

Summer 8-10-2017

In the Projects: Rebuilding Social Housing in New York City

Ruo Piao Chen

Follow this and additional works at: https://surface.syr.edu/honors_capstone



Part of the [Architecture Commons](#)

Recommended Citation

Chen, Ruo Piao, "In the Projects: Rebuilding Social Housing in New York City" (2017). *Syracuse University Honors Program Capstone Projects*. 1001.

https://surface.syr.edu/honors_capstone/1001

This Honors Capstone Project is brought to you for free and open access by the Syracuse University Honors Program Capstone Projects at SURFACE. It has been accepted for inclusion in Syracuse University Honors Program Capstone Projects by an authorized administrator of SURFACE. For more information, please contact surface@syr.edu.

In The Projects: Redeveloping public housing in New York City

Architectural Thesis S'2017 // McNair Research S'2017 // Capstone S'2017

Architectural Thesis Partner: Caroline Jeon

Architectural Thesis and Capstone Advisor: Professor Elizabeth A. Krietemeyer

McNair Advisor: Professor Yutaka Sho

Capstone Reader: Professor Shawn Amsler

Introduction

“Yeah, it will take about a year for them to come and fix that,” Kenny shrugged while I attempted to wedge the bathroom door back into its frame. Kenny lived in the Williamsburg Houses, the public housing project in Brooklyn with an unusually low-rise scheme. On that 70-degree November day, interior temperatures were stifling because the centralized heating system for the building had been officially turned on for the winter. The New York City Housing Authority, the largest landlord in the city, was responsible for 1 in 14 New Yorkers choking on hot air that day¹. Energy waste and outdated building systems are only two of many factors that contribute to NYCHA’s financial demand². The result is a massive number of unhappy tenants, living in stigmatized housing “projects” that are being starved of financial assistance from the federal government³.

¹ New York City Housing Authority, “Facts About NYCHA,” <https://www1.nyc.gov/assets/nycha/downloads/pdf/factsheet.pdf>, (April 11, 2016).

² New York City Housing Authority, “NextGeneration NYCHA Sustainability Agenda,” https://www1.nyc.gov/assets/nycha/downloads/pdf/sustainability_agenda_fact_sheet.pdf (April 21, 2016).

³ Erin Durkin, “President Trump’s \$75M funding cut to NYCHA poses ‘gravest threat’ in city public housing history,” <http://www.nydailynews.com/news/politics/trump-75m-funding-cut-poses-grave-threat-nycha-article-1.2996918>, (March 13, 2017).

The most logical solution to the affordable housing crisis in New York City is to redevelop the city's public housing stock. However, Mayor Bill DeBlasio's administration is far more concerned with incentivizing private developers to include affordable units in their ground-up projects⁴. As a result, NYCHA is forced to sell its land to private developers in order to generate its finances⁵. This creates no long term financial sustainability for public housing. It also leads to a stagnant economic landscape of housing, one that is purely market-driven and dominated by unoccupied units purchased by foreign investors⁶.

Although NYCHA is the largest landlord in New York, fewer than 1% of their units are vacant and available to rent each year⁷. A tenant applying for NYCHA housing can be waitlisted for up to 9 years⁸. The demand for housing, on the contrary, is skyrocketing due to the mismatch between astronomical market-rate housing prices and lukewarm income trends⁹. To top it off, the units that tenants do move into can be in such disastrous states that there is a higher risk of death in areas with high concentrations of public housing¹⁰.

Looking at the income range of New Yorkers, well over 50% of all New York households are in the Low Income to Extremely Low Income bracket, making 0%-60% of the Area Median Income¹¹. There is a projected population growth in New York and a decreased affordability,

⁴ New York City Department of City Planning, "New York City Mandatory Inclusionary Housing: Promoting Economically Diverse Neighborhoods," https://www1.nyc.gov/assets/planning/download/pdf/plans-studies/mih/mih_report.pdf, (September 2015).

⁵ Greg B. Smith, "Exclusive: NYCHA quietly selling off parking lots, green spaces, playgrounds to help ease budget woes," <http://www.nydailynews.com/new-york/exclusive-nycha-selling-green-space-developers-article-1.2165863>, (March 29, 2015).

⁶ Hana R. Alberts, "Shocker: Half of Midtown's Super Luxury Condos Sit Vacant," <http://ny.curbed.com/2014/10/24/10031340/shocker-half-of-midtowns-super-luxury-condos-sit-vacant>, (October 24, 2014).

⁷ Ingrid Gould Ellen and Max Weselcouch, "Housing, Neighborhoods and Opportunity: The Location of New York City's Subsidized Affordable Housing," http://furmancenter.org/files/NYUFurmanCenter_HousingNeighborhoodsOpp_Jan2015.pdf, (January 2015).

⁸ Ibid.

⁹ The City of New York Mayor Bill de Blasio, "Housing New York: A Five-Borough, Ten-Year Plan," http://www.nyc.gov/html/housing/assets/downloads/pdf/housing_plan.pdf, (March 2016).

¹⁰ Ellen and Weselcouch.

¹¹ The City of New York Mayor Bill de Blasio.

leading to an income threshold to escape poverty of which is becoming increasingly difficult to obtain. It is not unlikely that the homeless population in New York will continue to grow, even though a portion of the homeless actually have jobs but are too poor to afford housing in New York¹².

