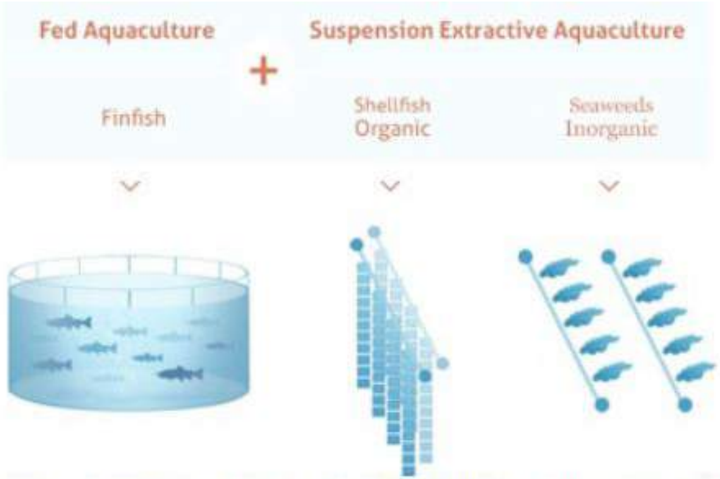


Figure 5.4 Integrated multi-trophic aquaculture (IMTA) operation scheme showing how a combination of varying levels of the food chain in the same environment take advantage of organic and inorganic nutrients made available by the various organisms (www.oceansfortomorrow.ca).

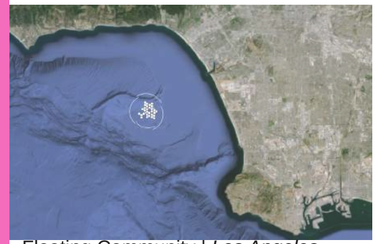
DESIGN DEVELOPMENT

DESIGN DEVELOPMENT

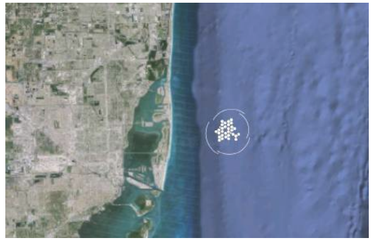
SITE PLAN

The whole community is located just a mile off the shore of Long Island, near Jamaica Bay. The idea is that this community can be placed off the shore of nearly any city/continent that is pron to climate change, and more specifically, sea-level rise. These communities can be as big as necessary to accommodate the population of the area is meant to serve and can be easily fabricated and moved where it is required.

This project in particular is meant to serve the greater Tri-State area, and North, East coast, where we have seen the effects of sea-level rise and climate change exceeded, for example Hurricane Sandy, and where a lot of people live along the coast lines that we are soon going to loose due to this epidemic.



Floating Community | *Los Angeles, California*



Floating Community | *Miami, Florida*

Floating Community | *New Orleans, Louisiana*

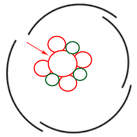
Site Plan | 1:400

DESIGN DEVELOPMENT

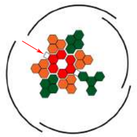
MASTER PLAN

This city/community in particular deals with a lot of strategies to not only accommodate a mass number of people but sustain such amount and even help sustain populations on the main land. Sustainable features such as wind and wave turbines, aquaculture and agriculture, oyster farming, solar panel farms, can all not only help serve this community but the greater community inland as well.

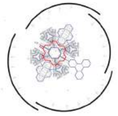
The idea is to be a complete self-sustained community that breaches the norm of building on land--land in which we are running out of--and provide shelter and a safe place to live for people affected by the effects of mankind, climate change.



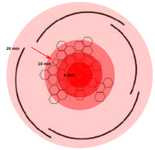
Concept Layout Diagram



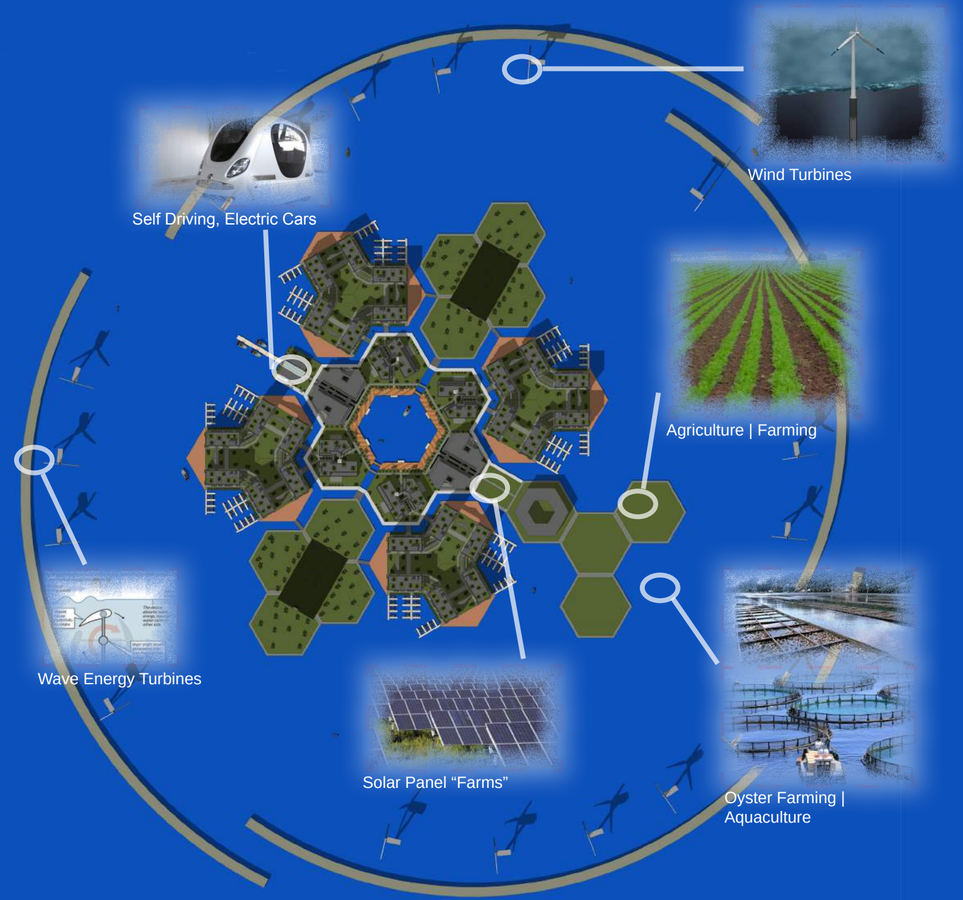
Zone Layout Diagram



Pedestrian vs Vehicular Diagram



Walking Diagram

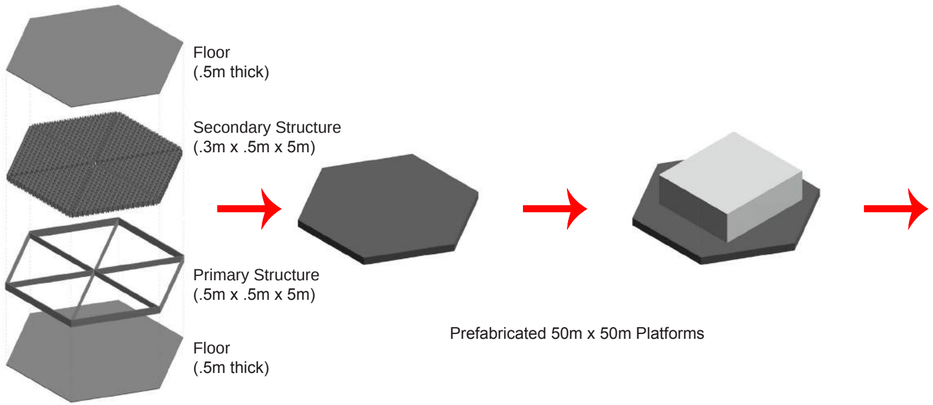


Masterplan | 1:100

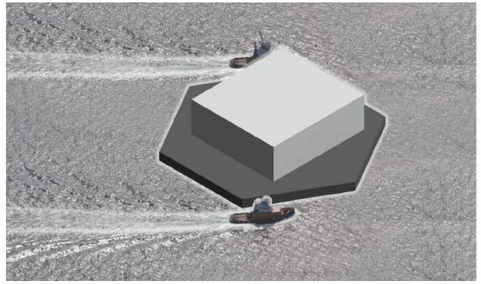
DESIGN DEVELOPMENT

PLATFORM FABRICATION

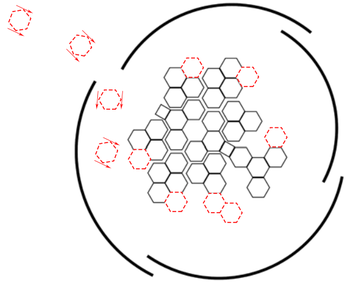
50M SIDE(S), TOW INTO PLACE PLATFORMS MAKE UP THE ENTIRTY OF THE COMMUNITY FOR EASY CONSTRUCTION AND EXPANDABILITY



