



8-2017

HUDSON HEALTH CORRIDOR: REDEFINING THE WORKFORCE HOUSING COMMUNITY

Brianne Michelle Burdy

University of Tennessee, Knoxville, bburdy@vols.utk.edu

Recommended Citation

Burdy, Brianne Michelle, "HUDSON HEALTH CORRIDOR: REDEFINING THE WORKFORCE HOUSING COMMUNITY." Master's Thesis, University of Tennessee, 2017.
https://trace.tennessee.edu/utk_gradthes/4860

This Thesis is brought to you for free and open access by the Graduate School at Trace: Tennessee Research and Creative Exchange. It has been accepted for inclusion in Masters Theses by an authorized administrator of Trace: Tennessee Research and Creative Exchange. For more information, please contact trace@utk.edu.

To the Graduate Council:

I am submitting herewith a thesis written by Brianne Michelle Burdy entitled "HUDSON HEALTH CORRIDOR: REDEFINING THE WORKFORCE HOUSING COMMUNITY." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Architecture, with a major in .

Marleen Davis, Major Professor

We have read this thesis and recommend its acceptance:

John McRae, Avigail Sachs

Accepted for the Council:

Dixie L. Thompson

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

HUDSON HEALTH CORRIDOR: REDEFINING THE WORKFORCE HOUSING COMMUNITY

A Thesis Presented for the
Master of Architecture
Degree
The University of Tennessee, Knoxville

Brianne Michelle Burdy
August 2017

Copyright ©2017 by Brianne Michelle Burdy
All rights reserved.

Acknowledgements

Thank you to:

My thesis committee, Marleen Davis, John McRae, and Avigail Sachs, for their continued support, advice, and guidance throughout this process. It is greatly appreciated.

My family and friends for their patience and support as I completed this degree. You have helped make this all possible.

Abstract

Neighborhoods slated for redevelopment and revitalization within urban centers are often overtaken by luxury development due to the incentives and benefits related to return on investment in these relatively ignored areas. Developers tend to create housing that will attract higher incomes in order to gain higher returns, resulting in the creation of an exclusive area marketed to particular groups within a certain income bracket. These areas then grow in popularity, continuing to attract upper class residents, and increasing the income level of the area. The result of this type of development displaces those who previously occupied these areas because they are no longer able to afford the various options and become priced out of their homes. Those with an income below the target market in these neighborhoods are never able to occupy them at all.

This thesis aims to counter the problem. Instead of beginning revitalization with living options exclusive to higher incomes, these communities can instead be anchored by affordable housing options. This involves developing affordable housing marketed to the working class at the initial phase of redevelopment. By combining workforce housing with a health platform, flexible and adaptive spaces can be produced to fit a variety of family types, balance community, and maintain economic sustainability for the future. Through this approach, it is possible for different residents to find housing situations that fit their family with adaptable units for a variety of income levels. A community focus in design becomes an economic driver to produce revenue as well as an attractor of neighborhood residents to help break down barriers and perceptions commonly associated with workforce housing. Architecture has the potential to change the way in which society views and treats workforce housing and its residents. By challenging the current development process, a new approach can be created where residents feel valued and community engagement becomes the forefront of workforce housing design.

Table of Contents

CHAPTER 1	01
Circumstance: Housing & Jersey City	
CHAPTER 2	14
A Housing & Health Partnership	
CHAPTER 3	18
Redefining Workforce Housing	
I. Master Plan Development	19
II. Financial Analysis	26
III. A Program for Community Engagement	37
IV. Adaptive Unit Design	43
CHAPTER 4	60
Conclusions for a Transformative Future	
Works Cited	62
Vita	65

List of Figures

FIGURE 1. Downtown Murals	01
FIGURE 2. Vibrant Streets	01
FIGURE 3. Adaptive Re-Use	01
FIGURE 4. Cultural Diversity	01
FIGURE 5. Average Rental Price of Two Bedroom Apartments	02
FIGURE 6. Luxury Development Lacking Street Culture	03
FIGURE 7. JCHA Housing Locations in Jersey City	04
FIGURE 8. Map of Jersey City Cultural Events	06
FIGURE 9. Map of Jersey City and Hoboken Connections	07
FIGURE 10. Map of Jersey City Transit Lines and Stops	08
FIGURE 11. Income Levels in Jersey City	09
FIGURE 12. Analysis of the Grid	10
FIGURE 13. Historic Rail Networks	11
FIGURE 14. Adding a City Connection with Site Development	12
FIGURE 15. Commercial Plan	20
FIGURE 16. Residential Plan	21
FIGURE 17. Commercial Street Elevation	23
FIGURE 18. Community Space Section	23
FIGURE 19. Jersey City Figure Ground	25
FIGURE 20. Site Circulation Diagram	25
FIGURE 21. Spatial Zones Diagram	25
FIGURE 22. Developer Driven Financial Model	28
FIGURE 23. Resident Driven Financial Model	29
FIGURE 24. Rent to Own Financial Model	30
FIGURE 25. City Owned and Operated Financial Model	31
FIGURE 26. Final Financial Model	33
FIGURE 27. Rental Types	35
FIGURE 28. Project Phasing	36
FIGURE 29. Program	38
FIGURE 30. Health Program	39
FIGURE 31. Housing Program	40
FIGURE 32. Program Locations on Site	42
FIGURE 33. Grid Development for Units	44
FIGURE 34. Growing Unit Modules	44
FIGURE 35. Unit Modules	45
FIGURE 36. U Building Floor Plan	46
FIGURE 37. Unit Adjacency Types	47
FIGURE 38. Moving Blocks Study	48
FIGURE 39. Infill Study	48
FIGURE 40. Resident Courtyard Perspective	49
FIGURE 41. Tower Studies	50

FIGURE 42. Main Street Perspective	51
FIGURE 43. Rent to Own Floor Plan	52
FIGURE 44. Rent to Own Unit Types	53
FIGURE 45. Rent to Own Diagrams	54
FIGURE 46. Micro Unit Plan	55
FIGURE 47. Micro Unit Model Plans	56
FIGURE 48. Micro Unit Diagram	57
FIGURE 49. Tower Diagram	58
FIGURE 50. Pedestrian Walk Perspective	59

CHAPTER 1 | Circumstance: Housing & Jersey City

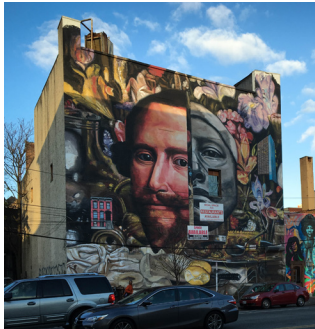


Figure 1. Downtown Murals

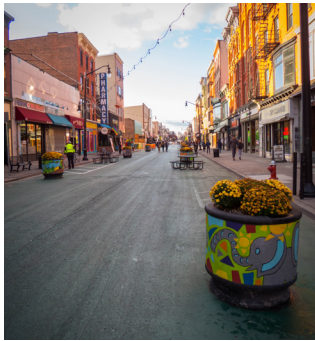


Figure 2. Vibrant Streets



Figure 3. Adaptive Re-Use



Figure 4. Cultural Diversity

Jersey City, New Jersey, located directly across the Hudson River from lower Manhattan, has had a reputation for being an area to seek refuge from the relatively high housing prices of the New York City area. Previously known for its relative affordability, Jersey City is now seeing rates of rapid development and change, increasing rental rates to become similar in price to the rest of the area (figure 5).

With this rapid development and change to luxury oriented buildings, Jersey City is beginning to lose a sense of cultural identity where this development is taking place, particularly near the riverfront and adjacent to the chosen site for this thesis. The rich culture and history of Jersey City is evident throughout the downtown area. This can be seen through the city mural program that adorns many downtown structures (figure 1), the adaptive re-use of old industrial buildings (figure 3), the local arts culture (figure 2), restaurants with cuisines from around the world, and the many festivals that take place throughout the year celebrating all of these factors. With this rich sense of culture (figure 4) comes a certain level of pride associated with being from this area, displayed through the many cultural groups that call Jersey City home. The diversity of the area is evident throughout the city and is extremely important to Jersey City's identity.