On my test site, the LaGuardia Houses, residential density has not been maxed out due to antiquated public housing ideals. After World War II, a desire to quickly and cheaply house war veterans according to the aesthetic ideals of the day led to the construction of tall towers in the middle of large open sites¹³. In today's urban environment, this configuration leads to awkward lapses in the street fronts as well as fenced-off, unutilized park spaces. Communities are broken up by these vertically distinct towers and intermittent swaths of underused on-grade parking. My partner and I see this as an opportunity to densify the site and incorporate more units, ultimately providing more affordable housing in order to remediate this housing crisis.

At the scale of the neighborhood, the site contains a lot of discontinuous pedestrian paths. Public programs such as playgrounds and outdoor exercise facilities are simply too difficult to get to from the housing towers because of the monumental scale of the buildings and poor infrastructural moves such as the lack of traffic lights. We wish to connect this site using a pedestrian-friendly way to allow this site to be less intimidating and more of a destination, with more public programs that are utilized to capacity rather than under-capacity.

Our plan to redesign and rebuild the LaGuardia Houses has several goals, all of which align with the goals of the current DeBlasio Administration, but fulfills them to a degree that surpasses the public sector's expectations. These objectives are:

¹² Coalition for the Homeless, "Rental Assistance Program," <http://www.coalitionforthehomeless.org/our-programs/housing/rental-assistance-program/>.

¹³ Richard Plunz, *A history of housing in New York City* (Columbia University Press, 2016), 247-280.

1. To create an economically-sustainable project
2. To include more housing units
3. To re-define affordability
4. To connect the site to its surrounding neighborhood
5. To establish equity for low-income residents so that they may have permanent housing that surpasses the minimum standard
6. To formulate a prototype of the reconstruction of public housing throughout New York City.

Throughout my four years in the McNair Scholars Program, I have been researching the relationship between architecture and socioeconomic inequality. From mapping sex trafficking routes in Japan to conducting zoning studies of public housing projects in New York, my research questions how architecture is not merely a passive result of law and policy, but can actively influence these forces in return. My current research which evolved into my architectural thesis is about achieving a new standard of affordability, one that goes above and beyond providing baseline services to tenants. Design-wise, my partner and I are exploring how phased construction can prevent tenants from being displaced for over a week, emphasizing construction speed using a modular construction methodology. By incorporating community programs and reducing parking requirements, public housing can redefine its relationship to the neighborhood fabric, eventually de-stigmatizing itself.

As a local New Yorker, I feel less at home than ever because my housing future is so uncertain. How can NYCHA effectively fund itself and redevelop its properties to sustain its operations while providing a higher standard of affordability? In order to work in the public

sector as an affordable housing expert, this research is key in understanding the landscape of housing and redefining the world that we live in for decades to come, one that includes affordable housing for all.

History of Housing in New York

The island of Manhattan has been a historical map for the redefinition of housing since its conception. Tenement housing, which flourished sometime around 1865, was a cruel way to house low-income residents at a very high density level¹⁴. The earliest tenement housing, ones pre-dating any formal building code regulations were associated with filth, disease, and poor lighting conditions¹⁵. They also occupied up to 90% of the site¹⁶. It was not until the Tenement House Act of 1901, or “New Law,” that the national standard dictated a 70% lot coverage, with running water, egress, and exterior windows for each unit¹⁷, that the typology of residences at the low-income level began to change into one that is still seen in some parts of New York City today, including on our site.

As density grew in Manhattan during the 1920’s, people looked to outer boroughs for housing that relieved them of the filth represented by these stigmatized tenement houses. In outer boroughs of lower residential density such as Brooklyn and Queens, there was an explosion of garden apartments¹⁸. These garden apartments consisted of relatively low-rise projects connected by gardens and greenspace. The scale of these projects was what made them successful, but inoperable in higher density locations such as in Manhattan.

¹⁴ Plunz, 21-88.

¹⁵ Ibid.

¹⁶ Ibid.

¹⁷ Ibid.

¹⁸ Ibid., 122-164.

And so city planners looked to the International Movement for inspiration. Post-World War II, there was a huge rise in the population in metropolitan areas and a subsequent crisis to house all the veterans that had returned from war¹⁹. It was then that Le Corbusier's Radiant City manifested in the development of public housing in New York²⁰. NYCHA, or the New York City Housing Authority, was established in 1934 by the late mayor Fiorello LaGuardia in order to address housing as a public issue, on an unprecedented scale and magnitude²¹. New housing projects began to pop up alongside infrastructural projects such as the FDR drive, which created blocks of low-income social housing that usually manifested formally as the Corbusian "towers in the park" configuration. The original goal of these projects was to build on less footprint in order to activate the ground space using lush greenery and mixed programming, while the residents would be able to be lifted from the filth near the ground and enjoy beautiful views on the higher floors.

Today, the public housing projects owned by NYCHA are easily identifiable by their scale, magnitude, and park-spaces, which are oftentimes in stark contrast to their surrounding environments. These buildings occur in clusters in the Lower East Side, in Williamsburg, Brownsville, Williamsburg, Harlem, Washington Heights, the Bronx, and in Queens.

As we mentioned before, these typologies are easily recognizable. Beginning with the First Houses, all of these NYCHA housing projects use similar materials, and were developed in the 20th century with a focus on constructability using highly repetitive building forms.²² Many of these buildings are in a state of disrepair due to outdated building systems and the lack of

¹⁹ Ibid., 247.

²⁰ Ibid.