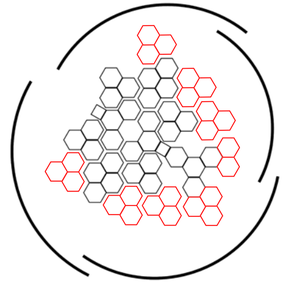
Prefabricated 50m x 50m Platforms



Tow into Place

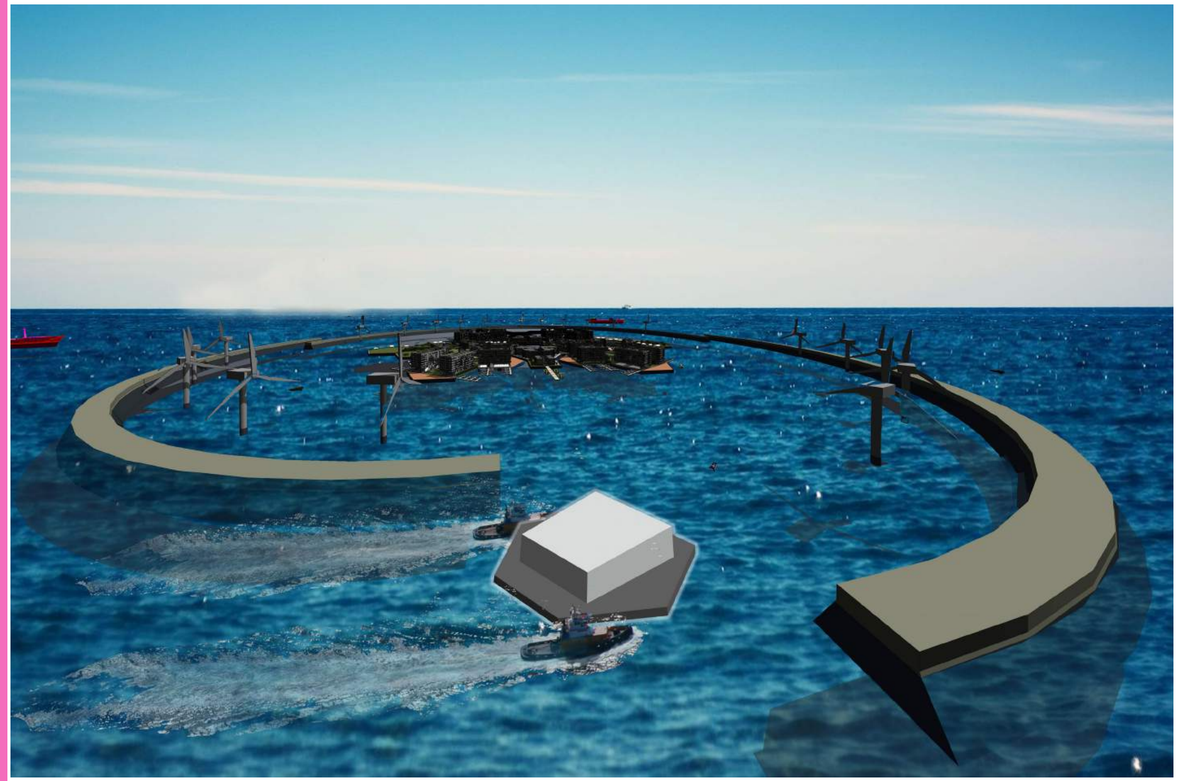


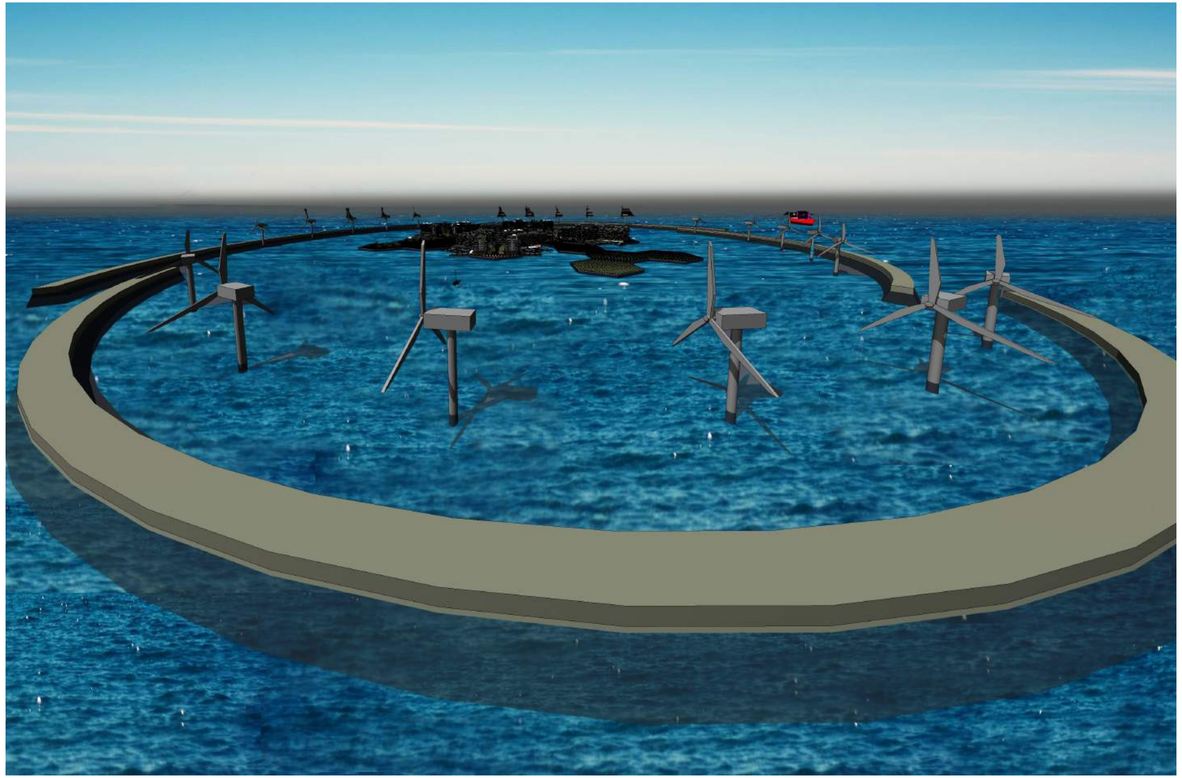
Exapandability



Max Capacity Diagram

DESIGN DEVELOPMENT





DESIGN DEVELOPMENT

Apartment Complex

Public Program:

_Lobby
_Cafe
_Small Market
_Daycare
_Gym
_Laundry Rooms
_Roof/Terrace Gardens
_Waterfront Access
_Communal Lawn

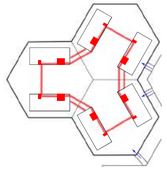
Private Program:

_1 Bedroom Apartments
_2 Bedroom Apartments
_3 Bedroom Apartments
_Lounge(s)/Breakout Rooms

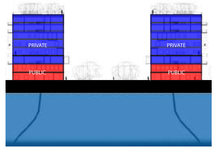
	One Bedroom (1-2 persons)	Two Bedroom (2-4 persons)	Three Bedroom (3-6 persons)
Third Floor (x6)	1	4	0
Fourth Floor (x6)	0	3	1
Fifth Floor (x6)	1	2	1
Sixth Floor (x6)	1	2	1
Seventh Floor (x6)	1	1	2
Eighth Floor (x6)	1	4	0
Total Apartments	**5**	**16**	**5**
Total People	**5-10**	**32-64**	**15-30**

***312-624 People Per Apartment Complex**

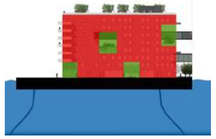
***1250-2500 Total Population**



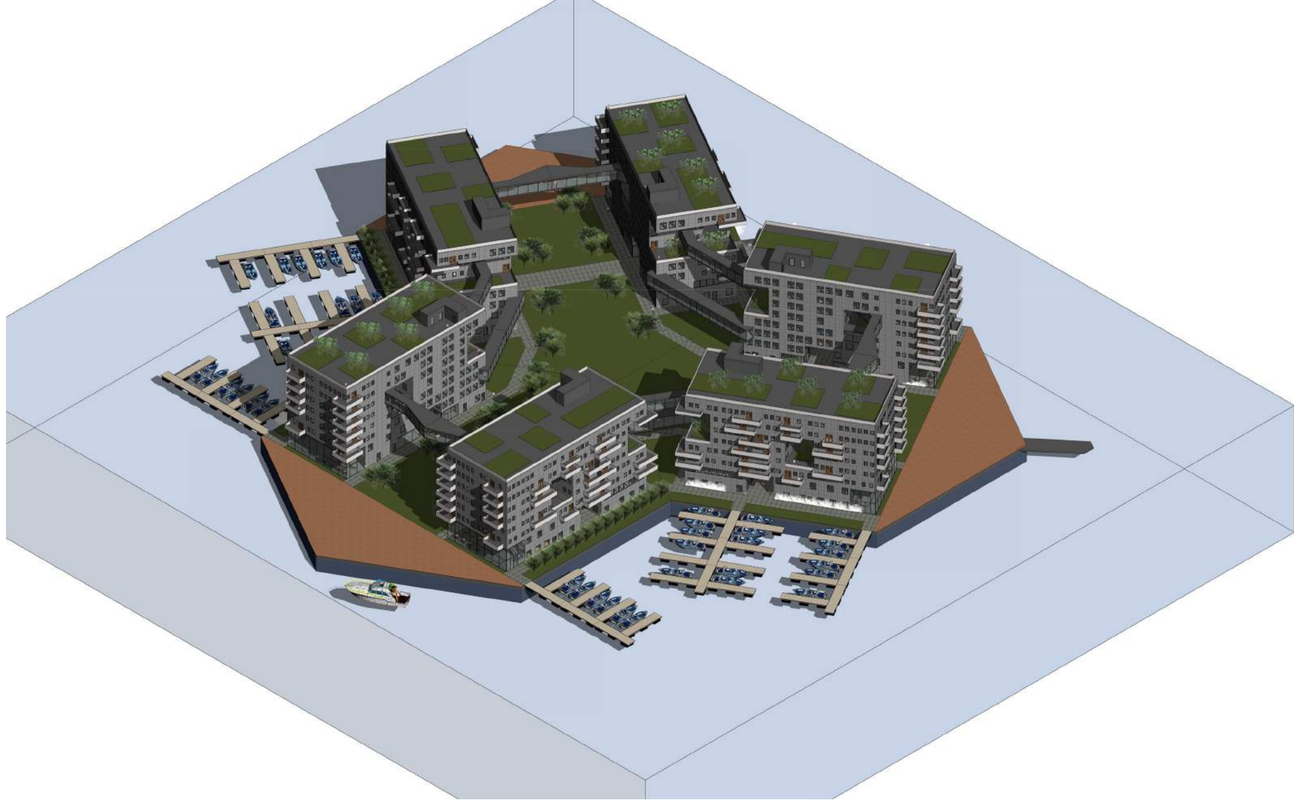
Circulation Diagram



Public / Private Diagram



Solid / Void Diagram



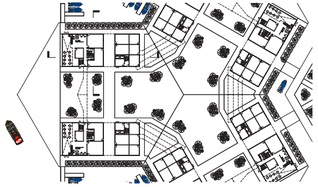
Cross Elevation | 1/16"=1'-0"

Cross Section | 1/16"=1'-0"

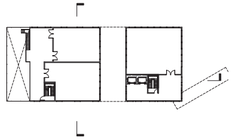
Longitudinal Elevation | 1/16"=1'-0"

Longitudinal Section | 1/16"=1'-0"

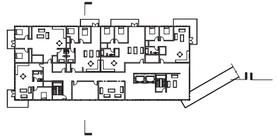
DESIGN DEVELOPMENT



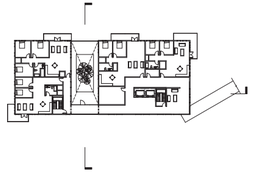
Ground Floor Plan | 1/16”=1’-0”



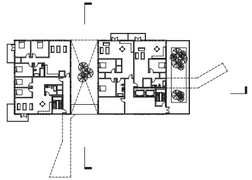
2nd Floor Plan | 1/16”=1’-0”



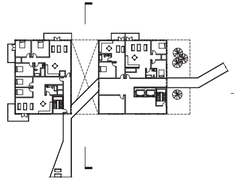
3rd Floor Plan | 1/16”=1’-0”



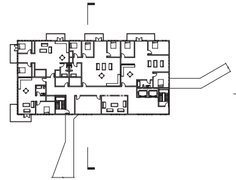
4th Floor Plan | 1/16”=1’-0”



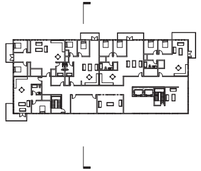
5th Floor Plan | 1/16”=1’-0”



6th Floor Plan | 1/16”=1’-0”



7th Floor Plan | 1/16”=1’-0”



8th Floor Plan | 1/16”=1’-0”

DESIGN DEVELOPMENT

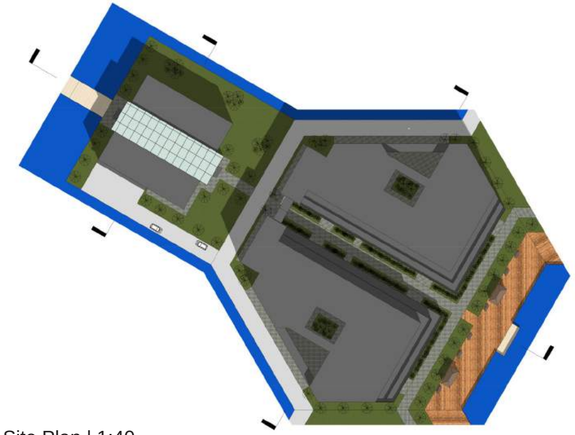
Downtown/Entry Platforms

Public Program: (Ground Floor)