This diverse and artistic culture is often the main factor that causes many residents to become attracted to living in Jersey City. With this being the case, it is extremely important that continued development, particularly housing development, embraces these factors and creates an environment for Jersey City to continue to thrive culturally. The new, luxury development fails to do so. Extreme high rises out of scale to the remainder of the city, surrounded by gated parking lots at the ground level, fail to address the active street culture evident in Jersey City. If development of this type continues, any and all active streets will become lost, diminishing the culture that defines Jersey City as it is today.

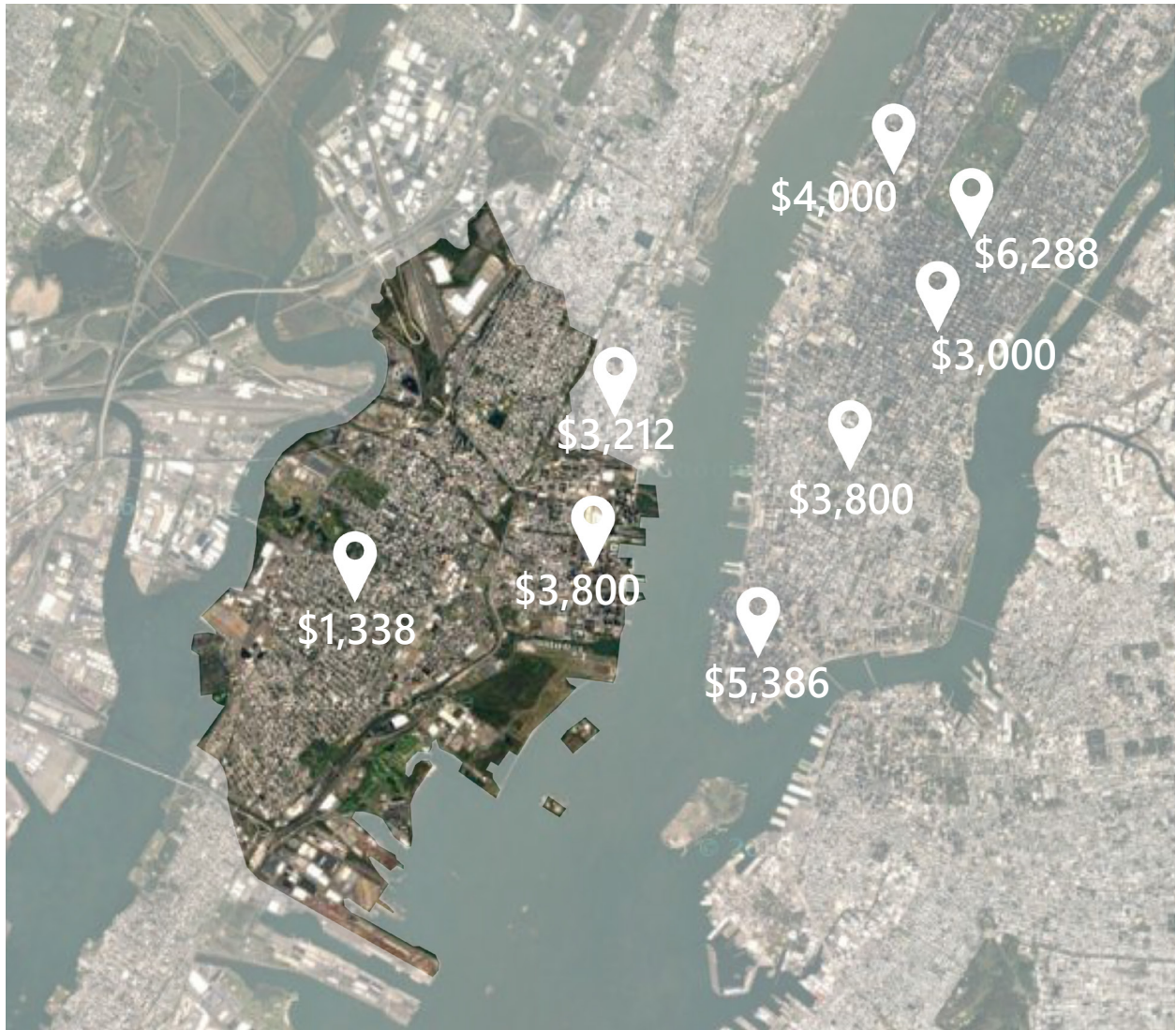


Figure 5. Average Rental Price of Two Bedroom Apartments

In contrast to the luxury development (figure 6), government housing options fail to address any level of high design and fail to meet the demands of city residents in need of reduced rate housing. Currently, there are many residents in need of housing options at a reduced rate and the Jersey City Housing Authority (JCHA) does not have enough housing facilities to accommodate these residents (figure 7). Even with continued development by the JCHA, affordable housing options continue to be poorly designed and are actually removing density, the exact opposite of what needs to be done. The number of residences is decreasing as continued development by the JCHA takes place due to the fact that JCHA's solution to improve living conditions is to replace large, high rise structures with single family homes and row houses. The purpose of this is to provide residents with a better quality of life. This is not only extremely out of context for the area, but displaces many families as the number of units in these complexes is being drastically reduced.

Housing developers and the current housing market in Jersey City have set up a situation in which there is no appeal to develop affordable housing in Jersey City due to the increased demand on the area. Workforce housing for Jersey City residents, that is not defined as luxury living, is a necessity for the area, yet extremely hard to come by. In the event it exists, it hardly ever encompasses high design.



Figure 6. Luxury Development Lacking Street Culture

Given these conditions of a workforce housing need, an increase in luxury development that removes culture from the streets of Jersey City, and its proximity to work options in both New York and New Jersey, Jersey City sets up a series of complex conditions to explore how workforce housing can be created to maintain community, yet still provide appeal and incentive, from a financial standpoint, to a developer.

The specific site chosen to be designed for development for this thesis is located on the northern edge of Jersey City,