²¹ Ibid.

²² New York City Housing Authority, "NextGeneration NYCHA," <https://www.mailman.columbia.edu/sites/default/files/pdf/nextgen-nycha-web.pdf>. (May 2015).

public funding to address building issues. Our site, the LaGuardia Houses on the Lower East Side, is only one manifestation of a series of easily recognizable and stigmatized public housing projects.

These typologies are repeated in over 177,666 apartments that the city owns today.²³ Most of them, built over half a century ago, are nearing the ends of their building lifecycles. Building systems are outdated and inefficient, leading to high energy bills and pest control issues.²⁴ Although the lack of maintenance could be the reason why these typologies are deteriorating rapidly, it does not change the fact that within the next ten years a significant portion of these housing projects will need to be rebuilt. This capstone and architectural thesis simply capitalizes on that dire future need and addresses public housing redevelopment holistically. By dealing with the issues directly instead of pushing them further down the line, we can formulate a new public housing typology that meets all of our design goals.

New York City's current mayor, Bill De Blasio, recognizes that there is an affordable housing crisis, issuing a 10-year housing plan that will incorporate 200,000 new units of affordable housing over the next 10 years.²⁵ Other public entities such as NYSERDA²⁶ and NextGeneration NYCHA²⁷ have issued competitions and other requests for proposals in order to address these issues of affordable public housing. So what exactly, is this housing crisis that we're talking about?

The Housing Crisis

²³ Ibid.

²⁴ Ibid.

²⁵ The City of New York Mayor Bill de Blasio.

²⁶ New York State Energy Research and Development Authority, "NYSERDA," <https://www.nyserda.ny.gov/>, (2017).

²⁷ New York City Housing Authority, "What is NextGeneration NYCHA?," <http://www1.nyc.gov/site/nycha/about/nextgen-nycha.page>, (2016).

Only about .65% of New York City Housing Authority properties are available to rent each year²⁸. In 2011, only 424,949 rental units were available to Extremely Low Income and Very Low Income Households while 979,142 households of these income levels reported to be residents of New York City²⁹. That's more than 2.3 households per available unit, making the competition for public housing very real. As the largest landlord of New York City, their eternally unavailable units has a monumental effect on the housing market. According to the 2005-2012 American Community Survey³⁰, The median renter income is projected to decrease while the median gross rent is projected to increase such that the gap is becoming larger and larger³¹. Federal funding for NYCHA and other public housing programs are also being squeezed³², which means that acquiring new land for development is coupled with an influx of unoccupied luxury housing that has become a popular way to solidify the assets of international investors, the landscape of housing in NYC seems to be quite bleak. NYCHA has to work with what it has, a handful of sinking investments and millions of tenants that will ultimately be brutally kicked out when these properties finally collapse, either financially or physically.

The de Blasio Administration tackled this problem with his "Housing New York: A Five-Borough, Ten-Year Plan." His measurements for affordability references a chart for AMI, or area median income. Because the median income is skewed by the surrounding wealthier suburbs of New York City as well as the five boroughs in the metropolitan area, more people qualify for affordable housing than just the poor. At the top of the "affordable" threshold is the Middle Income class, with qualifying four-person households making just under \$138,435 a year

²⁸ Ellen and Weselcouch.

²⁹ Ibid.

³⁰ United States Census Bureau, "American Community Survey," <https://www.census.gov/programs-surveys/acs/>, (2005-2012).

³¹ The City of New York Mayor Bill de Blasio.

³² Durkin.

according to these standards³³. That narrows it down to over 75% of households in New York City, according to the 2015 American Community Survey.³⁴ Although his new plan to replace the traditional 80/20 affordable housing plan with a 20% low-income, 30% moderate income, and 50% middle income household plan by the mandatory inclusionary housing policy³⁵, this begs to differ if the people who need housing the most are being out-competed by middle class families who do not have the burden of being on the verge of homelessness.

In addition to addressing the housing split in new developments on re-zoned land, the mayor also addresses public housing. One of the objectives of his plan is to “focus on the preservation of NYCHA units and assess the potential for underused NYCHA land and development rights to benefit existing residents, increase affordable housing, produce local retail, and community facilities, and serve other shared goals.”³⁶ All of his public housing goals align neatly with the framework that our project wishes to provide for the rebuilding of these housing projects. Instead of considering expansion on new sites in a tabula rasa state, we want to revamp the current condition so that it may be socioeconomically sustainable for the future.

Site Conditions

Jumping in the the site more specifically, we wish to address it on two scales. One is the scale of the neighborhood, and one is at the scale of the building in its demolition and construction.

³³ The City of New York Mayor Bill de Blasio.

³⁴ United States Census Bureau, “American Community Survey,” <https://www.census.gov/programs-surveys/acs/>, (2015).

³⁵ The City of New York Mayor Bill de Blasio.

³⁶ Ibid.

Our existing housing site is the LaGuardia Houses on the Lower East Side. Completed in 1957, it was originally thirteen apartment buildings with one elderly housing addition completed in 1965.³⁷ All buildings are sixteen stories tall, housing over 2,500 people.³⁸ However, many people were also displaced during its original construction much like other city-owned developments. In order to veer from the city's historical failures in displacing existing residents, we designed a phased construction process using modular construction in order not to displace tenants for over a week.