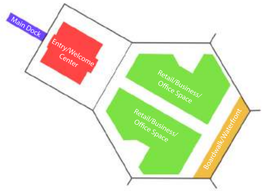
_Restaurants
_Retail Shops
_Small Businesses
_Waterfront Access
_Kiosk Stands
_Cafe's
_Markets
_Multipurpose Rooms/Lounges

Private Program: (Second-Fourth Floors)

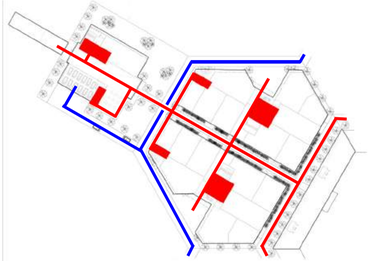
_Office Spaces
_Rooftop Balconies/Gardens



Site Plan | 1:40

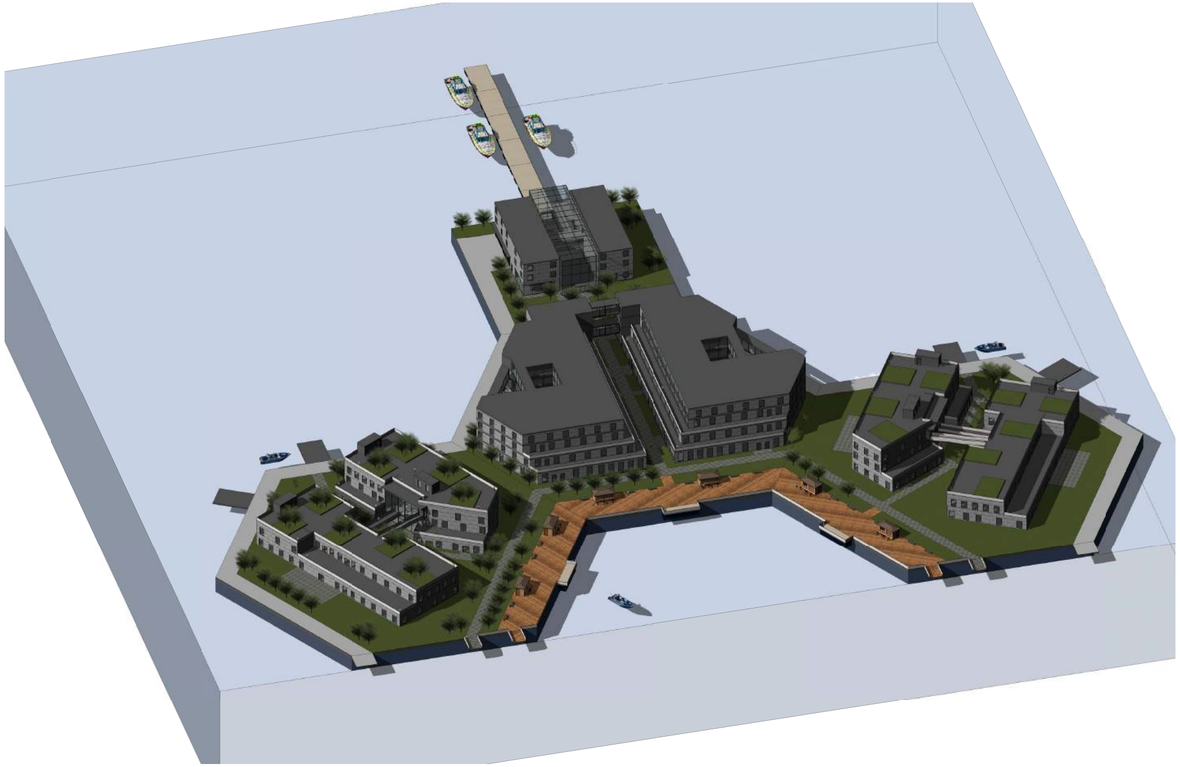


Program Diagram



Pedestrian / Vehicular Circulation

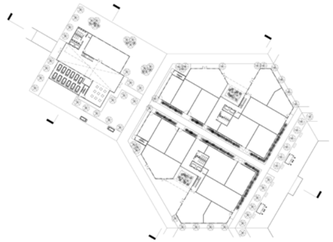
Public / Private Diagram



Longitudinal Section | 1/16"=1'-0"

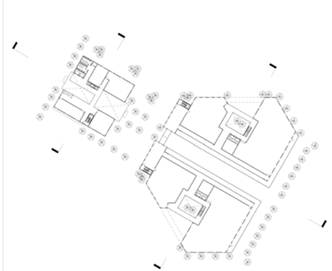
Cross Section [Downtown Platform] | 1/16"=1'-0"

DESIGN DEVELOPMENT

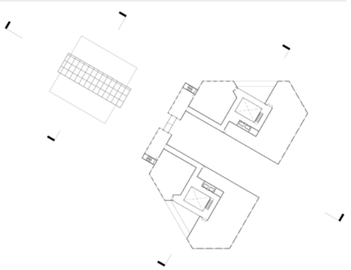


Ground Floor Plan | 1/32”=1’-0”

2th Floor Plan | 1/32”=1’-0”



3th Floor Plan | 1/32”=1’-0”



4th Floor Plan | 1/32”=1’-0”

FINAL DESIGN

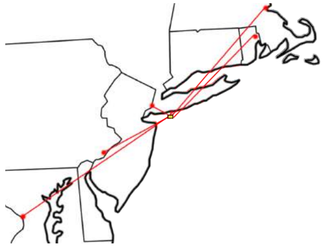
FINAL DESIGN

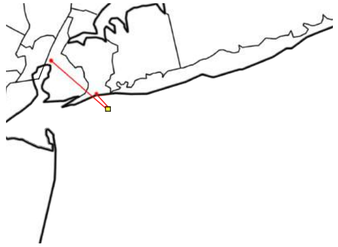
Project Statement

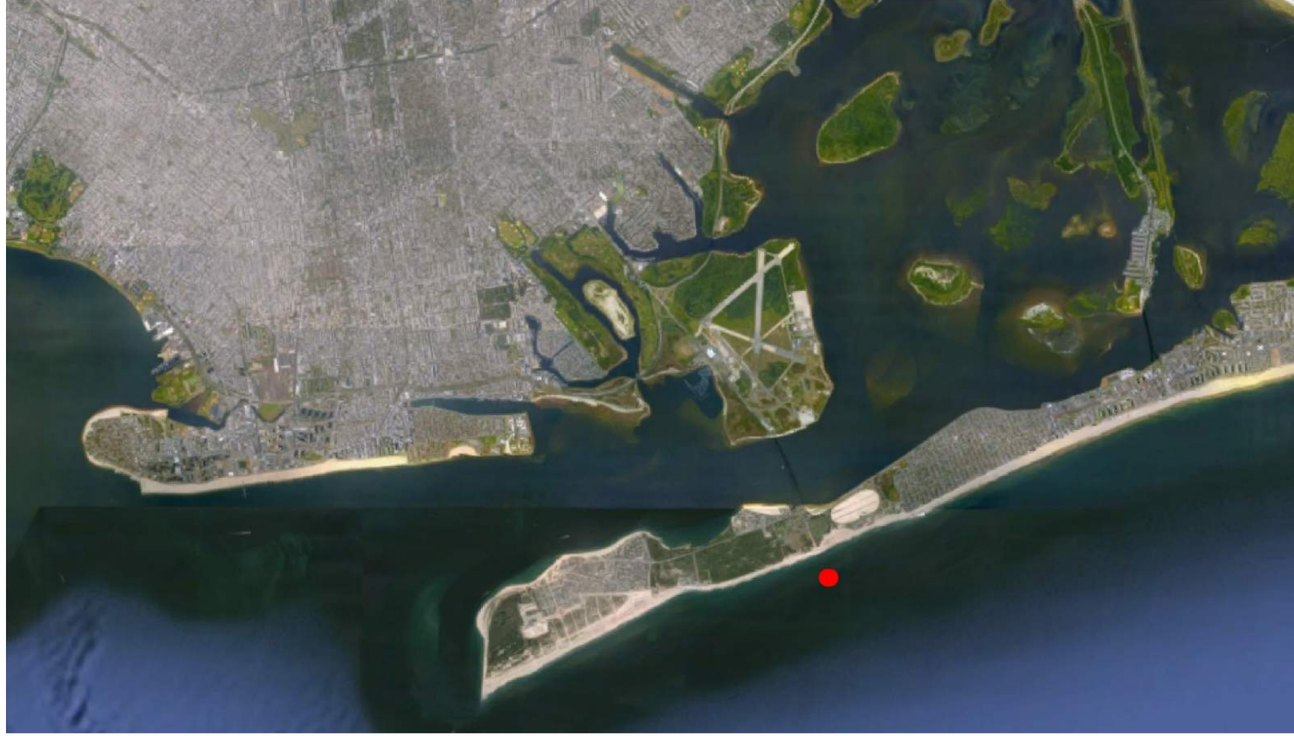
Land is running out and waters levels are increasing. In just 20 years, we plan to see an increase in population by almost 2 billion people. So where are these people going to live, eat, work, play? The best way to save the little habitable land we live on today is to simply not build on it. The idea is to start building out to sea, a place that is much easier and more feasible then living in the air or space. These structures would provide a place of comfort, a place of living, a place of learning and a place of sustainability in which we, as a population, can thrive.

Many regions around the world would benefit from a community like this, as a lot of coastal regions are experiencing extreme flooding and damage done to personal property. Being such a new, outrageous almost, idea, it is necessary to show the world that this is feasible and that everyday living in this floating community will be no different from the way one lives now in, lets say, a typical urban environment.

New York City, and much of the tristate, northern Atlantic region, experienced one of the most deadliest and most destructive hurricanes in history back in 2012, Hurricane Sandy. FEMA completely underestimated the power of the hurricane, and the people/structures at risk if such a natural disaster did occur. As we continue to do more and more damage to our planets ecosystem, we are only increasing our risks of such an disastrous event to happen again. Moving off the land and onto the ocean would not only help the flooding risks of living on the coast (or near it) but would have the opportunity to help save some of the coastal regions we have left.







The site is located off the coast of New York and New Jersey in the North East of the United States. It is located approximately **12 miles** from New York City and just **1 mile** off the coast of the Rockaway Peninsula. It is approximately **180 miles** from Boston, **224 miles** from Washington, D.C., **102 miles** from Philadelphia, and **140 miles** from Providence.

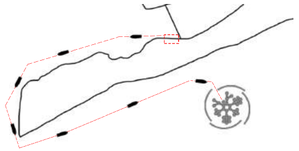
The ocean depth one mile off the coast of Rockaway, Queens is approximately 20m to 30m being made up of mostly gravel, sand, and rocks. This is ideal for anchoring the hexagonal platforms to the ocean floor. Currents tend to run from the South-West up along the coast towards the North-East.