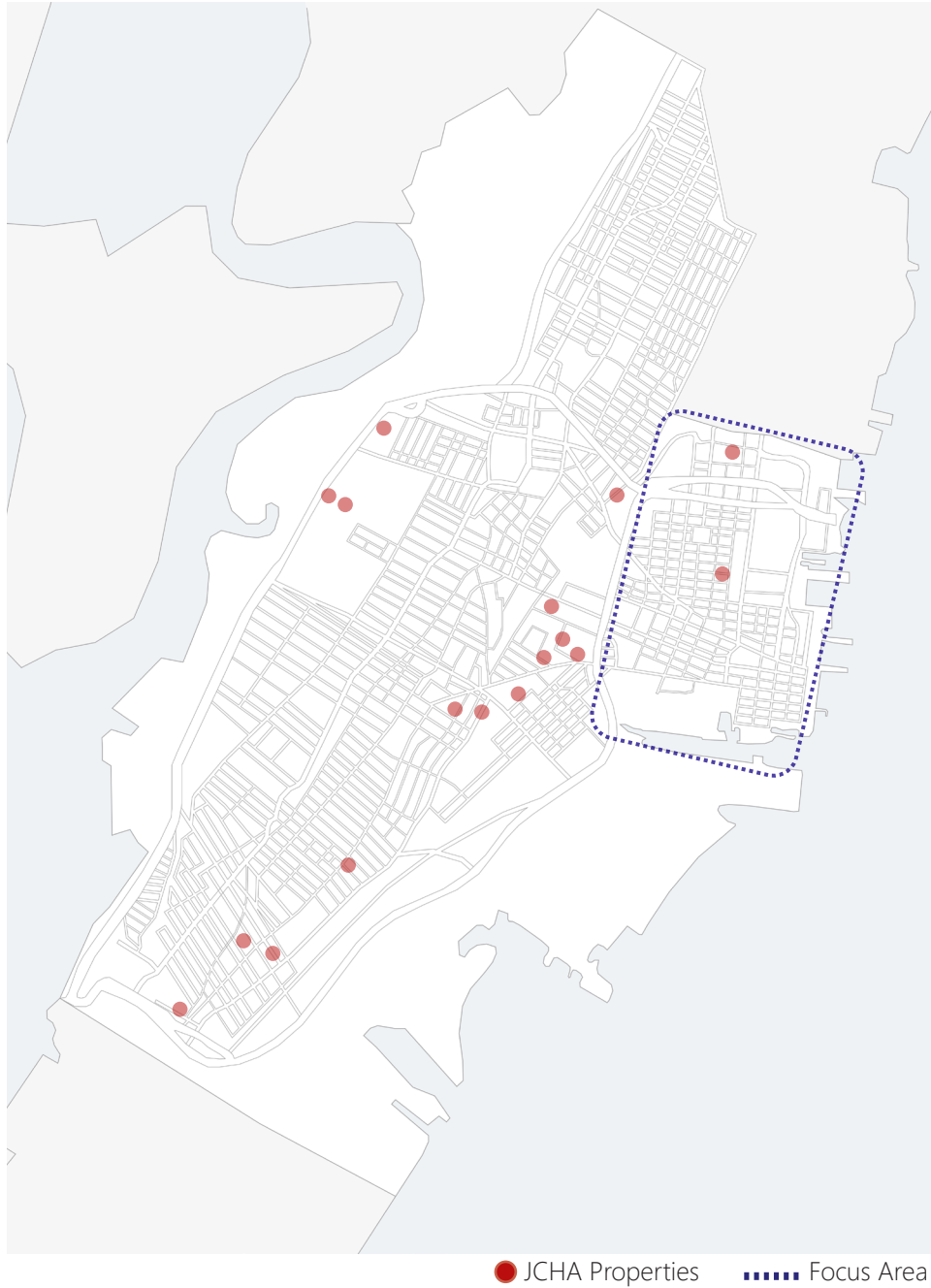


Figure 7. JCHA Housing Locations in Jersey City

This site was chosen because it is currently slated for redevelopment by the city and is one of the only areas of Jersey City that has yet to acquire its own identity within the greater whole, even though many of the components that encompass the local diversity are within close proximity to the site. Location near transit provides great opportunity for housing convenience while also resulting in decreased land costs upfront. With the proximity to waterfront parks and the downtowns of Hoboken and Jersey City, along with the positioning of the site along a major transit corridor, the site becomes an opportunity to develop another key hub within the Jersey City framework. With the possibility of attracting residents from the surrounding community, a situation is established in which a unique program can be introduced that fills the missing gaps with integral elements and creates a threshold between two vibrant city centers.

Instead, the area has begun to be developed by a luxury housing developer who is poorly setting a standard for the area and limiting the potential growth of this integral northern edge. Through the presentation of this new approach, the luxury development in the area could potentially be offset by workforce housing options and a community center better suited for the area, with a higher level of design.

Through urban analysis studies, various factors were evaluated to determine the needs of the particular site and how this contributes to the larger network of the city as a whole. Factors that were analyzed include location and proximity of cultural buildings, locations of various cultural events (figure 8), where cultural centers exist within the current framework, major traffic corridors and patterns (figure 9), transit stops and routes (figure 10), and median income levels (figure 11) and their proximities throughout the city. In addition to these values, certain situations were mapped to understand how the city has developed over time, thus informing these current conditions. This included how historical rail lines (figure 13)