The residential density of the LaGuardia Houses pales in comparison to its surrounding buildings, some of which are also NYCHA projects constructed in later years. We see this as an opportunity to densify on the site and incorporate more units and ultimately provide more affordable housing in order to mediate the New York City housing crisis.

At the scale of the neighborhood, the site is fairly uninviting to pedestrians. If you were to walk from North to South towards the pier, you would engage in a series of sectional conditions that makes this N-S axis feel disconnected. There is a lot of parking on site due to city zoning requirements, but there are also intermittent public programs such as playgrounds and outdoor exercise facilities that are simply too difficult to walk to because of the monumental scale of the buildings. The lack of traffic lights under the elevated FDR drive was also a poor infrastructural move. This makes walking to the pier a nightmare amongst waves of speeding cars. We wish to connect this disjointed axis using a pedestrian-friendly way to allow this site to be less intimidating and more of a destination, incorporating more public programs that are utilized to capacity.

³⁷ Emporis, "Mayor Fiorello H. LaGuardia Houses," <https://www.emporis.com/complex/101064/mayor-fiorello-h-laguardia-houses-new-york-city-ny-usa>, (2017).

³⁸ Ibid.

The LaGuardia Houses are surrounded on all sides by a wall of public housing and infrastructural projects, leading to monotonous programming in the the immediate neighborhood. Bordered on the South side by the FDR drive, it is also close to the entry onto the Manhattan and Brooklyn bridges on the West and East sides. However, because the site is situated near the Lower East Side and Chinatown, there is some small-scale retail program as well as public schools in the blocks north of the site. The site is well-connected in terms of public transportation, with access to highways, bus stops, and the subway. In terms of its building footprint, residential density, and height, it is not nearly as dense or as tall as its surrounding buildings, also leading to an opportunity to utilize the surrounding site to build while simultaneously demolishing some of the existing units.

Two different types of zoning restrictions affect our site. As a R7-2 medium density residential district, there is the original zoning with no height restriction but a maximum FAR ratio and a sky exposure plane.³⁹ As part of De Blasio's 10-year plan, Zoning for Quality and Affordability was also applied to our site, giving us the option to choose a type of zoning with height restrictions of 75ft but more aligned with the streetscape.⁴⁰ Both of these options, however, require that 50% of the units need on-site parking,⁴¹ attributing to what is actually underutilized private parking spots that cut through the otherwise walkable interior park spaces.

New construction needs only to conform to one set of zoning restrictions. However, because both zoning regulations required 50% of units to have parking on our site, we are

³⁹ New York City Department of City Planning, "Zoning Resolution," <https://www1.nyc.gov/site/planning/zoning/districts-tools/r7.page>, 2016.

⁴⁰ Ibid.

⁴¹ Ibid.

looking at possibilities of changing some parts of the zoning regulations that will have massive impacts on our designs.

Parking is redundant on our site due to its proximity to public transportation, so we are looking to reduce the amount of on-site parking. The guidelines for this parking reduction refers to a study done by the Institute for Public Architecture.⁴² According to their study, up to 80% of parking can be eliminated because of we are located less than 0.1 miles from a subway station (East Broadway station, F train).⁴³ In the final design, we are following these guidelines by waiving 80% of the parking so that more of the site may be used for public spaces or retail programs, which is currently restricted from the site. This goes back to the mixed-use strategy that de Blasio is championing, and we are seeking a variance on our zoning in order to incorporate restaurants, education centers, gyms, studios, and office spaces in our project.

Modular Construction

We are incorporating modular construction as a way to construct very quickly without much site disturbance. All housing units will be constructed in a factory and shipped to the site on the day of assembly. Because we do not wish to displace families for over a week during the construction process, we must simultaneously construct the new building while systematically demolishing parts of the existing buildings. Modular construction, compared to traditional on-site construction, is much more time-efficient by reducing site disruption.⁴⁴

⁴² Dana Schultz, "Could You Live on a 9 x 18 NYC Public Parking Space?," <https://www.6sqft.com/could-you-live-on-a-9-x-18-nyc-public-parking-space/>, (August 14, 2014).

⁴³ Ibid.

⁴⁴ Modular Building Institute, "Why Build Modular?," http://www.modular.org/htmlPage.aspx?name=why_modular, (Last accessed April 19, 2017).

Because modular construction is relatively untested, My partner and I conducted detailed analyses of precedent housing projects that utilized this construction methodology. The Nakagin capsule tower in Tokyo, Japan is an example of early modular housing which deals with social issues of the Metabolists in 1960's Japan.⁴⁵ It was very successful in utilizing a space-efficient unit design as well as a simple construction process. Its units were bolted into a circulation core with just four bolts each!⁴⁶ The units were designed to be removed and reattached with ease, resulting in a highly adaptable architectural design. The downside of the project was the massive financial expense to remove and reattach units, so its adaptability was never tested in reality, much to the dismay of the architect Kisho Kurokawa.⁴⁷

Emergency Housing prototype in Brooklyn is designed for post-disaster housing to provide residents in urban areas a temporary place to live in the event of emergency. Up to 28 units can be prefabricated each week, take about 15 hours for deployment.⁴⁸ The units are made of recyclable material uses photovoltaic panels for energy efficiency.

