Adaptive Strategies: Smart Cities Chelsea
Adaptive Strategies
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What is a Smart City?

Adaptive Strategies defines a smart city as being adaptable to both present and future needs, educational, environmentally conscious and socially equitable.

Our Vision

A smart city is one that is dynamic and adaptive.

It is democratic and pragmatic.

The smart city is resilient and accessible.

It leverages technology and infrastructure to create a more efficient and sustainable city.

A smart city is not, however, just the sum of its technological parts.

We cannot digitize as many solutions as there are problems that our cities face today.

While the narrative of the smart city is often focused on the implications of applications and airwaves, it can only be successful if the development of these systems begins from an egalitarian point.

The smart city must be resilient with respect to culture, economics and infrastructure.

It must be racially, economically and generationally diverse.

We want to create a city that preserves the right for people to exist in it. After all, the smart city is only as smart as the people that comprise it.

The development of the smart city must begin with these ethics. Only if we approach our cities from an egalitarian standpoint can they be successful.

“The smart city must be adaptable, evolving to meet short and long term demands.”

“Nothing is built with just a single-use purpose in mind.”

“As the world around us changes, our cities must adapt, and do so in an efficient way.”

- Adaptive Strategies

Technology, of course, does play a role in ensuring our cities remain accessible. The smart city will use technology to reduce the cost of services, making the provision of services easily scalable and accessible to those who need them.

To ensure we can provide clean environments for everyone, we need to build sustainable cities that simulate nature.

The city is often thought of as the antithesis to nature, but the smart city will have a symbiotic relationship with nature.

Implementing renewable energy technologies wherever possible helps towards neutralizing the city’s environmental impact. The smart city should be almost invisible in that sense, simulating the environment that existed before the city was there.

The smart city must also teach us. It should encourage play and activity. Smart city design should incite interaction and embed educational programs within its infrastructure.

Our vision of the smart city is a democratic space that at once preserves culture and diversity while also upgrading our existing infrastructure and design status quo to create a networked and sustainable city.
Site Analysis

Location and Neighborhood Context

The project site is located in Chelsea, a neighborhood on the island of Manhattan in New York City.

Chelsea spans from 14th to 34th street, from the Hudson River to 6th Avenue.

With a population of around 60,000 people it is comparable in size and density to most Manhattan neighborhoods in the surrounding area.

The neighborhood is home to four New York City Housing Authority public housing projects: the Elliott Houses built in 1947, Chelsea Houses in 1964, the Fulton Houses in 1965 and the Chelsea Addition in 1968.

The NYCHA housing projects provide housing for over 4,500 residents in the neighborhood.

The project site is bound by 10th and 11th Avenues and West 17th and 18th Streets.

It is in close proximity to several high traffic public areas including Chelsea Piers, Chelsea Market, the High Line, and Hudson River Park.

Of note is the Chelsea portion of Hudson River Park, which due to the new construction of a large public pier (Pier 55) and the Anthony Bourdain Food Court at Pier 57, will experience even more visitors in the coming years.

Location and Neighborhood Context

There is sufficient public transportation in the site area with several bus lines running up and down the West Side Highway and 10th and 9th Avenues as well as an entrance to the 14th Street stop for the A, C, E and L within 3 blocks and 4 Citi Bike stations within a one block radius.

The project site is also adjacent to the Hudson River Park Greenway, a bike path which spans much of Manhattan’s west side with connections to the east side and cross-town routes.

There are many public and private schools nearby and the surrounding area is home to a growing tech industry, including the New York headquarters of Google, as well as several performing and visual arts spaces. Despite this growth, however, there are no accessible grocery stores in the area surrounding the project site.

Income levels in the Chelsea neighborhood vary greatly by Block Group. While the median household income in the Block Group of the project site is 105K or higher, that of the Block Groups adjacent to the project site range greatly.

There is also great diversity in the neighborhood and the site itself is bordered by blocks where a majority of the residents identify as non-white.
Site Analysis

Site and Zoning

The project site is Block 689, Lot 17, and has a lot area of 76,425 square feet.

The project site has historically been used for parking, but is zoned as a C6-4 district with a maximum allowable floor area ratio (FAR) of 10.0.

The project site is located in Zone 1 of the six hurricane evacuation zones in New York City, which means it has the greatest chance of being flooded, although it did not sustain serious damage during Superstorm Sandy in 2012.

Natural Physical Features

According to Manahatta, in 1609, the project site was made up of the following soils: 75% Muddy Marine Bottom, 12% Beach, 12% Ipswich and 1% Pawcatuck. In addition, the following plants are native to the project site: Prairie Fleabane and Virginia Creeper.