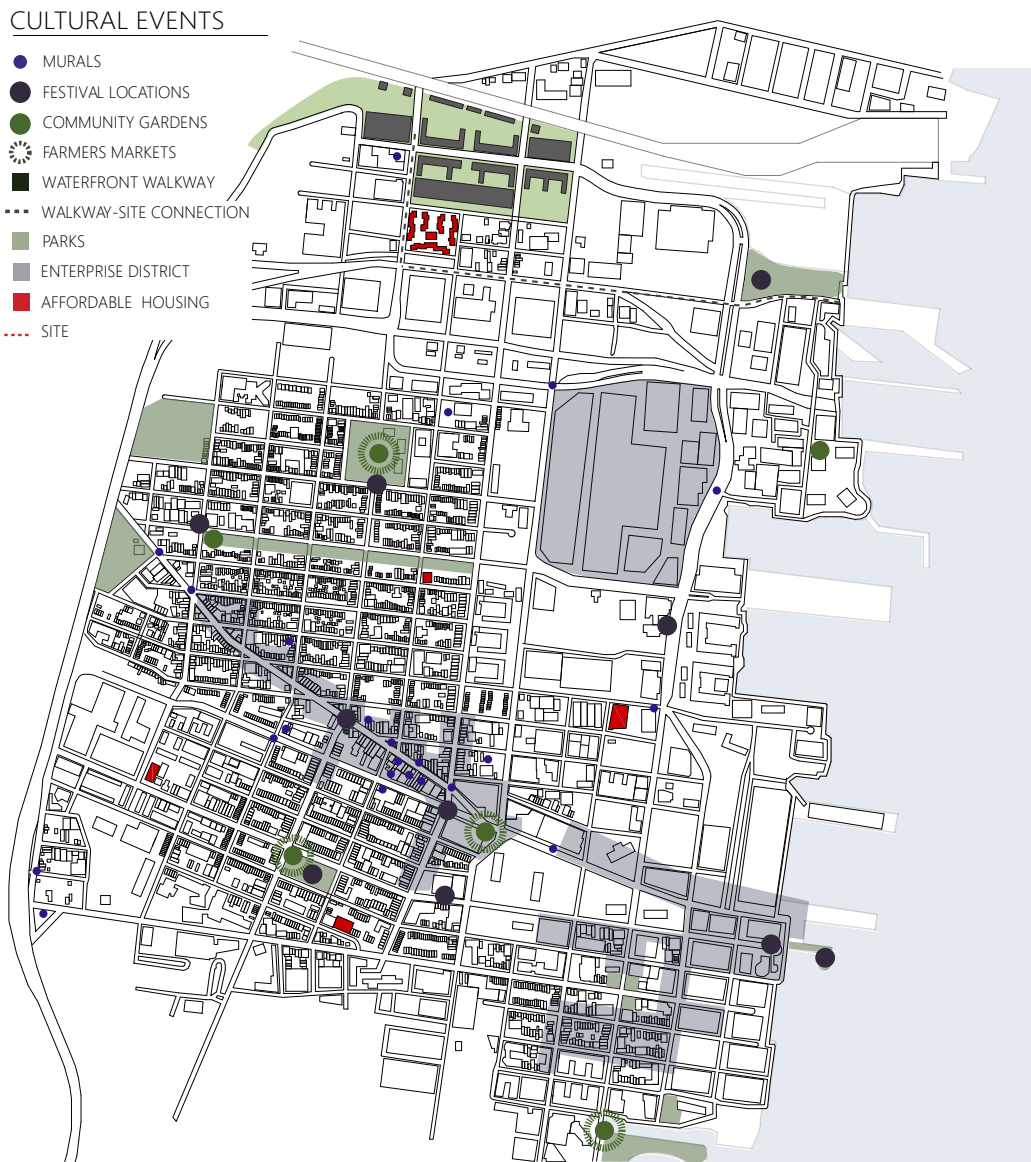


Figure 8. Map of Jersey City Cultural Events



Figure 9. Map of Jersey City and Hoboken Connections

TRANSIT

- PATH
- LIGHT RAIL
- 5 MINUTE WALKING RADIUS
- AFFORDABLE HOUSING
- ⋯ SITE

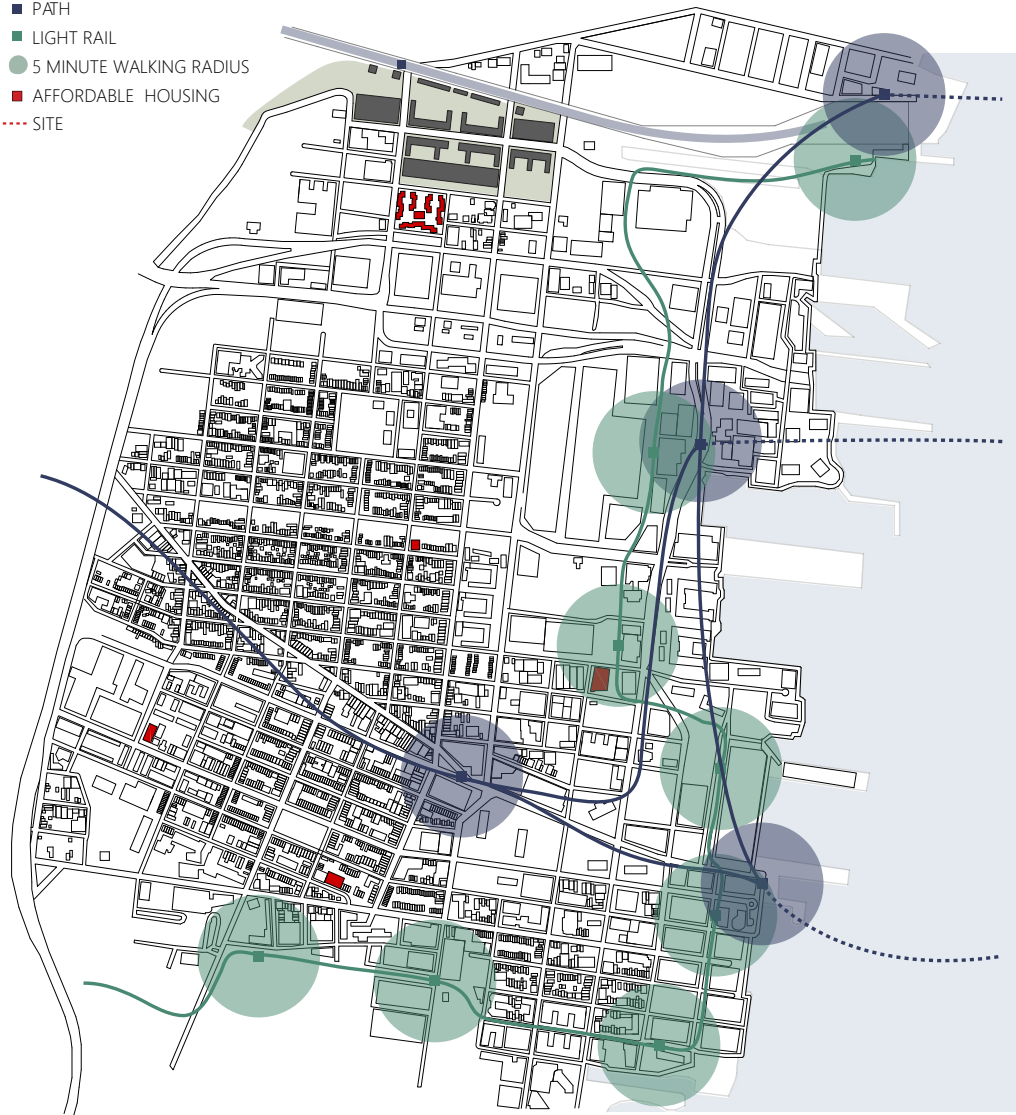


Figure 10. Map of Jersey City Transit Lines and Stops

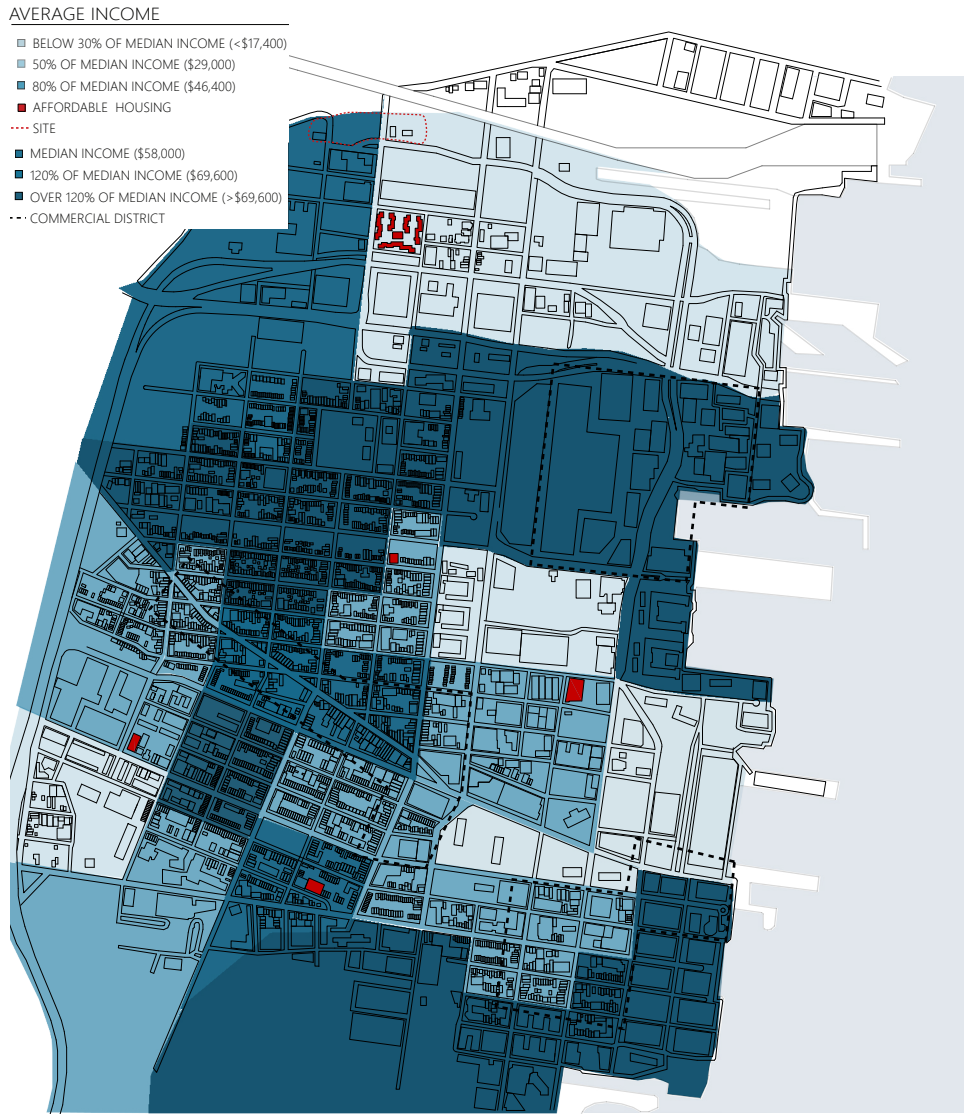


Figure 11. Income Levels in Jersey City



Figure 12. Analysis of the Grid



Figure 13. Historic Rail Networks

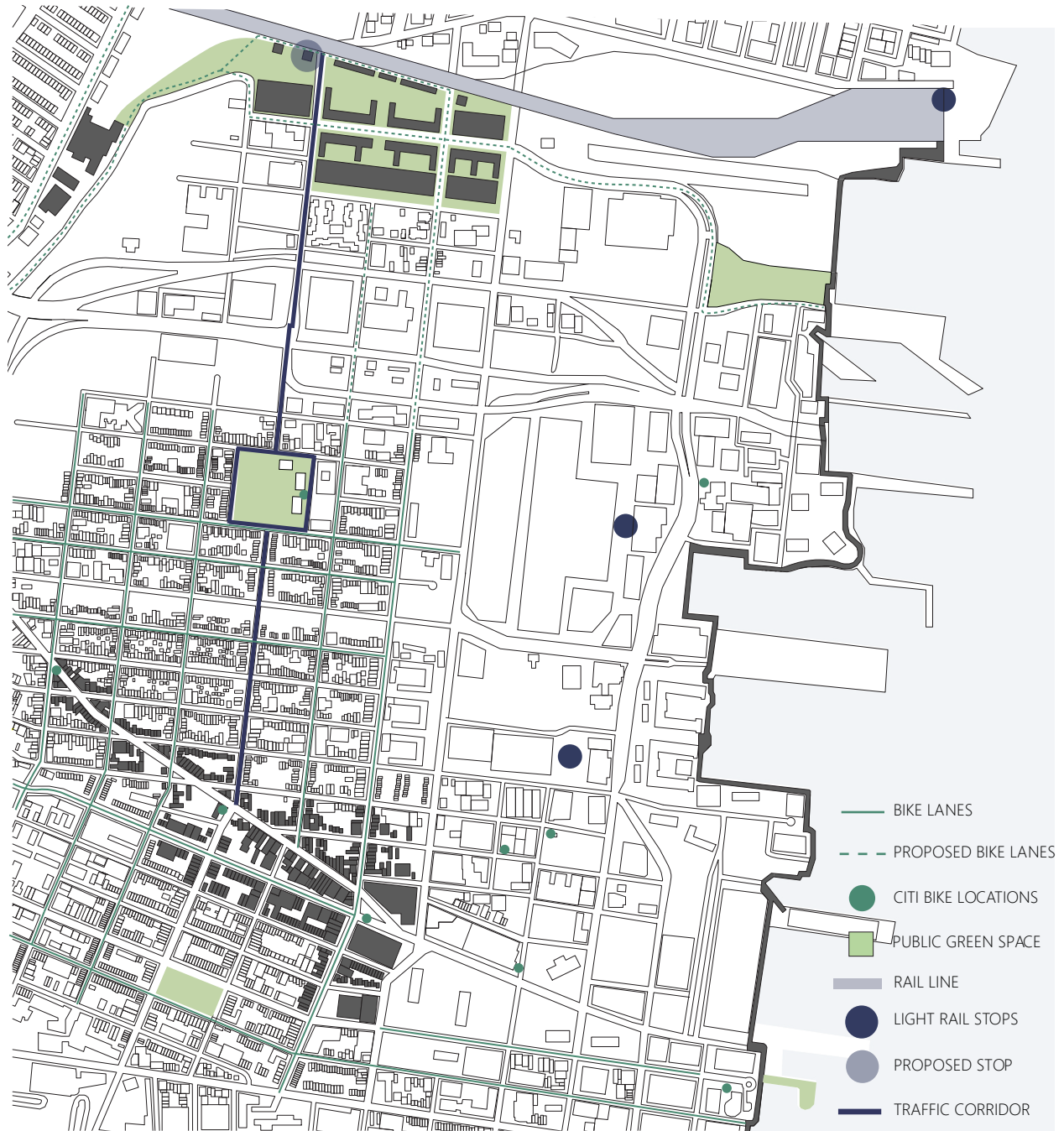


Figure 14. Adding a City Connection with Site Development

have since informed the development of the city grid (figure 12) and current street patterns (figure 14).

Setting the circumstance for proposed development on this site in Jersey City and understanding the site and extended community were vital to the success of the final design. Analysis and understanding of the site was also necessary to inform the various housing situations that would be encompassed in the final design, as well as the supporting programs that would be integral to the financial success of development.

CHAPTER 2 | A Housing & Health Partnership

After various methods of analysis were used to understand the program best suited for site development, it was determined that an underlying programmatic element would be necessary. This was needed to ensure the success of the economic equation, as well as to attract members of the surrounding community. These members of the surrounding community would pertain to those who may not live in the new development on the site, but would visit it should there be a reason to. Through the study of various precedents, it was determined that a health program would best suit the area, attract residents, enhance the surrounding community, and present multiple financial opportunities.

First and foremost, the health program presents an excellent opportunity for residents within the affordable housing system to receive healthcare within close proximity of their home. Those within the affordable housing system are often in need of healthcare services, yet are unable to afford them or do not know where to attain these services. By incorporating healthcare directly into the housing program, clinics and screening services can be provided directly within the facilities of the apartments, make access to care attainable. Educational and outreach services will also be provided to encourage preventative actions and improve the standard of health and wellness for all residents.

Incorporating a health program with workforce housing also provides the opportunity for additional funding sources. Local governments will be more inclined to invest in local housing projects that will save them money long term, such as projects that include healthcare or transit. By investing in housing with healthcare facilities, standards of health will be improved within the community, resulting in less hospital visits and reduced procedures of more drastic means of care that operate on city funding. The city's decision to invest in healthcare upfront becomes a long term economic investment for city funds.

A similar situation applies to health insurance companies. With the fairly large amount of capital commonly held by national health insurance companies, they are able to become a viable potential investor in health enriched housing development. By investing in housing with a healthcare component, care will increase at an earlier level and educational resources will be provided, increasing preventative care. With an increase in preventative care, hospital visits and more expensive health procedures will decrease over time. As these costly factors, often covered by insurance companies, decrease amongst users, insurance companies will begin to save money. Increasing in upfront, preventative care becomes a long term investment for insurance companies to retain more of their revenue and cover the cost of fewer procedures.

In addition to these funding options, health becomes a viable supporting program option because of the site's proximity to major hospitals. Directly adjacent to the site, within walking distance, is a large, major area hospital for Jersey City. The local transit lines, running through the site, connect to New York City in less than twenty minutes, providing access to major hospitals in a relatively short amount of time.

The development will include a large amount of commercial storefronts that can be occupied by many different entities associated with healthcare. The healthcare program provides a wide array of potential commercial renters to provide income for the financial equation. Upscale health facilities such as boutique gyms, natural supplement shops, and plastic surgeons, can affordable higher rates for their commercial storefront. This would then be balanced by the local clinics, educational facilities, and health food shops attainable to all incomes, who will pay a lower rental rate per square foot for their commercial storefronts as a tradeoff for their lower revenue businesses.