Carmel Place, also known as My Micro NY, is the first modular, micro-unit apartment built under Mayor DeBlasio's 10-year plan.⁴⁹ 40% of its units are affordable. In addition to creating a new social framework for living, the design objectives were to minimize unit size and maximize density without compromising quality of life. The construction process was simple but lengthier than anticipated since it was the first modular housing project constructed in New York City. The foundation was site-built, but the units were prefabricated at a factory. Reassembling

⁴⁵ Zhongjie Lin, "Nakagin Capsule Tower: Revisiting the Future of the Recent Past," *Journal of architectural education* 65, no. 1 (2011).

⁴⁶ Ibid.

⁴⁷ Ibid.

⁴⁸ Garrison Architects, "NYC Emergency Housing Prototype," http://www.garrisonarchitects.com/projects/buildings/oem_housing_prototype, (Last accessed April 19, 2017).

⁴⁹ nARCHITECTS, "Carmel Place," <http://narchitects.com/work/carmel-place/>, (2016).

everything on site was fairly successful, suggesting that this might be the way to build in dense urban areas in the future.

The Sugar Hill Development project is also a city project under Mayor DeBlasio's 10-year plan. Although the housing project used a traditional construction method, the public mixed use program such as preschool, cultural institution, a children's museum of art and storytelling, and offices makes it a precedent for incorporating mixed-use onto an affordable housing site.⁵⁰ The large scale project was successful in providing a large number of units dedicated to different affordability ranges.

Design Goals

A few key points of consideration describe our method and approach to the design. These four points are financial sustainability, construction methodology, policy & regulation, and community. Under financial sustainability, we wish to incorporate retail condominiums in order to generate revenue and offset building operation costs. The materials that we choose to use, such as finishes and recycled steel, all contribute to a lowered cost of construction. Under the consideration of construction methodology, we wish to build sturdy and durable buildings that can be quickly assembled and repaired when needed. Our goal with the community is to minimize disturbance by maximizing the speed of construction and not displacing tenants for over a week. The physical dimensions of the units as well as shared spaces also contribute to the community experience. Under policy & regulation, challenge existing zoning regulations that dictate on-grade parking for 50% of units. Because this site is very well connected by public

⁵⁰ "David Adjaye's Sugar Hill Development: A New Typology for Affordable Housing," Archdaily, <http://www.archdaily.com/514785/david-adjaye-s-sugar-hill-development-a-new-typology-for-affordable-housing>, (June 11, 2014).

transportation and bike lanes, we are questioning the effectiveness of existing policy. Our architectural design addresses all four of these considerations directly, instead of limiting its role as a passive object upon which these four forces influence.

The de Blasio Administration is focused on a mixed-use, mixed-income strategy so that affordable housing can contribute to the neighborhood fabric.⁵¹ We are looking at this by including leasable and retail space (restaurants and a fitness center on ground floor retail in the center of the site, accessible by both residents and the public). We are also introducing community spaces such as a daycare facility for the children of the working residents, a medical clinic, art studios, and a computer lab for those looking for jobs. All of this is connected by occupiable roof spaces that are similar to the high line, which crosses the longitudinal axis of the site on both the North and South sides.

The five different scales of design that we are manipulating are the unit scale, the building scale, the site scale, the neighborhood scale, and the city scale. Factors such as financial sustainability trickle down from the city to the individual tenant's interior comfort. By designing through these five scales, our building will have calculated impacts on its nested spheres of influence.

By reviewing the existing demographics of the tenants on our site, we found mismatches between household sizes and unit types. Although the largest demographic on our existing site is single person households, most of the units on our site are 3 and 4-bedrooms.⁵² By introducing studios onto the site, we can balance the housing supply to existing and future demand.

⁵¹ The City of New York Mayor Bill de Blasio.

⁵² Office of the New York City Comptroller Scott M. Stringer, "The Growing Gap: New York City's Housing Affordability Change," (April 2014).

The Project and its Process

The project consists of 9 schematic designs that Caroline and I developed according to a rapid iterative process. We started by maximizing the building envelope according to the New York City zoning resolution. The result was a housing superblock with very little light permeability and centralized retail and community spaces. For reasons historically established by the failed tenement housing projects, this iteration was not feasible as a design strategy. As our schematics evolved from trying to meet our design criteria (12% more housing units than the existing project, light and air considerations, distance from amenities, and site permeability), we arrived at the solution of a landscaped scheme. This 9th schematic iteration contained housing clusters with centralized courtyards planned like a contemporary version of the garden apartments. Retail is distributed along the first floor on the North and South axes as well as centralized in one-story buildings containing a grocery store, fitness center and a cafe. Community spaces are wedged between the housing clusters in order to facilitate interactions between the housing blocks and the public.

We compared our new units to the existing units through five quantitative criteria. These are: window-to-wall ratio, bedroom size, kitchen size, storage size, and daylighting hours. Our new units in this 9th schematic configuration best the existing units by far in all five categories. Most importantly, all the units have enormous window-to-wall ratios unlike those of any public housing project. By making our buildings more transparent, we hope to combat the issue of public housing stigmatization on our site.

Financial Pro Forma

The heart of this capstone project lies in the financial pro forma that Professor Shawn Amsler and I have created for the LaGuardia Houses. It is attached at the end of the text, and demonstrates the financial feasibility of the entire development over the course of 20 years. From this quantitative analysis, we determined that the development not only generates enough revenue to offset the costs, but exceeds those costs by over \$11 million in net present value.

The first page summarizes the entire deal. Given a site area of 559,000sf and an existing gross building area of 1,203,184sf, there are several huge financial considerations when attempting to demolish this existing building and rebuild a new project of 1,668,000sf. Because we are expanding the square footage of the site while retaining similar unit sizes, we are able to add more affordable units than there were previously on the site.