In 1609, the average, maximum and minimum elevations of the project site were -7, 4 and -18 feet, respectively.

Man-Made Features

The project site is located below a portion of the High Line, a park established over existing above-ground railroad tracks. The construction of the High Line was completed in three phases, in 2009, 2011 and 2014, respectively and its development has contributed to rising land values in the neighborhood.

There has been a surge of development in the neighborhood in the past few years and many studies have been done to show the project’s role as a catalyst for the changes in the neighborhood.

According to a study by the New York City Economic Development Corporation property values within a 5 minute walk from the park increased by 103 percent between 2003 and 2011.

Adaptive Strategies: Our Proposal
Our Proposal

Adaptive Strategies’ proposal divides the project site into two main areas: the West and East Sides of the High Line.

Unifying Features

There are several unifying features across all of the developed space on this site.

- All pavement noted as ‘porous’ will be made up of crushed New York oysters in order to assist with stormwater drainage and potential disasters that result in flooding. This is both a local and historical decision as oysters are native to the waterfront area and play an important role in the history of the region.

- Most structures contain built-in seating.

- There is access to free public WiFi throughout the site via the LinkNYC program.

- All structures are ADA accessible.

West Side

Adaptive Strategies’ proposal for the project site has two main components: a mixed-use development and an open public space.

Our proposal for the project site values adaptability and responsiveness to current and future needs of the community, the simulation of nature through infrastructure and education about the project site and New York City as a whole.

The proposed development to the west side of the High Line is a mixed-use building that is comprised of the Chelsea Quarter, Chelsea Food Co-op, Chelsea Offices and The Hudson River Micro-Units. The Chelsea Quarter and Chelsea Food Co-op will take up the east and west sides of the first two floors of the proposed development, respectively, the Chelsea Offices comprise the second through 5th floors, while the apartments are residential micro-units from the sixth to twelfth floors.

Building Sustainability

The building seeks to utilize every possible space to implement sustainability features.

The rooftop is covered with solar panels that track the sun’s movement. Per current zoning codes, the rooftop will continue to have direct sun exposure despite future development. The building facade is coated with titanium dioxide which when exposed to sunlight, begins a chemical reaction that helps neutralize air pollutants. The building itself is designed to leverage passive solar techniques. The south-eastern facing facade is entirely glass, angled in a way to increase the intensity of sunlight on the building. The glass itself is dynamic, able to convert to frosted windows to provide shade during summer months. Polymers in the glass are triggered by an electrical current, making it more opaque. This can be controlled manually or autonomously to save on heating and cooling costs and energy usage.
West Side

The Chelsea Quarter

The Chelsea Quarter is a retail plaza on the west side of the development, with storefronts facing north towards West 18th Street and west towards 11th Avenue.

The plaza strives to support local business owners and artists in the neighborhood by prioritizing their use of the space for small business and gallery space.

A small business incubator will be present in the building, funded by city grants and subsidized by the building’s revenue. Small businesses will pay a below-market monthly rate for the retail space if they qualify.

An advanced waste removal system will be implemented throughout the project site; and the technology will be available on each floor of the mixed-use building.

Each of the retail spaces in the Chelsea Quarter will have access to the proposed advanced waste removal system, which will feature a pneumatic tube system for garbage removal, recycling and composting.

Each of the potential retail space renters and residents will be given a card key which activates each of the chutes to open.

The Chelsea Food Co-op

The Chelsea Food Co-op is a grocery store for local residents and the community to have access to locally grown produce and other goods.

Residents of the micro-unit apartments will have priority membership benefits to the Co-op, which includes discounts for locally grown produce and other goods for a one-time membership fee and designated work hours at the co-op. The cost of operation of the store will be kept to a minimum as a majority of the workers will be volunteer members, working on monthly shift commitments.

Seating, landscaping, solar panel bike racks and a bike repair center will be operated and maintained by the Chelsea Food Co-op and is open for the public to use.

There are picnic tables, and a series of benches throughout the space and trees are planted along the western edge of the site to cancel noise from the traffic along 11th Avenue.

Additionally, the Hudson River is just across the West Side Highway from the Co-op and with a higher concentration of salt in the air it will be difficult for vegetation to survive. With this noted, low growth sumacs are planted alongside the trees as they are able to survive in such an environment.