FINAL DESIGN

SITE PLAN

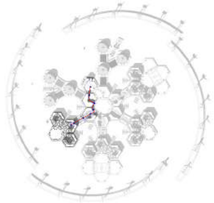
The whole community is located just a mile off the shore of Long Island, near Jamaica Bay. The idea is that this community can be placed off the shore of nearly any city/continent that is pron to climate change, and more specifically, sea-level rise. These communities can be as big as necessary to accommodate the population of the area is meant to serve and can be easily fabricated and moved where it is required.

This project in particular is meant to serve the greater Tri-State area, and North, East coast, where we have seen the effects of sea-level rise and climate change exceeded, for example Hurricane Sandy, and where a lot of people live along the coast lines that we are soon going to loose due to this epidemic.



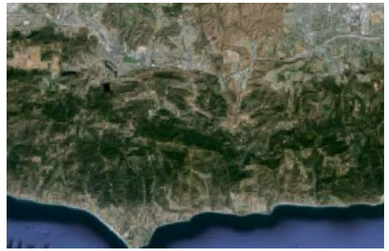
Ferry Access | Distance: 9 miles
Duration: 15 minutes

Distance From Shore (1m) | Community Diamter (1mi)

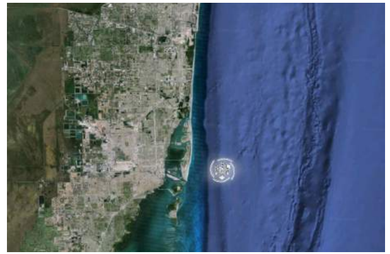


Vignette Location Diagram

Site Plan | 1:400



Floating Community | *Los Angeles, California*



Floating Community | *Miami, Florida*

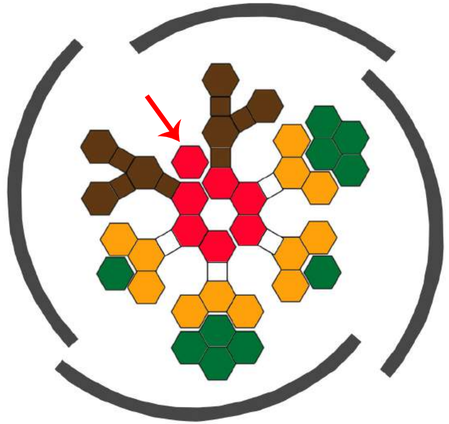
Floating Community | *New Orleans, Louisiana*

FINAL DESIGN

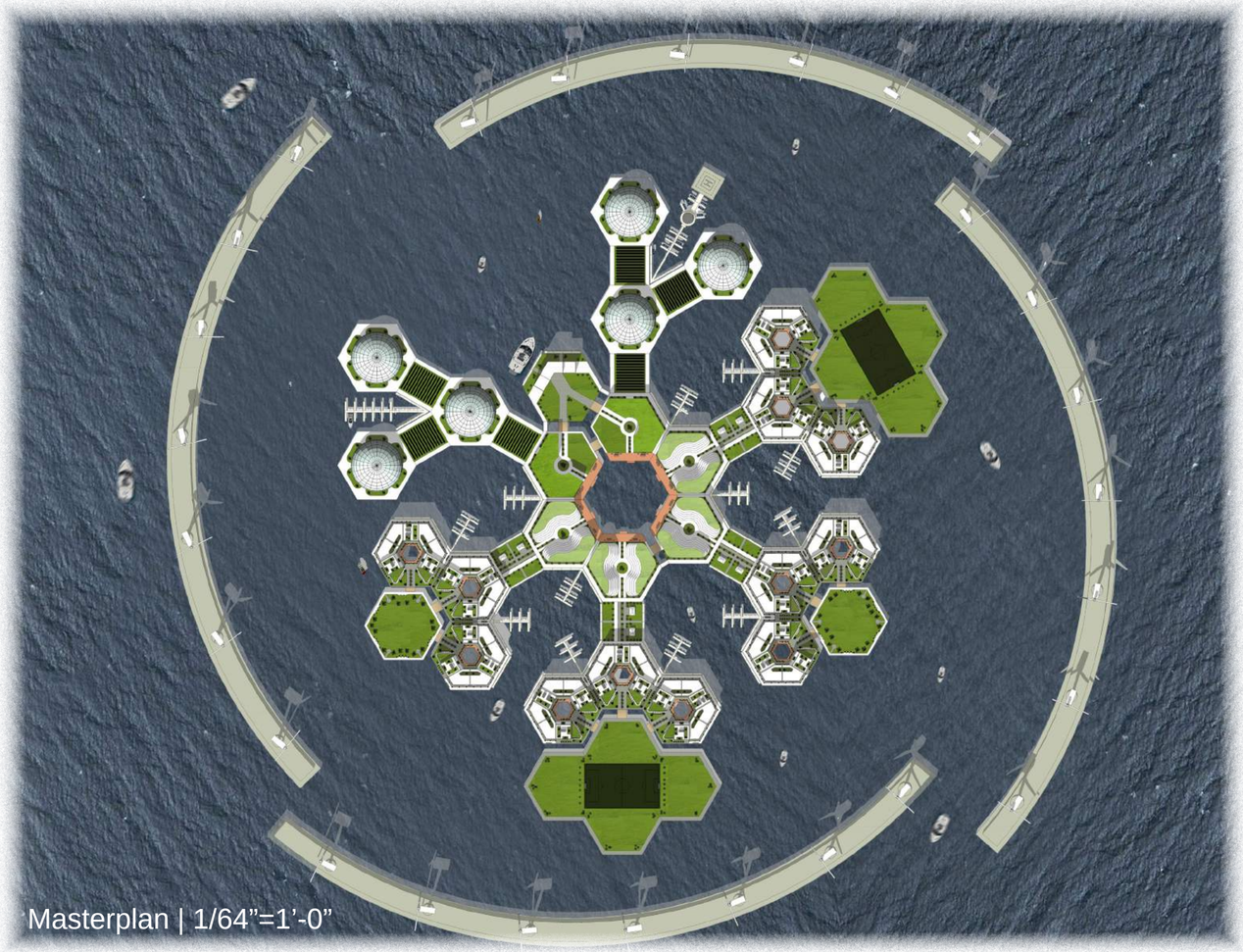
MASTER PLAN

This city/community in particular deals with a lot of strategies to not only accommodate a mass number of people but sustain such amount and even help sustain populations on the main land. Sustainable features such as wind and wave turbines, aquaculture and agriculture, oyster farming, solar panel farms, can all not only help serve this community but the greater community inland as well.

The idea is to be a complete self-sustained community that breaches the norm of building on land--land in which we are running out of--and provide shelter and a safe place to live for people affected by the effects of mankind, climate change.



Branches | Downtown/Entry
Residential
Sustainable (farming/ aquaculture)
Public Green Space



Masterplan | 1/64”=1’-0”

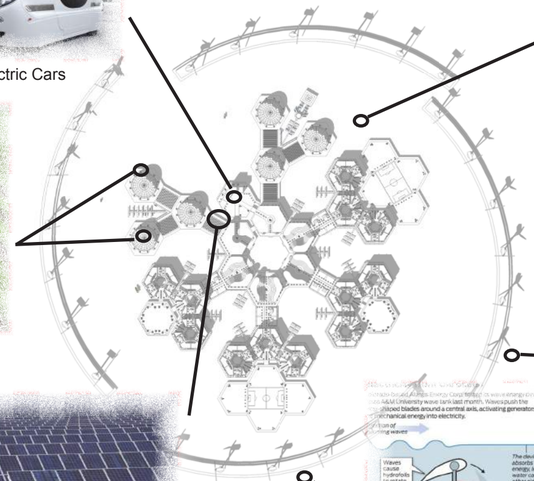
FINAL DESIGN

Sustainable Features

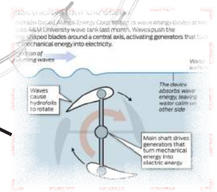
Self Driving, Electric Cars

Oyster Farming | Aquaculture

Agriculture | Farming

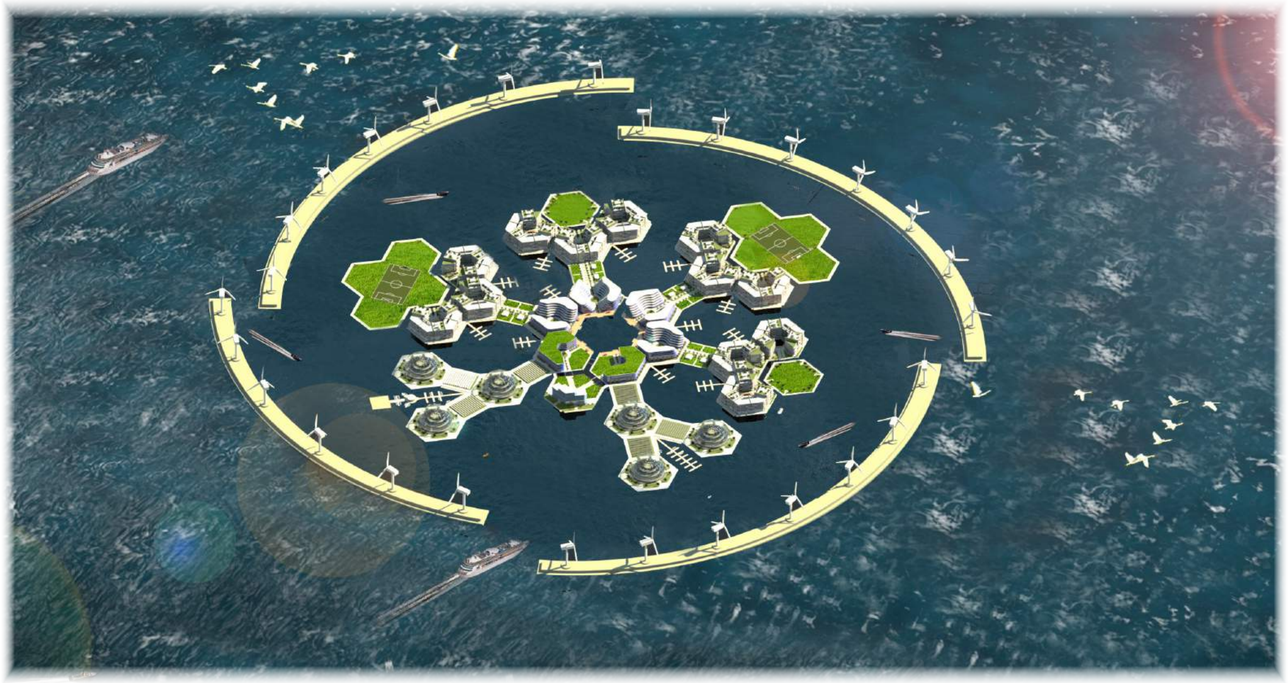


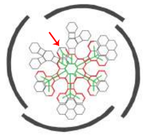
Solar Panel “Farms”



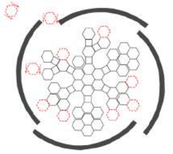
Wave Energy Turbines

Wind Turbines

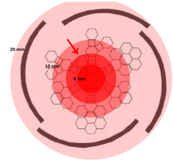




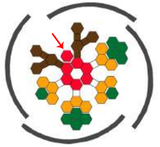
Vehicular | Pedestrian
Circulation



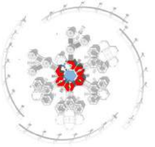
Expandability Diagram



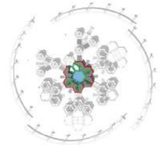
Walking Diagram



Branches | Downtown/Entry
Residential
Sustainable (farming/ aquaculture)
Public Green Space