The entire project is split into 70% housing, 20% community space, and 10% retail space. After factoring in all the costs of demolition, new construction, sitework, and building operations, the total cost of development comes out to \$763,603,420 in the first year. Because the land is already owned by the city, we save hundreds of millions of dollars that a private developer would have to spend just for land acquisition. In addition, by selling our retail condominiums to private owners in year 2, we can generate \$958,332,205 in revenue, offsetting total cost of development. These private owners will provide retail program such as grocery stores and fitness centers for both LaGuardia residents and the public.

Page two summarizes the housing portion of the deal. From the U.S. Department of Housing and Urban Development income numbers, our project is considered 100% affordable.⁵³

⁵³ U.S. Department of Housing and Urban Development, <https://portal.hud.gov/hudportal/HUD> (Last accessed April 26, 2017).

For studio apartments, 25% of residents will spend \$318 on rent per month, 25% will spend \$635, 25% will spend \$953, and the remaining will spend \$1,270. These numbers demonstrate that the building will have a highly mixed level of income but remain affordable for New Yorkers living in Manhattan.

The rent generated through all of these apartments is enough to offset over half of the operating costs of our building each year. The rest of the operating costs can be offset by the net positive revenue from the retail condominiums and the very reduced rent generated by leasing community spaces to education centers, daycare centers, and medical care facilities. All things considered, the net present value of this development is over \$11 million. This surplus goes directly to the New York City Housing Authority to help them break ground on their other housing sites throughout the city. This project is able to not only sustain itself financially for the next 20 years, but also catalyze a complete change in public housing typology throughout New York City.

Conclusion

Architecture can act as a social mediator and economic equalizer, shaping the forces which influence it in return. The public sector in New York City is already trying to utilize new initiatives, such as Mayor Bill DeBlasio's housing plan to incorporate 200,000 new units of affordable housing over the next ten years. However, by offering incentives for new and private developments, the city is ignoring its rapidly deteriorating existing stock. The goal of this project is ultimately to persuade the public sector to view their properties not as sinking investments, but as investments with a more economically and urbanistically sustainable timeline.

Glossary

Affordable housing - any housing project containing units that are below market rate. The specific level of affordability is defined by the municipalities that govern the site of the project.

Area Median Income - the median of reported incomes in the 5 boroughs of New York, as well as its neighboring wealthier suburbs. It is a criteria by which affordability is often determined in New York City.

Bill De Blasio - the current mayor of New York City. 10-Year Housing Plan incentivizes 200,000 new private developments to be made affordable on a sliding scale of AMI.

Floor Area Ratio (FAR) - according to the New York City Department of Planning, the floor area ratio (FAR) is the principal bulk regulation controlling the size of buildings. FAR is the ratio of total building floor area to the area of its zoning lot. Each zoning district has an FAR which, when multiplied by the lot area of the zoning lot, produces the maximum amount of floor area allowable on that zoning lot. For example, on a 10,000 square foot zoning lot in a district with a maximum FAR of 1.0, the floor area on the zoning lot cannot exceed 10,000 square feet.

Mat building - a term coined by Alison Smithson, a mat-building is one that is usually relatively low to the groundplane and covers much of it in its plan strategy.

Mitchell-Lama - a program that provides affordable rental and cooperative housing to moderate-middle income families as determined by AMI.

NextGeneration NYCHA - a NYCHA rebuilding initiative started by the De Blasio administration.

NYCHA - New York City Housing Authority. NYCHA owns all of the public housing stock in New York, making it the largest single landowner in the city.

NYSERDA - The New York State Energy Research & Development Authority.

Open Space Ratio (OSR) - according to the New York City Department of Planning, the open space ratio (OSR) is the amount of open space required on a residential zoning lot in non-contextual districts, expressed as a percentage of the total floor area on the zoning lot. For example, if a building with 20,000 square feet of floor area has an OSR of 20, 4,000 square feet of open space would be required on the zoning lot ($0.20 \times 20,000$ sq ft).

Quality Housing Program - enacted by Bill De Blasio, The Quality Housing Program, mandatory in contextual R6 through R10 residence districts and optional in non-contextual R6 through R10 districts, encourages development consistent with the character of many established neighborhoods. Its bulk regulations set height limits and allow high lot coverage buildings that are set at or near the street line. The Quality Housing Program also requires amenities relating to interior space, recreation areas and landscaping.

R7 - a medium density residential district as classified by the New York City Department of Planning.

R7-2 - a R7 district with extra parking requirements. In R7-2 districts, parking must be provided for 50% of the units.

Rent stabilization - a program in New York that began in 1943, stating that certain apartments that are rent stabilized cannot have their rents raised by levels more than those set by local rent boards. Tenants cannot be evicted or denied signing their leases for any other reason other than not paying rent. However, because this program is unsubsidized, landlords are lobbying for the return of these apartments to market rate after the original tenants move out. There are over 1 million apartments in New York City that are rent stabilized, but the stock is rapidly shrinking.

Section 8 - part of a federal act called the Housing and Community Development Act of 1978.

Section 8 Portable Vouchers - in the portable vouchers option of the section 8 act, rental assistance is tied with the tenant. The tenant pays no more than 30% of their income on rent.