With the direct access to hospitals, as well as the introduction of additional healthcare facilities upon completion of the development, there will be a large amount of healthcare workers in the area who then become potential renters. Including healthcare as an underlying program component is further supported by the fact that healthcare workers cover a wide array of income levels. Healthcare employees stem beyond the common association of doctors and nurses and also includes employees such as technicians, receptionists, custodial staff, pharmacists and practitioners, just to name a few. Many employees within this network are in need of workforce housing options. While there are some employees within this network that lie outside the income bracket for workforce housing, they will be able to afford market rate units to contribute to the financial success of the development. For example, a surgeon who comes to the hospital only a few times per week may be able to rent a small unit when it is necessary to be near the hospital and live elsewhere, farther outside the city, on days off.

With the incorporation of a healthcare component, it is important to define what exactly this entails. A focus on health extends beyond doctors' offices and clinics with routine screenings. In order to improve health at a community level and attract a variety of user groups and income levels, health needs to be approached from the perspective of holistic health. This involves resources for physical health, the most common element of holistic health. Physical health applies to elements such as clinics, screening rooms, doctors' offices and gyms. Extending beyond this basic components, physical health can include cooking classes and community kitchens, access to outdoor facilities for group fitness, and the introduction of bike and running trails at a city level. Other elements of holistic health involve social, mental and spiritual health. Social health promotes engagement and interaction and can include aspects such as meeting room facilities, community gardens, art classes, and galleries. Mental and spiritual health contains

elements such as therapy services, space for meditation, reflection, and relaxation, and walks to clear thoughts and discover one's self. To balance the holistic health equation, social, spiritual and mental health need to be valued to the same regard as physical health.

Creating a community that extends beyond just basic housing necessities is essential to begin to change the way workforce housing is designed and developed. By incorporating health as the supporting programmatic element, the concept beyond the design and implementation of workforce housing is taken to a higher level. To further study and refine the healthcare elements that will be implemented into the site, a master plan needs to define enclosure, public, private, and outdoor space. After further development of a master plan, holistic healthcare components can continue to be redefined to best serve the needs of the immediate community.

CHAPTER 3 | **Redefining Workforce Housing**

The objective behind the ultimate goal of redefining workforce housing involves creating a new approach to the way in which this type of housing is thought of and valued in society, and how this, in turn, influences design approach. Throughout history, society has downgraded many types of affordable housing and the residents who occupy them. With the appropriate changes, a result can be created in which this is no longer the case. Affordable can be high design, well thought out and considered, and value human life.

The approach to the redefinition of workforce housing has been divided into three phases, all of which consider, and take influence, from the predeceasing research and analysis. These three phases pertain to master plan development, financial analysis, programming for community engagement, and designing adaptive units. A design emphasis within each of these major categories challenges current affordable housing design practices and presents new alternatives for a more dynamic design future.

Master Plan Development

Full development of a master plan that was able to create and define community space was essential to the success of the proposed development. The master plan went through multiple iterations to determine various aspects of the location and density of assorted program elements. While creation of the specific programmatic elements were developed jointly with the master plan, they will be discussed in detail in the following section.

The first aspect of the master plan development involved the design of the built forms that would occupy the site. Conditions that affected the design of these structures involved building size, shape and location, density options relating to corridor size and building heights, and set backs and distances between buildings and other existing structures.

The final design settled on a combination of three building types (figure 15). The core of the site is composed of u-shaped buildings with single loaded corridor wings. The double loaded portion of the building would be seven stories high, with the wings reaching five stories in height, and resident roof gardens on the top level. The center of the u then becomes public and resident amenity space. The decision for a single loaded corridor in the wings was made because of the emphasis on introducing natural light into the circulation space. The corridors of apartment buildings are places of potential interaction to meet new neighbors and learn about those you share a space with (figure 16). This interaction is extremely important in mixed income housing where social interaction between income levels is known to be a problem. Building height was meant to maintain a balance between an eyes on the street mentality and a maximization of residences. It was important to create buildings that were not astronomically tall and out of context for the city. This can also take away from the vibrant street life, as seen in the luxury development.