Downtown | Office Sapce
Small/Large Businesses
Retail Commercial Space
Shops/Markets
Local Businesses
Rentable Apartment Spaces

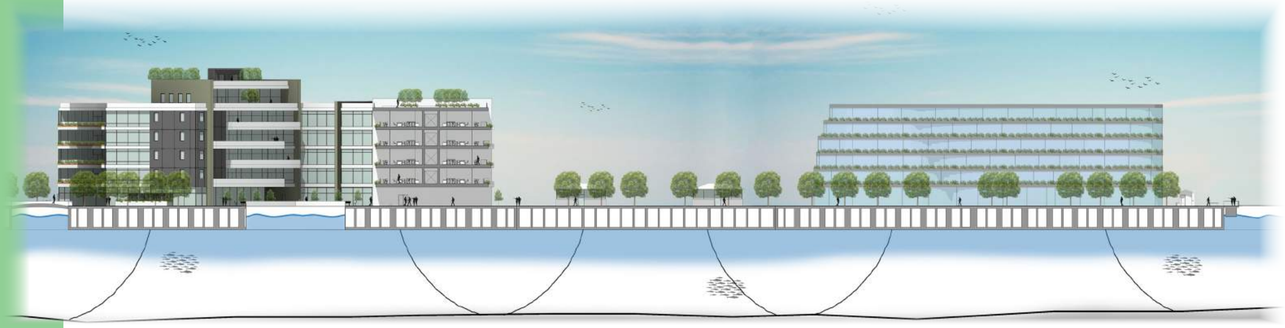


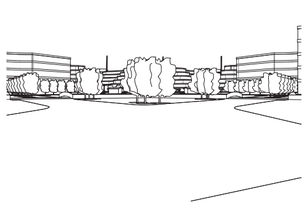
Downtown Circulation | Pedestrian v Vehicular

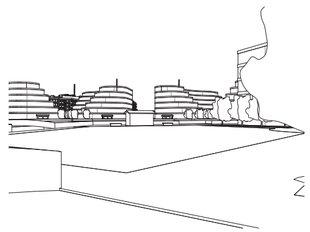
FINAL DESIGN

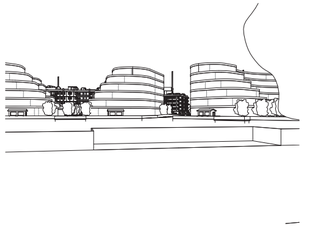
COMMUNITY WALK-THROUGH

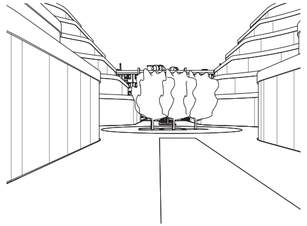
As you walk through the community you will be indulged in full water front views, surrounded by greenery, shops and lively area. Everything in the approximately mile wide community is no more than a 10 minute walk, taking you from your private luxury apartment to a lively downtown. You will find yourself indulged in fine living with the ease of sustainble practices.

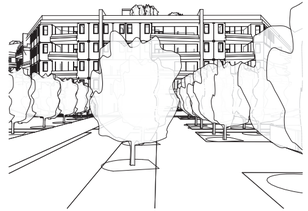












Apartment Complex

Public Program:

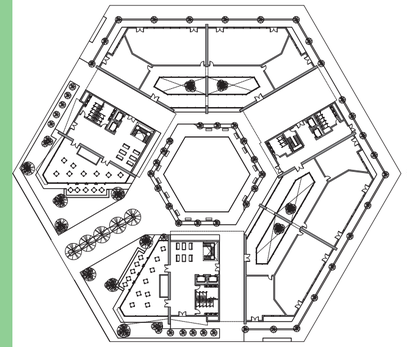
_Lobby
_Cafe
_Small Market
_Daycare
_Gym
_Laundry Rooms
_Roof/Terrace Gardens
_Waterfront Access
_Communal Lawn

Private Program:

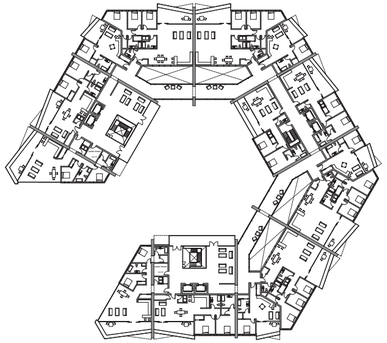
_1 Bedroom Apartments
_2 Bedroom Apartments
_3 Bedroom Apartments
_Lounge(s)/Breakout Rooms

Unit Demographics	One Bedroom (1-2 persons)	Two Bedroom (2-4 persons)	Three Bedroom (3-6 persons)
Typical Floor (x12)	4	6	4
Penthouse Floor (x3)	0	0	2
Total Apartments	**48**	**72**	**54**
Total People	**48-96**	**144-168**	**162-324**

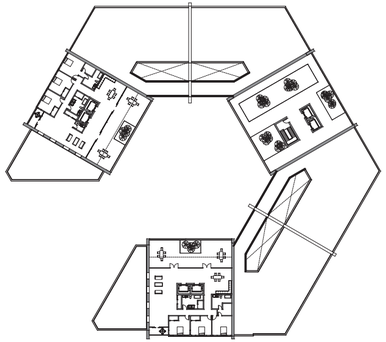
***354-588 People Per Apartment Complex**
***1,400-2,350 Total Population**



Ground Floor Plan
1/8”=1’-0”

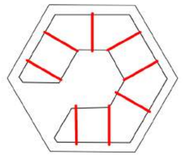


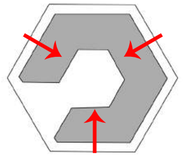
Typical Floor Plan
1/8”=1’-0”

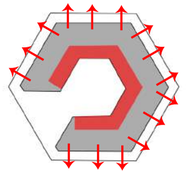


Penthouse Floor Plan
1/8”=1’-0”

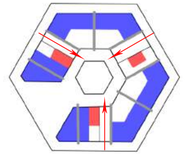
Typical Housing Neighborhood Site Plan | 1/32”=1’-0”







Circulation/Views Diagram



Ground Floor Diagram |
Public Program
Vertical Circulation

FINAL DESIGN

FINAL DESIGN

APPENDIX

BUILDING CODES

The following are a few examples of New York State Building Codes that will prove useful when designing structures within the floating community. They deal with regulations in building heights, building materials, flood-resistant construction, and so on. For the housing units proposd on this Floating Community--apartment building, hotel, individual housing, doromtories--there are different requirements and codes for each.

All of these codes are gathers from NYC.GOV:

Chapter 5: Building Height and Areas

This is where the allowable building height, for a specific type of construction (i.e. TYPE I, TYPE II, etc.) are defined. It also goes over the allowable area (total floor area, total gross area, etc.) that each building is allowed to occupy on the site.

The type of buildings that the housing blocks fall under are Type 1 (Apartment Building, Group R-2), Type 2 (Hotel/Dormitories, Group R-1), and Type 3 (Individual Housing, Group R-3). Each Construction Type is explained on the following page.

		TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
GROUP	HEIGHT (feet) / HEIGHT (S)	UL	160°	65	55	65	55	65	50	40
R-1	S	UL	UL	6	NP	6	NP	6	NP	NP
	A	UL	UL	UL	NP	24,000	NP	20,500	NP	NP
R-2	S	UL	UL	6	NP	6	3	6	NP	NP
	A	UL	UL	UL	NP	24,000	5,600	20,500	NP	NP
R-3	S	UL	UL	6	3	6	3	6	3	3
	A	UL	UL	17,500	10,500	14,700	5,600	30,000	8,400	5,500

Chapter 6: Type of Construction

This section defines the type of construction (talked about above) and the classifications for each of those types. Along with that, it goes over fire separation, allowable building material regulations.

Type 1: Fire-Resistive

_High-rises usually defined as buildings more than 75 feet tall

_Concrete and protected steel (steel coated with a fire-resistant material, most often a concrete mixture), and are designed to hold fire for an extended amount of time in order to keep the fire at bay in the room and/or floor of origin.

Type 2: Non-Combustible

_New buildings and remodels of commercial structures. The walls and roofs are constructed of non-combustible materials.

_Walls are usually reinforced masonry or tilt slab, while roofs have metal structural members and decking.

Type 3: Ordinary

_New or old construction, having non-combustible walls and a wood roof.

_Most common types of roof systems in a commercial setting include parallel cord truss and panel ized roof members.

_Newer buildings will have lightweight roof systems supported by reinforced masonry or tilt slab

BUILDING CODES

Chapter 10: Means of Egress

This chapter includes design, construction and arrangement of means of egress components required in order to provide a safe means of egress from said structures. General regulations throughout this docu ment include:

_Ceiling height should not be less than 7ft 6in

_Walking surfaces shall have a slip-resistant surface and be securely attached

_Exits include exterior exit doors at the levelof exit discharge, vertical exit enclosures, exit passageways, exterior exit stairways, exterior exit ramps and horizontal exits, but do not include access stairs, aisles, exit access doors opening to corridors, or corridors

_Width of means of egress in inches shall not be les than the total occupant load served by the means of egress multiplied by 0.3 inches per occupant for stairways and by 0.2 inches per occupant for other egress componenets

TABLE 1004.1.1
MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	FLOOR AREA IN SQ. FT. PER OCCUPANT
Agricultural building	300 gross
Aircraft hangars	500 gross
Assembly	
Gaming floors (keno, slots, etc.)	11 gross
Exhibit gallery and museums	30 net
Assembly with fixed seats	See Section 1004.7
Assembly without fixed seats	
Concentrated (chairs only—not fixed)	7 net
Dance floor	5 net
Dance floor (ballroom)	10net
Standing space	5 net
Unconcentrated (tables and chairs)	15net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas	100 gross
Courtrooms – other than fixed seating areas	40 net
Day Care	
Age under 6 months	50 net
Age 6 months – 2 years	40 net
Age 2 years – 6 years	30 net
Age above 6 years	50 net
Dormitories	50 gross
Educational	
Classroom area	20 net
Shops and other vocational room areas	50 net
Kindergarten, and pre-kindergarten	30 net
Exercise rooms	50 gross
Gymnasiums	15 net
H-5 Fabrication and manufacturing areas	200 gross
Industrial areas	100 gross
Institutional areas	
Inpatient treatment areas	240 gross
Outpatient areas	100 gross
Sleeping areas	120 gross
Kitchens, commercial	200 gross
Library	
Reading rooms	50 net
Stack area	100 gross
Locker rooms	50 gross
Mercantile	
Areas on other floors	60 gross
Basement and grade floor areas	30 gross
Storage, stock, shipping areas	300 gross
Parking garages	200 gross
Passenger terminal	
Baggage claim	20 gross
Baggage handling	300 gross
Concourse	100 gross
Passenger terminal or platform	1.5 X C*
Waiting area (Standing)	15 gross
Waiting areas (Seated)	5 net
Residential	200 gross within dwelling units

Chapter 19: Concrete Construction

This section goes into the codes and regulations for building/constructing with concrete as a main building material.

Chapter 22: Steel Construction

This section goes into the codes and regulations for building/constructing with steel as a main building material.

Chapter 23: Wood Construction

This section goes into the codes and regulations for building/constructing with wood as a main building material.