Section 8 Project-Based - in the project-based section 8 act, rental assistance is tied with specific apartments. The tenant pays no more than 30% of their income on rent. However, there is no guarantee of affordability if the tenant decides to move out of the associated apartment.

Social housing - as defined in Michael Harloe The Recommodification of Housing (1981) by Michael Harloe, social housing is has the following qualities:

1. Ostensive (directly or clearly demonstrative) definition: housing built/managed for rent by local authorities or housing associations or other registered providers
2. Low rent, security, housing need- three dimensional definition from shelter

Ten-year plan - enacted by Bill De Blasio in 2016, the Ten-year plan is his administration's answer to the current housing crisis in New York City.

Bibliography

Print Sources

- Barrow, Susan, and Rita Zimmer. "Transitional housing and services: A synthesis." Practical Lessons: The 1998 National Symposium on Homelessness Research. Washington, DC: US
- Berghauser Pont, Meta Yolanda, and Per André Haupt. Space, density and urban form. Diss. TU Delft, Delft University of Technology, 2009.
- Bloom, Nicholas Dagen. Public Housing That Worked: New York in the Twentieth Century. University of Pennsylvania Press, 2014.
- Dailey, Jessica. "NYCHA Shares Details About Controversial Land Leasing Plan." Curbed NY. 2013. Accessed September 18, 2016.
- Ellen, Ingrid Gold and Max Weselcouch. "Housing, Neighborhoods, and Opportunity: The Location of New York City's Subsidized Affordable Housing." New York: NYU Furman Center, 2015.
- Fischer, Robert L. "Toward self-sufficiency: Evaluating a transitional housing program for homeless families." Policy Studies Journal 28.2 (2000): 402-420.
- French, Hilary. Key urban housing of the twentieth century: plans, sections, and elevations. WW Norton & Company, 2008.
- Grogan, Paul S. "Proof Positive: Community-Based Solution to America's Affordable Housing Crisis." Stan. L. & Pol'y Rev. 7 (1995): 159.
- Humphreys, Janice, and Kathryn Lee. "Sleep disturbance in battered women living in transitional housing." Issues in mental health nursing 26.7 (2005): 771-780.
- Jacobs, Jane. "The economy of cities." The economy of cities. (1970).
- Lin, Zhongjie. "Nakagin Capsule Tower: Revisiting the Future of the Recent Past." *Journal of architectural education* 65, no. 1 (2011): 13-32.
- Salama, Ashraf M., and H. Alshuwaikhat. "A trans-disciplinary approach for a comprehensive understanding of sustainable affordable housing." Global Built Environment Review 5.3 (2006): 35-50.
- Schill, Michael H., et al. "Revitalizing Inner-City Neighborhoods: New York City's Ten-Year Plan." Housing Policy Debate 13.3 (2002): 529-566.

Schneider, Friederike, ed. *Floor Plan Manual Housing*. Birkhauser Architecture, 2004.

Tighe, Rosie and Elizabeth Mueller. *The Affordable Housing Reader*. Routledge, 2013. Plunz, Richard. *A History of Housing in New York City*. Columbia University Press, 1990.

Web Sources

“David Adjaye’s Sugar Hill Development: A New Typology for Affordable Housing.” Archdaily. June 11, 2014. Last accessed April 19, 2017.

<http://www.archdaily.com/514785/david-adjaye-s-sugar-hill-development-a-new-typology-for-affordable-housing>.

“Jersey City Real Estate Market Overview.” Real Estate Overview for Jersey City, NJ. Accessed September 20, 2016.

http://www.trulia.com/real_estate/Jersey_City-New_Jersey/.

“New York City Maps.” Mta.info. Accessed September 20, 2016. <http://web.mta.info/maps/>.

“NYCHA - Eligibility.” NYCHA - Eligibility. Accessed September 20, 2016.

<http://www1.nyc.gov/site/nycha/eligibility/eligibility.page>.

“NYCHA - Voucher Payment Standards VPS Utility Allowance Schedule.” NYCHA. Accessed September 20, 2016.

<http://www1.nyc.gov/site/nycha/section-8/voucher-payment-standards-vps-utility-allowance-schedule.page>.

“Our Current Affordable Housing Crisis Affordable Housing for Every New Yorker.”

<http://www1.nyc.gov/site/housing/problem/problem.page>.

“Small Town in Town.” Ratt Institute Historic Preservation Graduate Students. Accessed September 19, 2016. <http://smalltownintown.wixsite.com/home/la-guardia-houses>.

Alberts, Hana R. “Shocker: Half of Midtown’s Super Luxury Condos Sit Vacant.” NY Curbed. October 24, 2016. Last accessed April 19, 2017.

<http://ny.curbed.com/2014/10/24/10031340/shocker-half-of-midtowns-super-luxury-condos-sit-vacant>.

The City of New York Mayor Bill de Blasio. “Housing New York: A Five-Borough, Ten-Year Plan.” Last accessed April 19, 2017. http://www.nyc.gov/html/housing/assets/downloads/pdf/housing_plan.pdf.

Coalition for the Homeless. “Rental Assistance Program.” Last accessed April 19, 2017.

<http://www.coalitionforthehomeless.org/our-programs/housing/rental-assistance-program/>.

Daily, Jessica. "NYCHA Shares Details About Controversial Land Leasing Plan." Last accessed October 21, 2016. <http://ny.curbed.com/2013/3/20/10262204/nycha-shares-details-about-controversial-land-leasing-plan>.