Figure 15. Commercial Plan



Figure 16. Residential Plan

The site is bordered on either edge by two u-shaped buildings designed in a similar manner to those at the core of the site. However, instead of community courtyards filling the interior of the structure, a parking garage is inserted in its place. This is to provide additional amenities to residents who may not be in the center area of the site, the prime zone for community engagement. In this sense, the parking situation acts as one of the tradeoffs for living in this area of the site. The parking also helps to provide additional transit parking, as well as serve as a source of revenue for the site from a financial aspect. The parking garage has a resident roof garden above, providing residents with an additional amenity and access to outdoor space.

Lastly, the site is bordered on the northern edge by tower structures along the transit corridor. This is to provide yet an additional type of housing to the scheme to attract a variety of user groups. These towers, reaching fourteen stories in height, are still small in comparison to nearby luxury development but are able to maximize the number of units. This enables the opportunity to provide housing to as many city residents in need of affordable housing as possible.

In addition to the building and housing types designed for the master plan, a variety of community spaces and resident amenities were designed on the exterior of the building (figure 17). The goal of this was for the outdoor spaces and indoor spaces to flow together, creating a continuation of space throughout the site (figure 18). Areas introduced to the exterior include spaces such as sports facilities, transit stations, market areas, community gardens and farmers' markets. These spaces will be discussed in more detail in the following section pertaining to program.

Circulation through the site was a challenging factor given the variation of housing types as well as outdoor spaces. The pedestrian and bicycle transportation were the most



Figure 17. Commercial Street Elevation



Figure 18. Community Space Section

important. Pedestrian paths are accessible throughout the site with the major pedestrian thruway running on a north-south axis. This grid line, currently broken by the site, will be reinstated as a pedestrian way, connecting pedestrians in Jersey City thru to Hoboken. Pedestrian circulation also occurs along the roads, which become retail orientated (figure 21), and through the back portion of the site where paths for meditation and art parks have been introduced (figure 20). Bike paths have been added to the major roads through the site, this connects into a larger citywide bike path system. The bike path extends through the northern portion of the site, under the rail line, around the sports facilities, and to the nearby hospital. Near the proposed transit station and adjacent to parking facilities, a bus drop off lane has been incorporated. Roads through the site have been maintained but modified to reduce the number of lanes in some locations to make the streets friendlier to pedestrians. The introduction of crosswalks to connect major commercial streets also puts the circulation focus on the pedestrian as opposed to the car.

Transit is the final component of the master plan. Currently, an elevated rail line exists on the site in which local trains and the city light rail travel regularly. While this track is heavily utilized, there is no stop at this location. In order to access local trains or the light rail, one must venture for at least twenty minutes on foot to find the nearest station. With this difficulty of finding accessible transit in the area, a light rail stop has been proposed at this location with the introduction of an additional transit station. This will better serve the area as well as the future residents of this workforce housing development (figure 19).

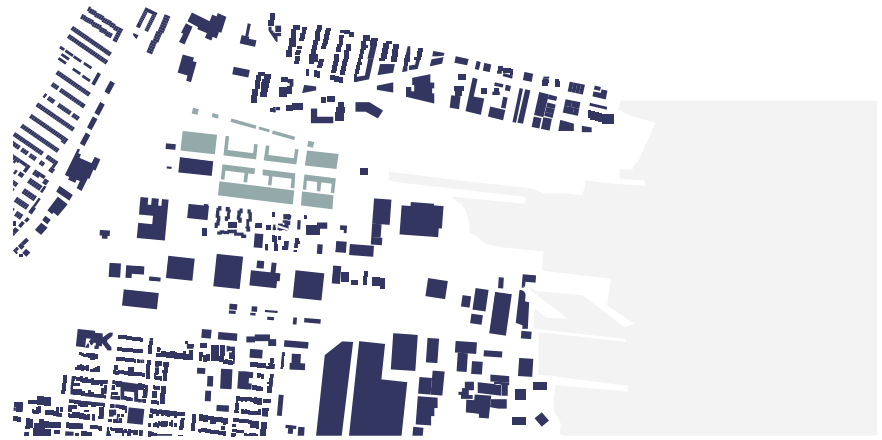


Figure 19. Jersey City Figure Ground

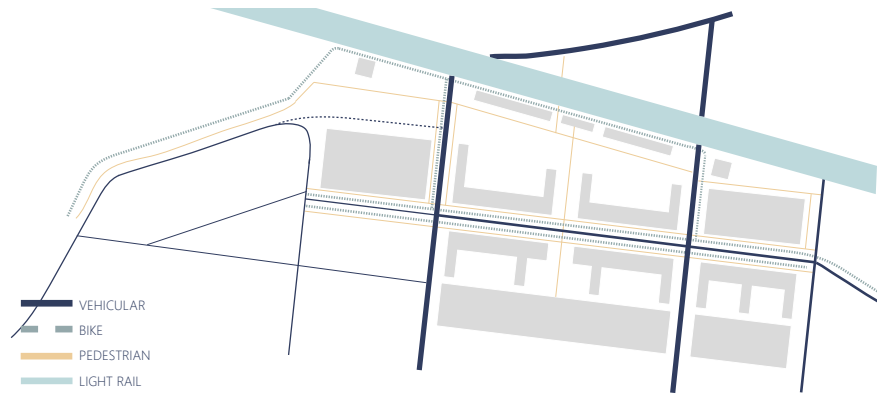


Figure 20. Site Circulation Diagram



Figure 21. Spatial Zones Diagram

Financial Analysis

In order to determine the feasibility of the project, a financial analysis needed to be conducted to test and refine the master plan. Based on various test factors and scenarios, a final financial model was established. In order for the project to be successful, it was important that the financial model have developer appeal through cost of construction and return on investment, be affordable to the potential resident, have commercial income potential, and serve as a location for community development.

After multiple phases of research, several factors were used to test the various financial models. These test factors were divided up into four main categories. These categories are cost of development, funding options, income opportunity, and cost to resident. Cost of development includes the cost of construction, cost of the land, and the amount of units that could feasibly be put on the site in relation to the total cost of construction. Funding options pertains to various sources of investor and/or government sponsored funding options. The test factors within funding options are government funding options based on the type of development, potential investors, and local city and policy changes that could ease the development process. The income opportunity category involves sources of revenue for the potential owner of the site to determine when they would receive a return on their investment. Subcategories of income opportunity include total square feet of commercial space, annual commercial revenue, floors of commercial space, number of parking spaces, and annual commercial revenue to determine total annual potential revenue outside of housing. Cost to the resident pertains to the cost of living for future residents of this development to determine if the project will actually produce rental rates in the proper target market. Subcategories of cost to resident include the affordable rental rate per square foot, the market rental rate per square foot, the transit cost to residents, and

the necessity and cost of outside amenities and additional expenses.

Upon conclusion of the hard number analysis, there were missing factors in the equation that could not be determined by a monetary value. These factors were put into the categories of resident quality of life and community engagement. Resident quality of life includes quality of units, size and availability of outdoor spaces, resident investment in the property, and access to community resources. Community engagement includes appeal to the outside community, quality of the street, scale and context integration, and potential for future growth. In order to assess these categories, a ranking system was applied to each which then contributed to a final 'score' for each category.

With the financial equation in place, four situations were then tested to study how they would respond, from a design and financial standpoint, after being evaluated through the model. Each scenario was tested through the various factors and the master plan was then modified to express the results. The four situations were developer driven, resident driven, rent to own, and city owned and operated.

The developer driven model (figure 22) represents the ultimate appeal to the developer. This is reflected in maximizing the numbers of units and commercial space in order to achieve a higher amount of revenue. This altered the master plan by losing single loaded corridors, increasing the height of the buildings, and losing community space.

The resident driven model (figure 23) represents the initial approach as an architect, to maximize the residential quality of life with the concern not on profit. The model maintained single loaded corridors, community space, and roof gardens. A higher cost of construction does not yield as many units or as much commercial space as the developer driven model.