Appendix G: Flood-Resistant Construction

The purpose of this section is to, not only define specific flood hazard areas but, more over, minimize pulic and private losses due to flooding conditions in those specific flood hazard areas. It goes into detail about administration, permit and inspection requirements, certificate of occupancy, etc.

These are just a few of some of the building codes in the New York area that should be considered throughout the design process of this project. Along with building codes many environmental regulations, especially in this case with building on the water, should be highly considered. The New York State Coastal Management Program has defined a densely packed dissertation that details the specifics for building along or adjacent to coastal regions in New York State. Some of these policies are listed in the following section.

ENVIRONMENTAL IMPACT POLICIES

The Coastal Management Program has provided a means for improving this situation by describing in this document the forty-four coastal policies with which all State agency actions must be consistent. Generally, the policies fall under three headings: promotion of beneficial use of coastal resources; prevention of their impairment; and management of major activities substantially affecting numerous resources. The criteria embodied in these policies require all agencies to take into account the interrelationships that exist or should exist in the coastal area. (DOS.NY.GOV)

The following are a few examples of some of these coastal policies:

Policy 2

Facilitate the sitting of water dependent uses and facilities on or adjacent to coastal waters

Policy 7-8

Significant coastal fish and wildlife resources will be protected, preserved, and, where practical, restored so as to maintain their viability as habitats

Policy 9

Expand recreational use of fish and wildlife resources in coastal areas by increasing access to existing resources, supplementing existing stocks, and developing new resources

Policy 10

Further develop commercial finfish, shellfish and crustacean resources in the coastal area by encouraging the construction of new, or improvement of existing on-shore commercial fishing facilities, increasing marketing of the State's seafood products, maintaining adequate stocks, and expanding aquaculture facilities.

Other sections within this statement could also prove useful when designing the community:

Section 3: Coastal Boundaries

Goes through the boundary criteria, special accommodations, and New York State Coastal Area definitions.

Section 5: Coastal Issues

Defines the development, fish and wildlife, flood and erosion hazards, public/recreational areas, agriculture, energy, water resources, etc., all within the coastal areas of New York State.

Section 9: Special Federal Program Requirements

Introduces national and federal procedures for dealing with coastal regions within the United States, including, but not limited too, recreational/transportational facilities, general criteria for building along or adjacent to the coast, and types of regional uses.

PRECEDENTS

Two main precedents I looked at were Masdar City in the United Arab Emirates and Linked Hybrid in China. These two were good examples of communities that are self-sustaining, nearly zero-emission, and connected directly to the surrounding cities/regions. They both provided me with clear sustainable aspects that could easily be implemented into my design and community.

Masdar is a larger city, and one of the first zero-carbon, zero-emission city of its kind. They incorporate a lot of high-tech, sustainable aspects, such as the layout of the city itself, the design of specific buildings within the city, self-driving electric cars, connection to the Dubai, the largest nearby city, and many other. I found this project very helpful in organizing my city layout and will be even more helpful when designing my project itself.

Linked Hybrid project in Beijing, is a self-sustaining housing complex that is a 'city within a city'. Aspects of this complex that I found helpful is the layout of housing units as opposed to commercial programs, and of course the use of sustainable aspects such as materiality and geothermal energy.

Masdar City

Architects

Foster and Partners

Location

Abu Dhabi, United Arab Emirates

Area

6.0 sqkm

Project Year

2006-current

Masdar City

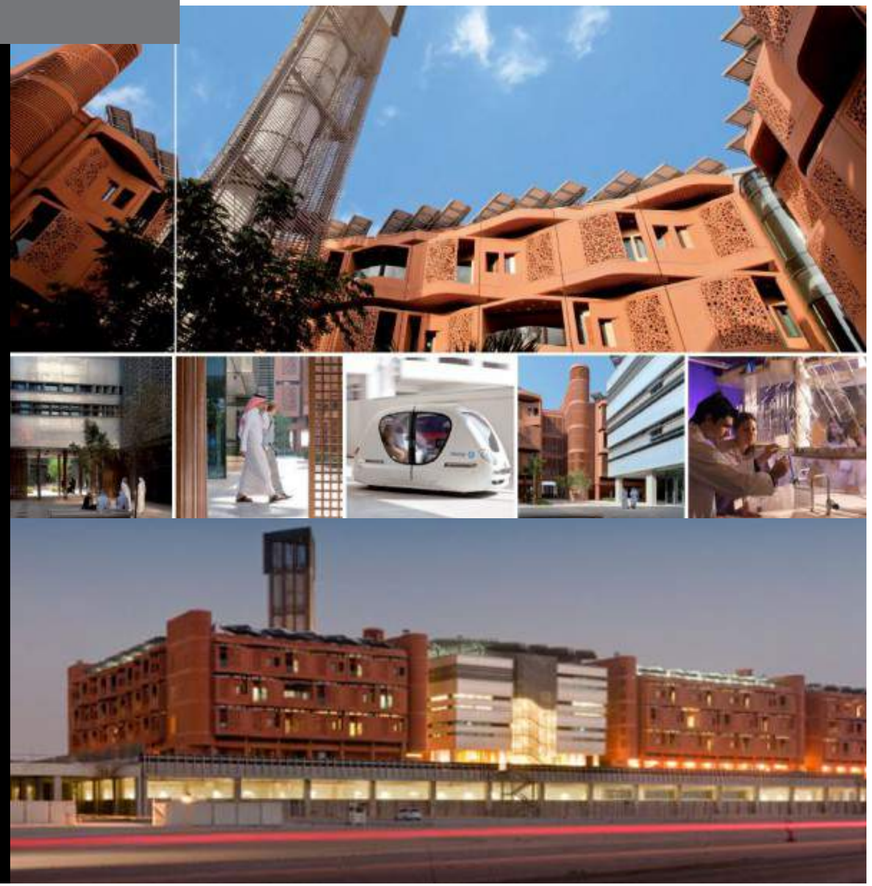
What Is Masdar?

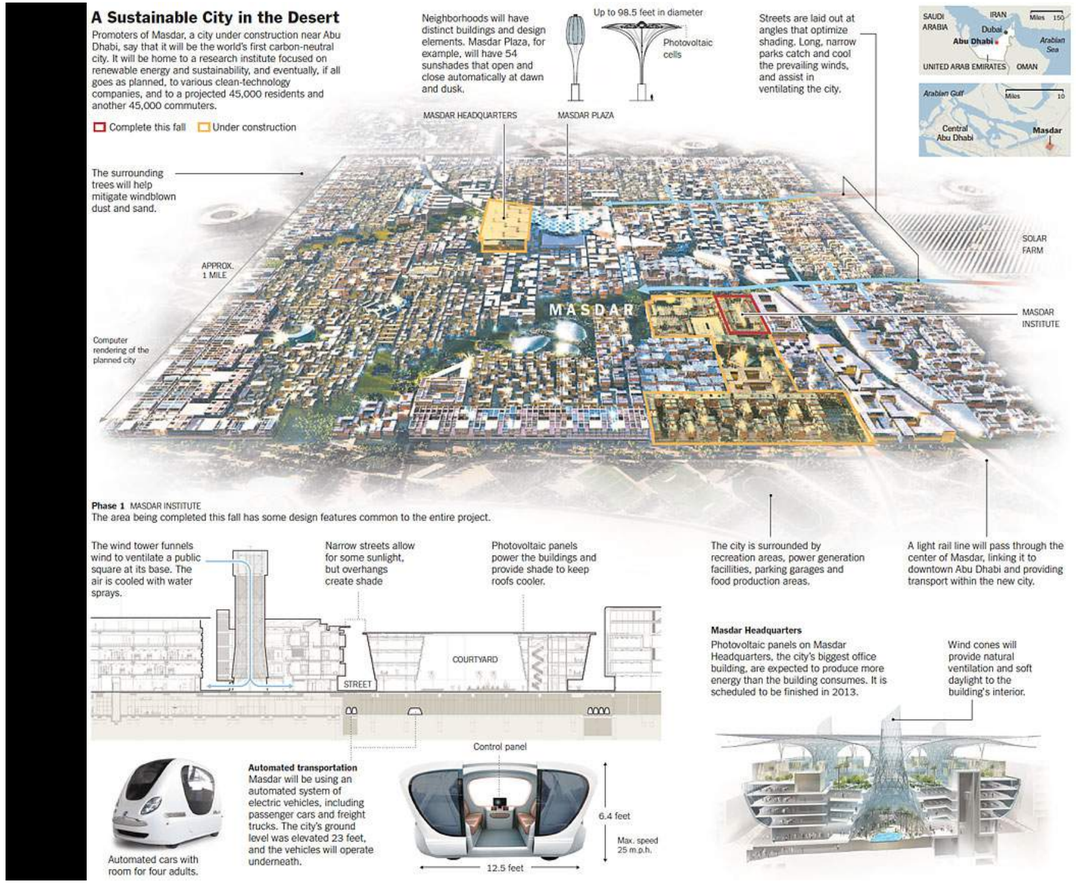
Vision

Make Abu Dhabi the preeminent source of renewable energy knowledge, development and implementation and the world's benchmark for sustainable development

Mission

To advance renewable energy and sustainable technologies through education, research and development, investment, commercialization and adaptation

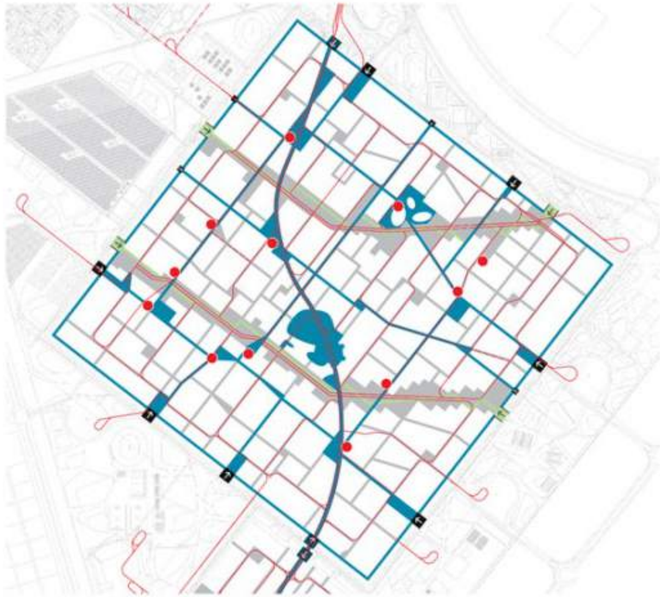




2 Review of masterplan and strategies
Movement structure

Proposed cycle route network

- Indicative pedestrian and cycle network
- PRT route
- PRT station with cycle hire and parking facilities close to cycle route
- Greenfingers
- City gateways
- City spine gateways
- Greenfinger gateways



Cycling network

Context

Cyclist's travel needs to be accommodated on podium streets, but cyclists travel at a different speed to pedestrians, which can be a cause of conflict. In mixed mode travel scenarios people need safe places to park their bicycles.

Wayfinding principles

_Legibility; Sustainability (changing travel behaviours).

Wayfinding issues and gaps

_Enabling cycling as an option
_Connecting the field and the city
_Need to integrate PRT with the cycle route network (cycle parking).