Durkin, Erin. "President Trump's \$75M funding cut to NYCHA poses 'gravest threat' in city public housing history." NY Daily News. March 13, 2017. Last accessed April 19, 2017. <http://www.nydailynews.com/news/politics/trump-75m-funding-cut-poses-grave-threat-nycha-article-1.2996918>.

Emporis. "Mayor Fiorello H. LaGuardia Houses." Last accessed April 19, 2017. <https://www.emporis.com/complex/101064/mayor-fiorello-h-laguardia-houses-new-york-city-ny-usa>.

Garrison Architects. "NYC Emergency Housing Prototype." Last accessed April 19, 2017. http://www.garrisonarchitects.com/projects/buildings/oem_housing_prototype.

Help, USA. Last accessed December 28, 2016. <http://www.helpusa.org/>.

Lightfeldt, Alan. "Bright Lights, Big Rent Burden: Understanding New York City's Rent Affordability Problem | StreetEasy." StreetEasy Blog. 2015. Last accessed September 20, 2016. <http://streeteasy.com/blog/new-york-city-rent-affordability/>.

Lindsey, Nate. "Emporis." Laguardia Houses Addition, New York City. Last accessed September 19, 2016. <https://www.emporis.com/buildings/147128/laguardia-houses-addition-new-york-city-ny-usa>.

Merin, Gili. "AD Classics: Ville Radieuse / Le Corbusier." ArchDaily. 2013. Accessed September 19, 2016. <http://www.archdaily.com/411878/ad-classics-ville-radieuse-le-corbusier>.

Modular Building Institute. "Why Build Modular?" Last accessed April 19, 2017. http://www.modular.org/htmlPage.aspx?name=why_modular.

nARCHITECTS. "Carmel Place." Last accessed April 19, 2017. <http://narchitects.com/work/carmel-place/>.

New York City Department of City Planning. "New York City Mandatory Inclusionary Housing: Promoting Economically Diverse Neighborhoods." Last accessed April 19, 2017. https://www1.nyc.gov/assets/planning/download/pdf/plans-studies/mih/mih_report.pdf.

New York City Department of City Planning. "Zoning & Land Use." Last accessed April 19, 2017. <http://maps.nyc.gov/doitt/nycitymap/template.jsp?applicationName=ZOLA>.

- New York City Housing Authority. "Facts About NYCHA." Last accessed April 19, 2017. <https://www1.nyc.gov/assets/nycha/downloads/pdf/factsheet.pdf>.
- New York City Housing Authority. "La Guardia & La Guardia Addition." Last accessed December 13, 2016. <https://www1.nyc.gov/assets/nycha/downloads/pdf/La%20Guardia.pdf>.
- New York City Housing Authority. "NextGeneration NYCHA." May 2015. Last accessed April 19, 2017. <https://www.mailman.columbia.edu/sites/default/files/pdf/nextgen-nycha-web.pdf>.
- New York City Housing Authority. "NextGeneration NYCHA Sustainability Agenda." Last accessed April 19, 2017. https://www1.nyc.gov/assets/nycha/downloads/pdf/sustainability_agenda_fact_sheet.pdf
- New York City Housing Authority. "What is NextGeneration NYCHA?" Last accessed April 19, 2017. <http://www1.nyc.gov/site/nycha/about/nextgen-nycha.page>.
- New York City Rent Guidelines Board. "Housing Resources." Last accessed December 13, 2016. <http://www.nycrgb.org/html/resources/zip.html#tables>.
- New York State Energy Research and Development Authority. "NYSERDA." Last accessed April 19, 2017. <https://www.nyserda.ny.gov/>.
- Office of the New York City Comptroller Scott M. Stringer. April 2014. Last accessed April 19, 2017. "The Growing Gap: New York City's Housing Affordability Change."
- Oh, Eric, and Patricia Arcilla. "Watch NArchitects' My Micro New York Near Completion." My Micro Ny. 2015. <http://www.archdaily.com/tag/my-micro-ny>.
- Pratt Center for Community Development. "Mobility and Equity for New York's Transit-Starved Neighborhoods: The Case for Full-Featured Bus Rapid Transit." Rockefeller Foundation. December 2013. Last accessed September 18, 2016. <https://assets.rockefellerfoundation.org/app/uploads/20131217143911/Mobility-and-Equity-for-NYs-Transit-Starved-Neighborhoods.pdf>.
- Schultz, Dana. "Could You Live on a 9 x 18 NYC Public Parking Space?" August 14, 2014. Last accessed April 19, 2017. <https://www.6sqft.com/could-you-live-on-a-9-x-18-nyc-public-parking-space/>.
- Smith, Greg B. "Exclusive: NYCHA quietly selling off parking lots, green spaces, playgrounds to help ease budget woes." NY Daily News. March 29, 2015. Last accessed April 19, 2017. <http://www.nydailynews.com/new-york/exclusive-nycha-selling-green-space-developers-article-1.2165863>.

Sveiven, Magen. "Nakagin Capsule Tower / Kisho Kurokawa." ArchDaily. 2011.
<http://www.archdaily.com/110745/ad-classics-nakagin-capsule-tower-kisho-kurokawa>.

United States Census Bureau. "American Community Survey." Last accessed April 19, 2017.
<https://www.census.gov/programs-surveys/acs/>.

U.S. Department of Housing and Urban Development. Last accessed April 26, 2017.
<https://portal.hud.gov/hudportal/HUD>.