Similar to the retail spaces in the Chelsea Quarter, the Chelsea Food Co-op will have access to the advanced composting system and will be given a card key that activates each of the waste removal chutes, for garbage, recycling and compost.
West Side

The Chelsea Food Co-Op

The bike parking station and bike repair center will be located on the northwest corner of the project site.

The bike parking station will have solar panels on its roof which will provide energy for the components of the bike repair center.

The bike repair center will feature a bike pump, a bike lift with tools attached, and a bike part vending machine. The bike part vending machine will be provided in partnership with ExpressBiker, a New York-based company aiming to provide bike parts on the go.

As biking becomes more ubiquitous in cities, extra bicycle infrastructure helps normalize cycle commuting and active transportation culture.

The Hudson River Micro-Units

Apartments provided in the building are micro-unit apartments, averaging 300 square feet each.

Micro apartments allow the renters to live alone in a below-market rate apartment, while increasing revenue for the building because the revenue per square foot of micro apartments is higher than that of traditional apartments.

In this way, it is a win-win. Micro-units allow for the creation of affordable units for young professionals and the elderly, where the highest demand for affordable and convenient apartments exists.

When built in a modular way, they can also be combined to allow for family units. The walls will be constructed in such a way that they are easily transformable. Micro-units also increase the density of the neighborhood, allowing more residents per square footage. Given their small size, micro units require less energy to heat and cool.

Adding micro-apartments in the city center can also help ease rising rents on family homes in the outer rings of city that are often converted into two or three bedroom apartments for young people. In this way, micro-apartments are an integral part of the smart city ethos by helping to preserve affordable rents while creating more sustainable living spaces.
East Side

The second part of Adaptive Strategies’ proposal is the portion of the site that is east of the High Line, which will have the following components. All components listed below will be accessible via entrances on 10th Avenue and 18th Street.

Interactive Space

There is a section of porous pavement which leads to a network of underground pipes that deliver the water to a catchment basin.

This catchment basin sits below a native plant bed where additional water is absorbed and filtered through a layer of soil and filtration substrate before reaching the basin.

Additionally, the benches that sit along the sides of the plant bed are designed with narrow slits at the surface level. These slits allow rain water that is not absorbed by the pavement or plants directly to easily flow into the plant beds.

The catchment basin below ground is connected to the High Line level planters via a series of visible pipes.

Water-pumping seesaws are installed above the catchment basin which when in use will pump water up a series of tubes to ultimately reach the plant beds.

These seesaws will serve as an interactive and educational tool as users will be able to see the water as it pumps both from the ground via a surface level glass plates and as it travels up the tubes to the High Line.

Each seesaw has its own tube, allowing visitors to watch as they pump the water at their own speed. Additionally, each tube is filled with different filtration substrate allowing visitors to learn about water filtration and the densities of different substrate.

The proposal includes informational signage to help convey these environmental concepts.
East Side
Dynamic Pods

There are two types of ‘pods’ on this site. One facilitates aquaculture and hydroponics and the other produces solar energy to power the aquaponics system. The pods also provide shaded seating and information about the pods.

The pods can also double as shelters during emergency situations. These are at once an *educational*, *recreational* and *resilience* piece.

The walls of the aquaponics pod support soilless growth of plants while the water tank under the transparent walkway provides for aquaculture (freshwater fish, such as carp, catfish and tilapia).

The freshwater fish living in the tank produce waste which is converted into bacteria. That bacteria is then used to support plant growth on the sides of the structure.

A series of fiberglass plates and a transparent walkway over the tank are in place to show visitors the processes of aquaponics science.

The plants and fish are routinely harvested and sold in the Chelsea Co-op.

The solar generating pods are connected to the aquaponics pods via an underground piping system and provide power to generate the flow of water.

Additionally, each pod is equipped with an aluminum foldaway structure that can be deployed in case of emergency to create an enclosed shelter.

Once deployed they can be retracted and easily stored away in a chamber on top of the pod.
Conclusions

This proposal demonstrates ideas that can be duplicated and reworked to fit the needs of other cities around the globe.

It serves as a framework for the potential of a semi-self sustaining city block that uses innovative tools to meet both present and future needs.

While the individual pieces of this proposal can function autonomously it is meant to demonstrate the potential of a broader city-wide communicative network of infrastructure and technology.

“Democratic spaces that preserve culture and diversity, upgrade existing infrastructure and create a networked and sustainable city are paramount to the future of urban environments.”

“Cities across the globe must continue to evolve in order to face rapidly changing environmental and social climates and to ensure a safe, equitable and smart future.”

- Adaptive Strategies