Wayfinding recommendations

To amplify –
_Legibility and connectivity: main cycle routes need to be layered over the main pedestrian circulation routes
_Changing travel behaviours: create a legible cycle path system that connects the City Ring, the Central Core, and connections through City Gateways to the Field.
_Need to increase cycle parking capacity at PRT stations close to cycle routes.

Masdar City

Some of its Buildings

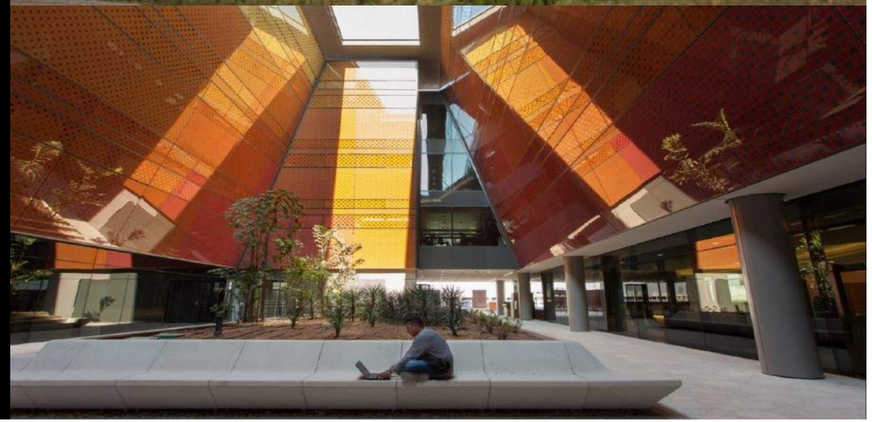
IRENA Global HQ

Rooftop solar photovoltaic panels generate more than 340,000 kilowatt-hours per year.

Incubator Building

Lies at the heart of the Masdar City development and is strategically located adjacent to Masdar Institute.

It is a hub for innovation and entrepreneurs, offering businesses of all sizes unique, convenient and flexible office solutions



Masdar City

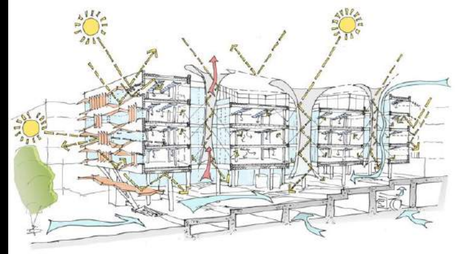
Some of its Buildings

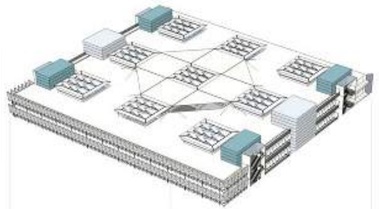
Siemens Building

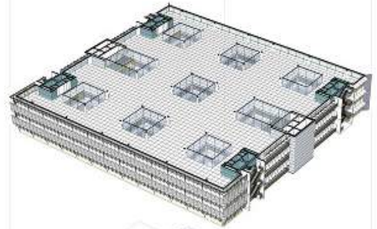
The structure meets the highest requirements for architecture, energy efficiency and equipment. It has the potential to reduce energy consumption by 45 percent and water consumption by 50 percent

Sets the standard in sustainable engineering, providing a 20,000-square-metre, Grade A office space. Flexible office floor plates, each of them 4,500 square metres, give tenants the ability to configure their space to suit their needs.

Nine atriums provide natural light to all workspaces within the building.







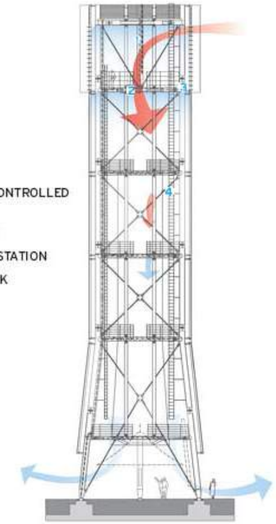
Masdar City

Some of its Buildings

Masdar Institute's Buildings

The buildings on campus consume: 95 percent less in domestic hot water energy, 75 percent less in cooling demand and 70 percent less in both electricity and potable water.

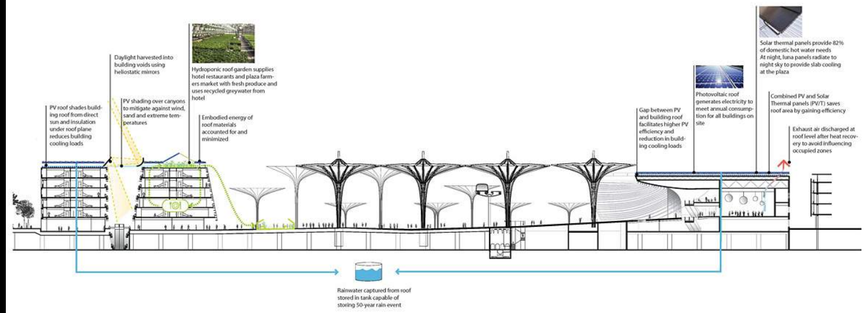
State of the art technologies: narrow corridors to smart shading and environmentally friendly materials, the campus reduces heat in the summer and uses solar panels to generate renewable energy.



SECTION – WINDTOWER

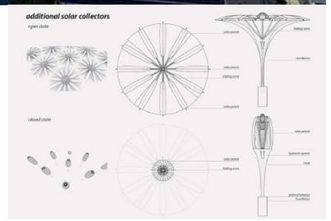
Masdar City Center

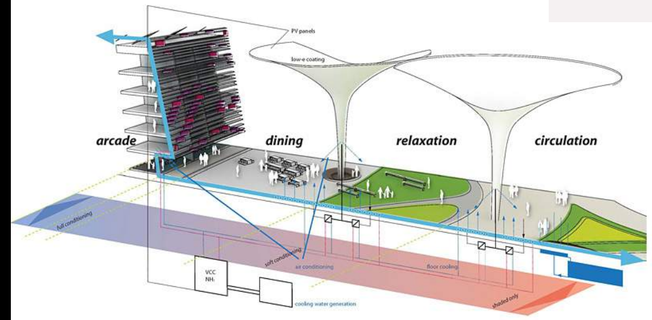
Masdar's city center includes a central plaza, five-star hotel, long stay hotel, convention center, entertainment complex as well as retail facilities. While most retail and public gathering spaces in the Middle East are located indoors and air-conditioned, LAVA wanted to create a distinct outdoor public plaza modeled after traditional European plazas. In order to maintain a comfortable atmosphere, the architects designed "solar umbrellas" to shade the plaza and keep the air moving through. Modeled after flowers, the solar umbrellas open up during the day and close up at night to keep the plaza cool.



Masdar City Center

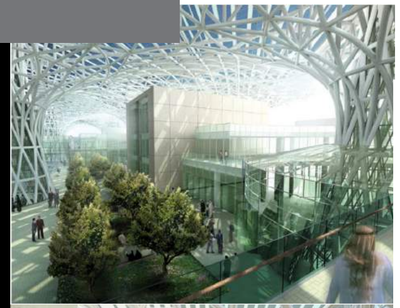
The city center includes many other integrated sustainable design features, such as adaptive building facades that can adjust and angle themselves to receive more or less sun, and wall surface materials that respond to changing temperatures and contain minimal embedded energy. The city center will also store water underground, have rooftop gardens to grow food, reuse organic waste, utilize interactive light poles, interactive and heat-sensitive technology, generate its own energy and be very water-efficient. An intriguing design for the desert that has all the components to be super sustainable city center for potentially the world's most sustainable city.

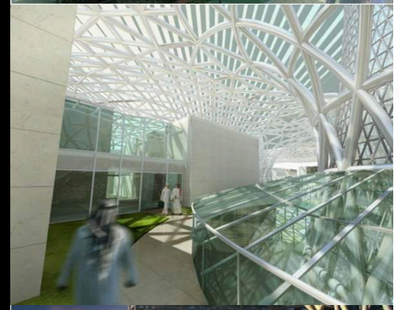


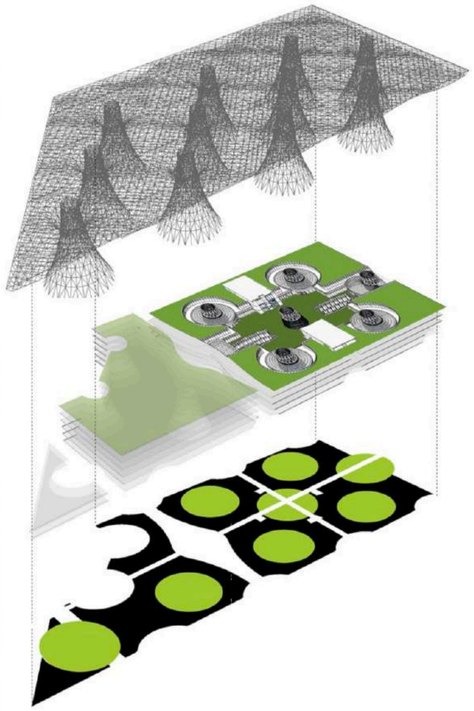


Masdar Headquarters

The project is the centerpiece of Masdar City, a zero-waste, carbon-neutral development outside Abu Dhabi in the United Arab Emirates. The seven-story, 134,662 square-meter structure, which includes landscaped areas, will accommodate commercial, retail and cultural uses. The building's form, sculpted in response to extensive environmental analysis, adapts the ancient science and aesthetics of Arabic wind towers, screens and other vernacular architecture, which emphasize natural ventilation, sun shading, high thermal mass, courtyards and vegetation.

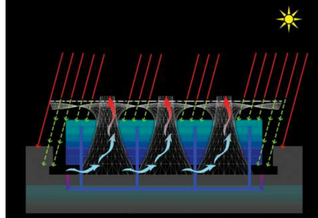


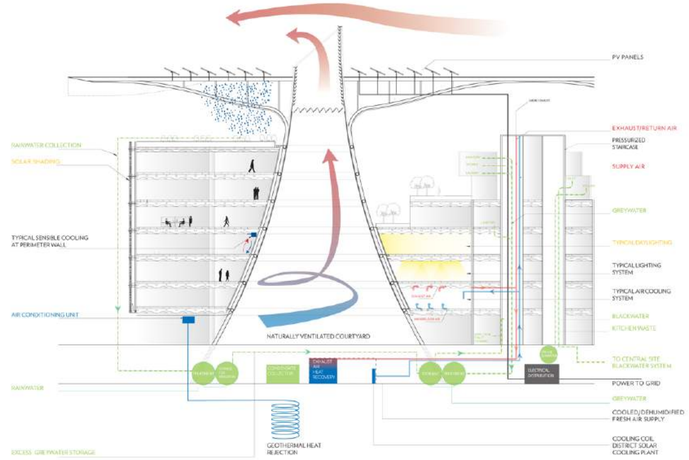


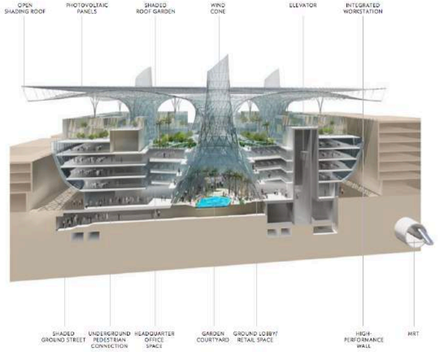


Masdar Headquarters

Masdar HQ's signature architectural feature is a collection of eleven wind cones which provide natural ventilation and cooling (drawing warm air up to roof level, where wind moves it away) and form oasis-like interior courtyards and/or flexible spaces, each with its own theme, at ground level. The cones also provide soft day lighting for the building's interiors.







Linked Hybrid

Architects

Steven Holl Architects

Location

Beijing, China

Program

750 apartments, public green space, commercial zones, hotel, cinemateque, kindergarten, Montessori school, underground parking

Client

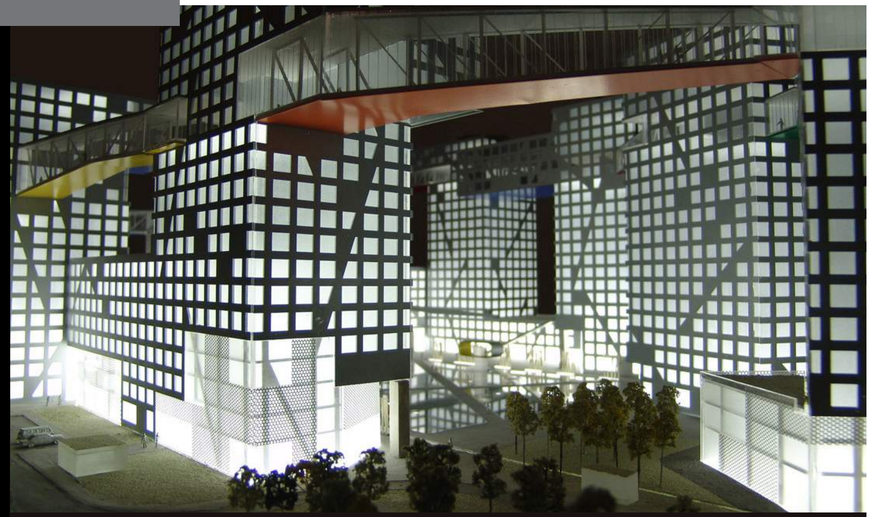
Modern Green Development Co., Ltd. Beijing

Area

220,000 sq

Project Year

2009



Linked Hybrid

"Open City within a City"

Aims to counter the urban developments in China

New porous urban space, inviting and open to the public from every side

Public spaces vary from commercial, residential, and educational to recreational

Linked Hybrid

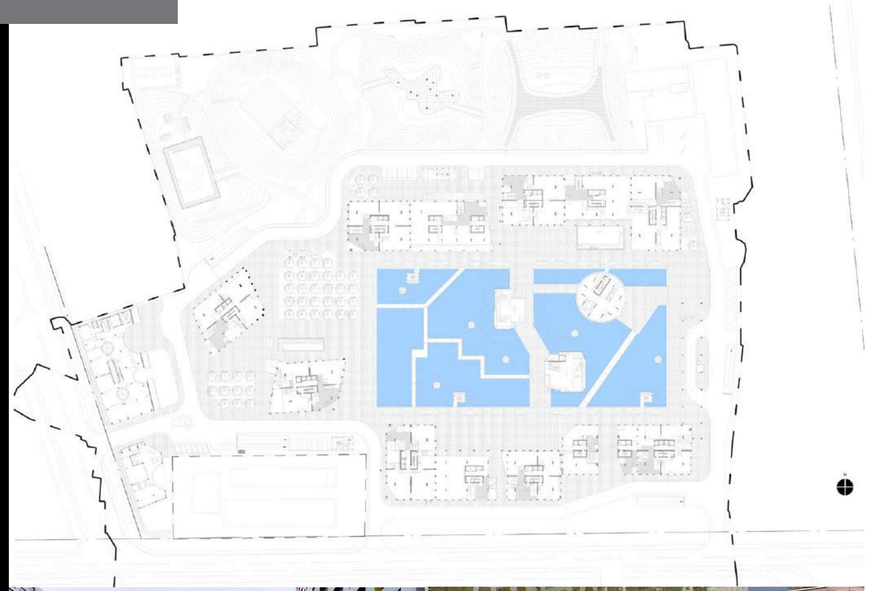
Ground Level

Offers a number of open passages for all people (residents and visitors)

“A micro-urbanism of small scale”

Shops activate the urban space surrounding the large reflecting pool

All public functions on ground level—restaurants, hotel, Montessori school, kindergarten, and cinema—have connections to the green spaces

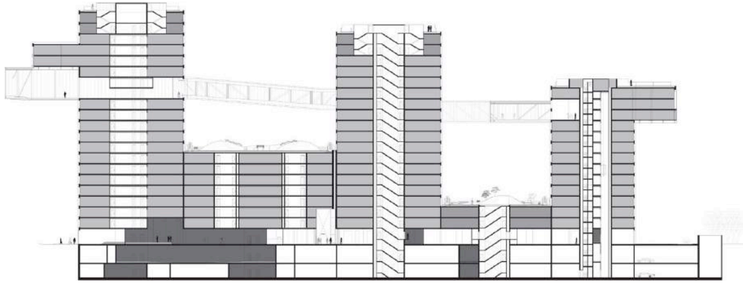


Linked Hybrid

Intermediate Level(s)

Public roofs gardens offer tranquil green spaces (lower buildings)

Private roof gardens are connected to penthouses (top of the eight residential towers)



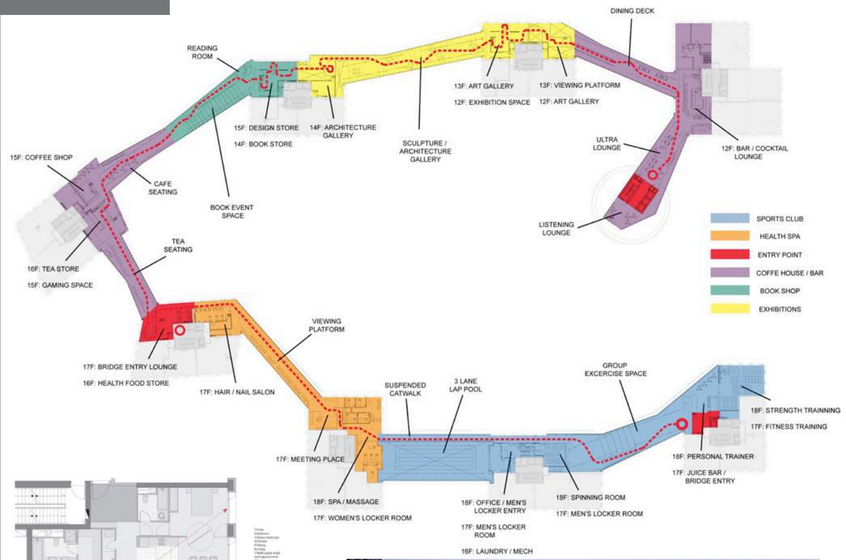
Linked Hybrid

Upper Level(s)

Multi-functional series of sky bridges with a swimming pool, a fitness room, a café, a gallery, auditorium, and a mini salon (12th to 18th floor)

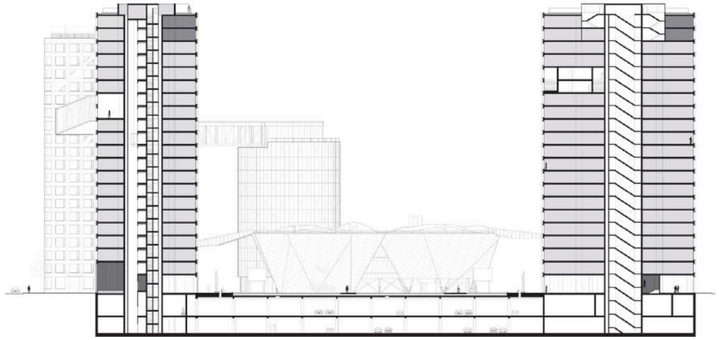
Connects the eight residential towers to the hotel tower

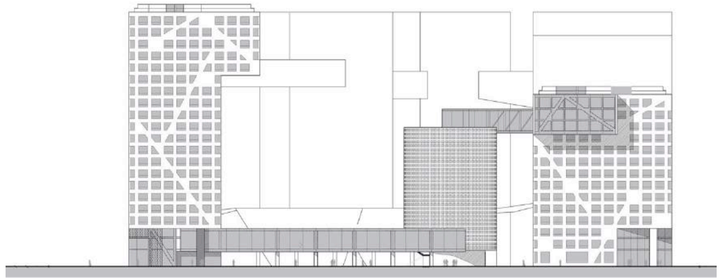
Spectacular views over the ‘unfolding city’

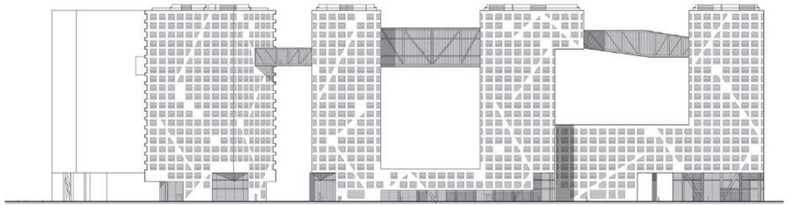


Linked Hybrid

Top Right: Section AA
Middle Right: East Elevation
Bottom Right: North Elevation





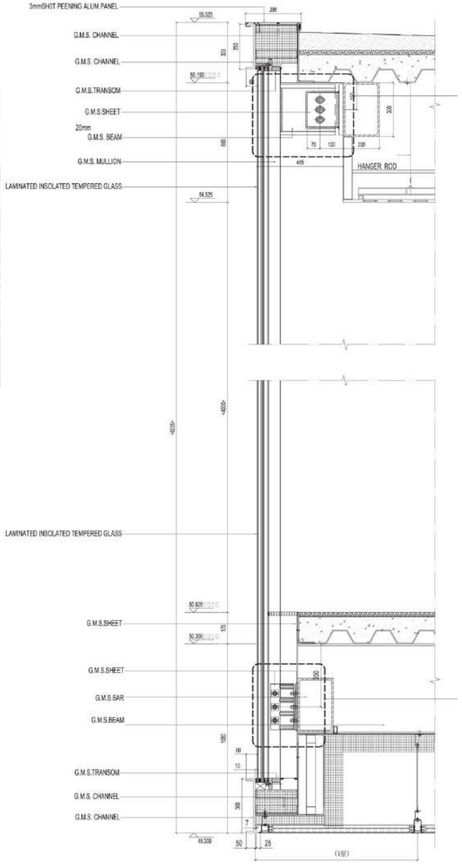


Linked Hybrid

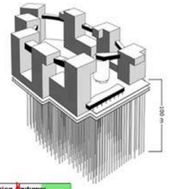
Geothermal System

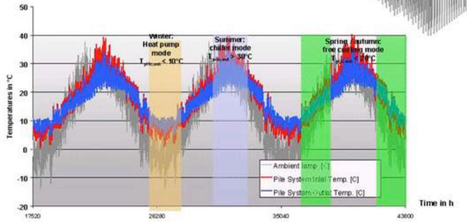
Geo-thermal wells (660 at 100 meters deep) provide Linked Hybrid with cooling in summer and heating in winter

Makes it one of the largest green residential projects in the world (aiming at LEED Gold rating).



Geothermal System with Borehole heat exchanger, cooling tower, chiller(summer) and heat pump(winter) system Temperatures 3rd to 5th year





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