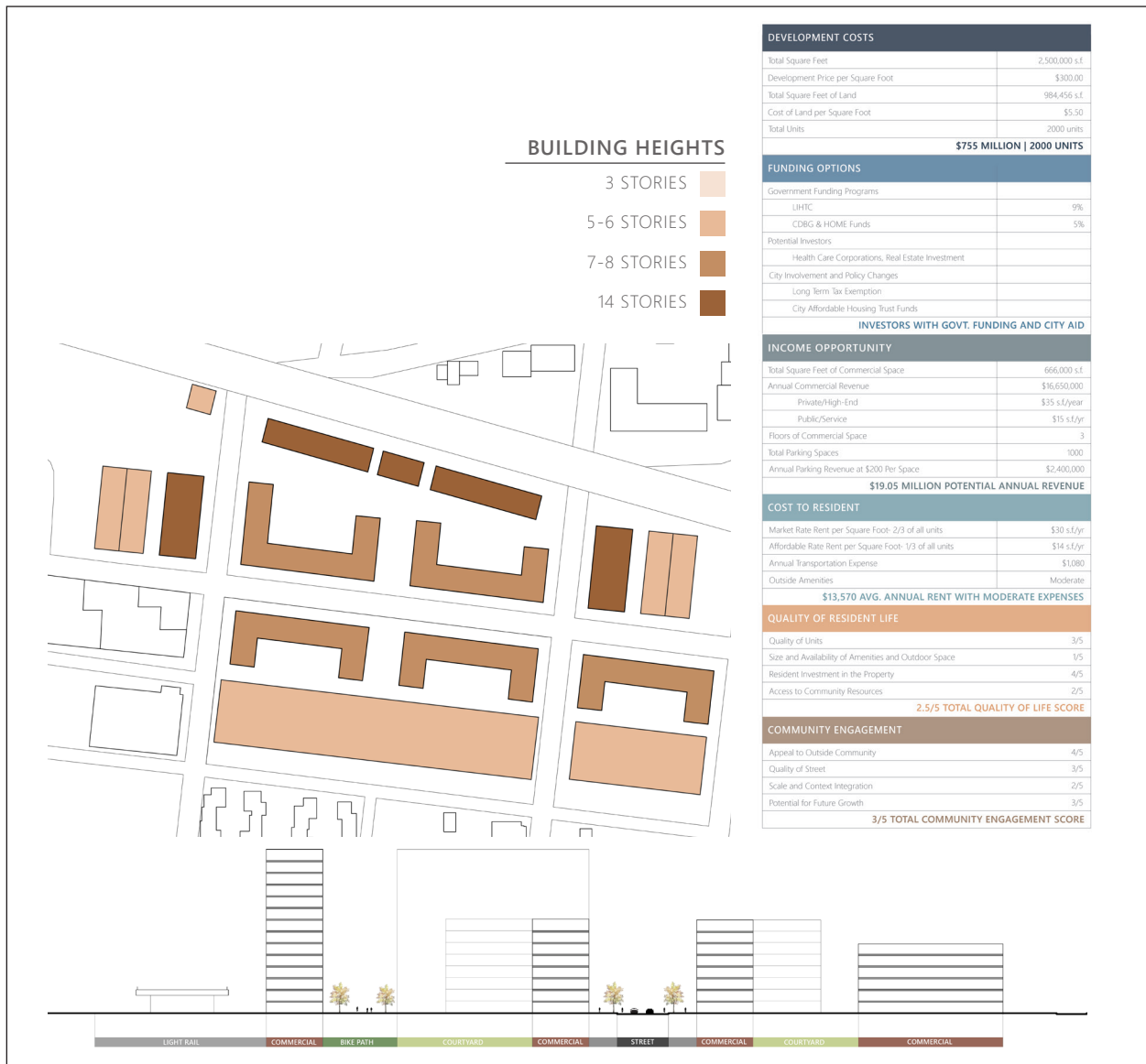


Figure 22. Developer Driven Financial Model

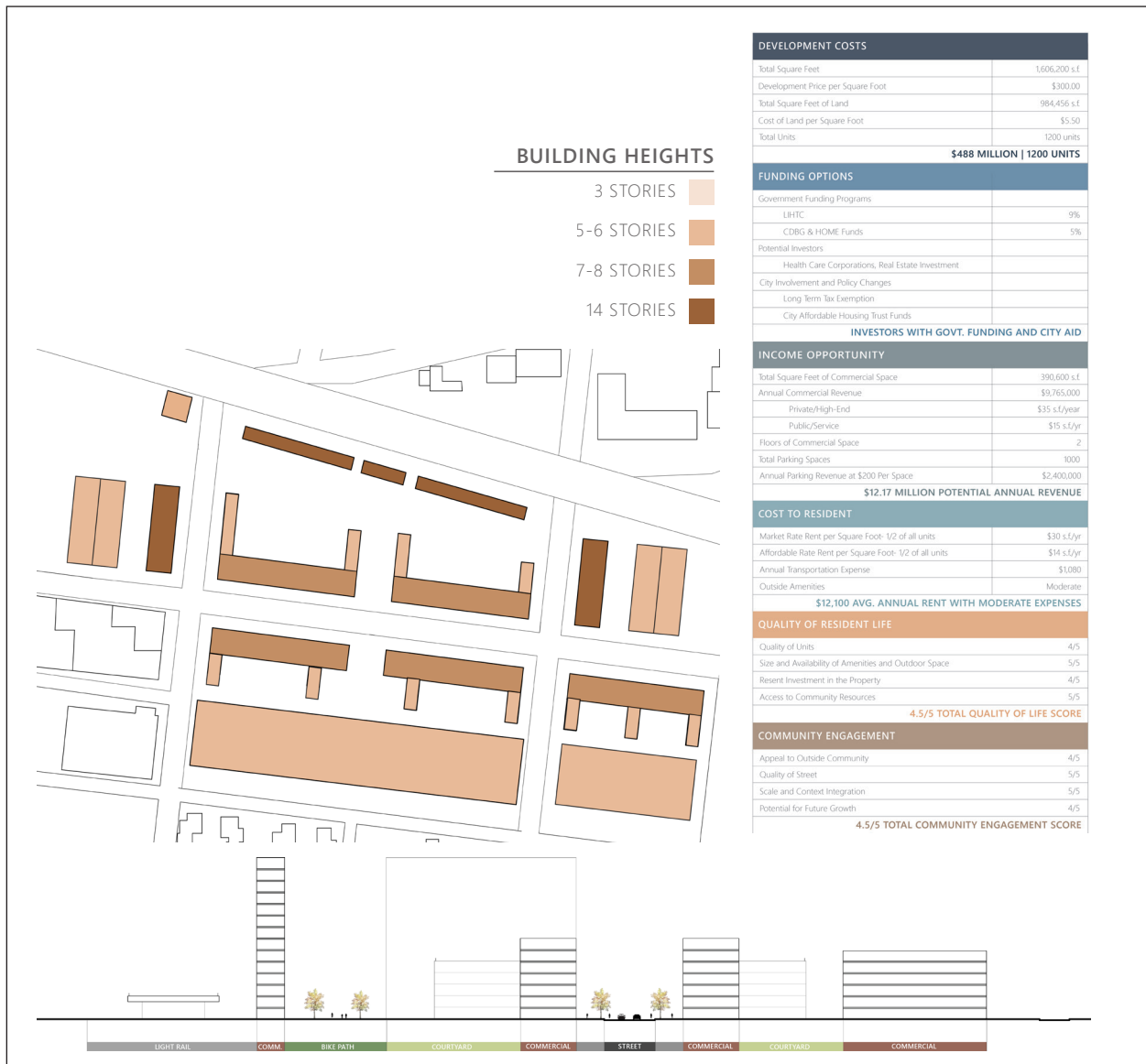


Figure 23. Resident Driven Financial Model

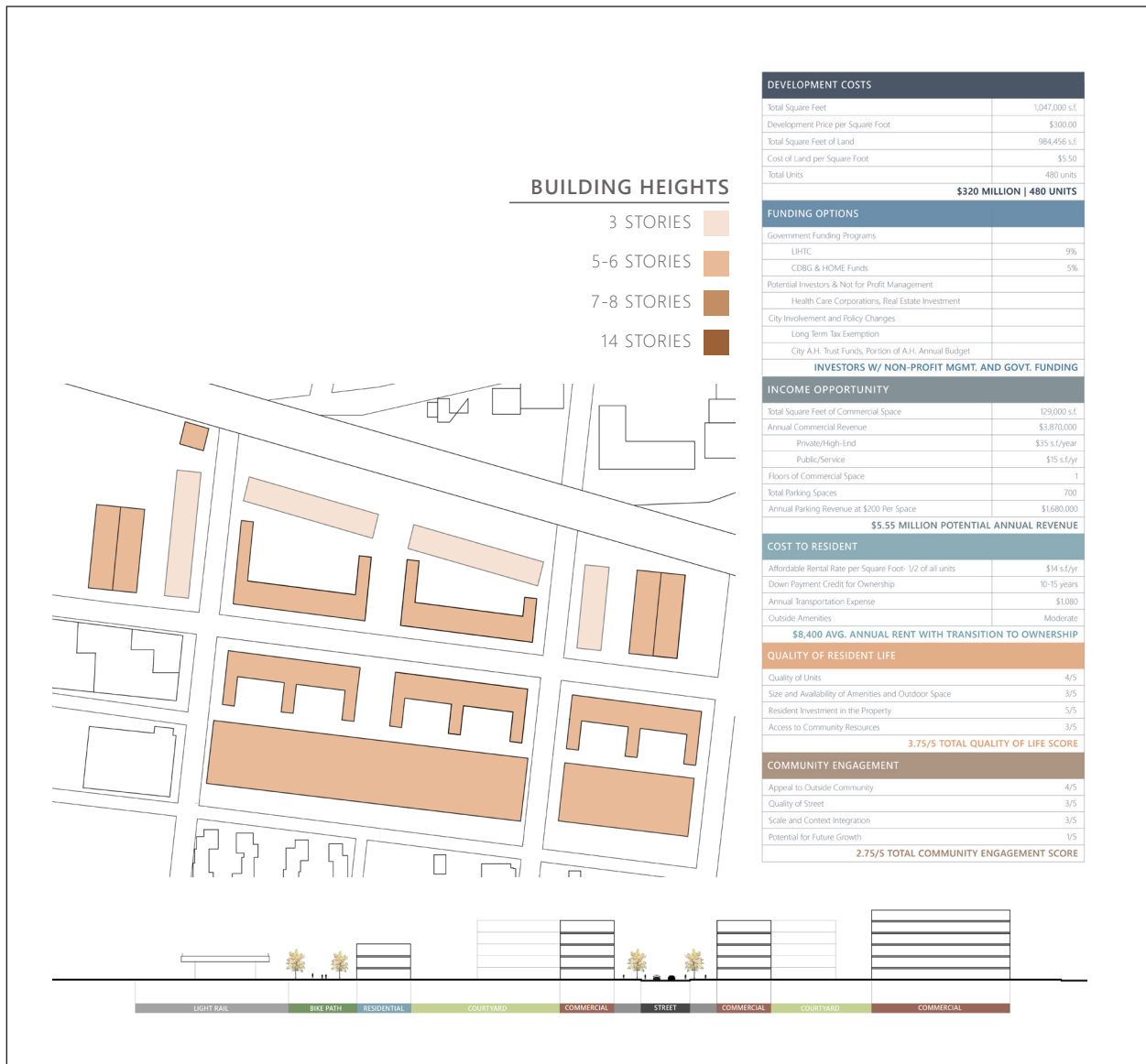


Figure 24. Rent to Own Financial Model

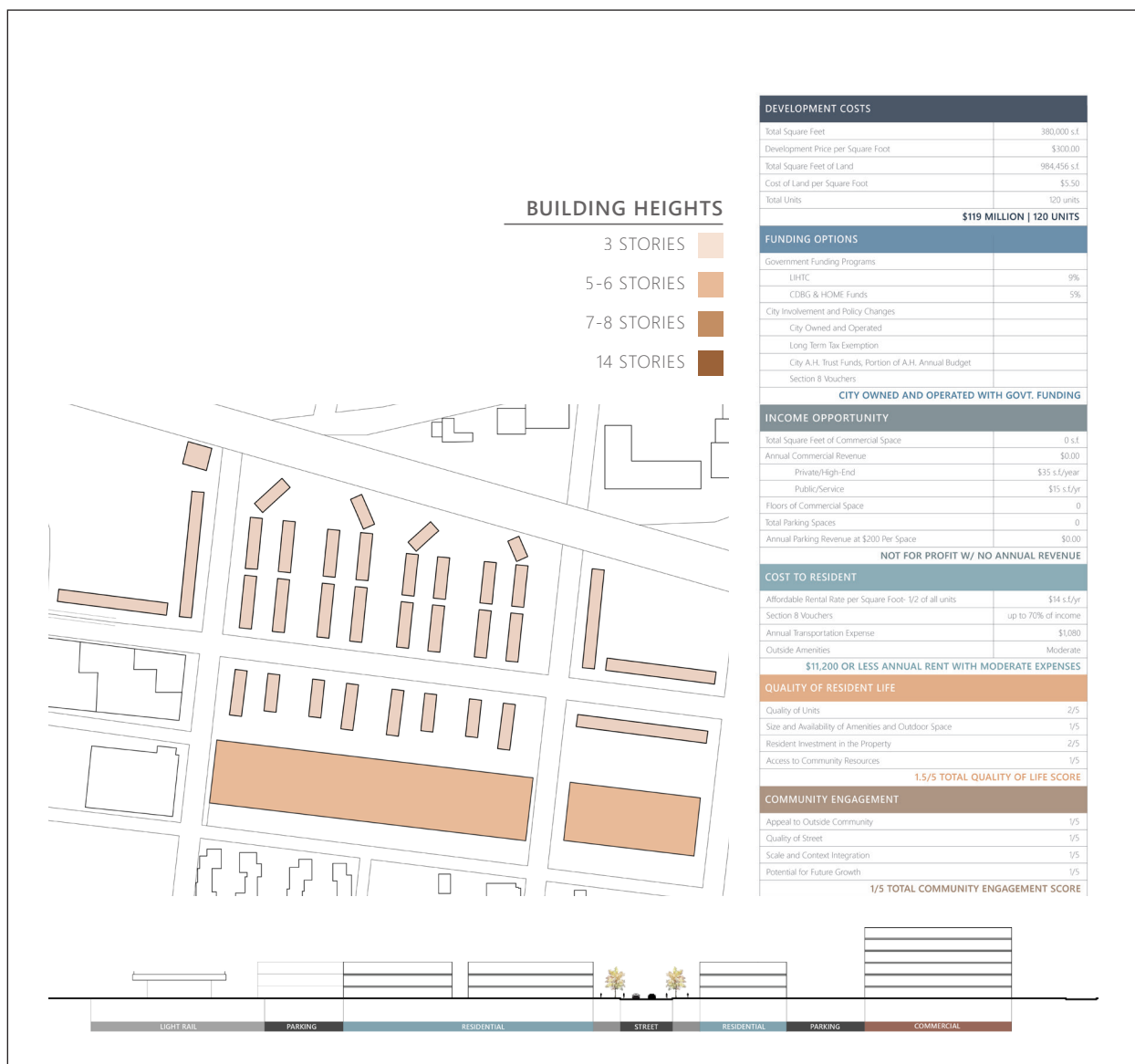


Figure 25. City Owned and Operated Financial Model

The rent to own model (figure 24) was based off a current trend in the affordable housing market. Many cities and state government agencies are allocating money towards affordable housing projects that are rent to own. In this scenario, residents would pay rent for approximately ten to fifteen years with a portion of each of these rent checks being set aside, essentially a type of savings account. After the terms of the agreement is over, the residents receive the sum back to use as a down payment on their home. This system encourages residents to care for and respect their space, stay in a unit long term, and helps transition residents out of the affordable housing system. However, after the term period is over and the units are sold, there is no way to control the price of the units in the future; they could potentially become available only to people well outside the affordable housing income bracket. With this model, units are larger to accommodate growing families who will be living in them long term. Due to the ownership factor of community space once the apartments are owned, it is kept to a minimum to avoid discrepancies of who space belongs to.

The city owned and operated model (figure 25) represents the style of affordable housing currently being implemented by the city. This type of housing does not take into account site context or resident appeal. With this system, there is no commercial space and no potential for future growth. While the least costly, it provides the least amount of units and does nothing to promote community.

Upon studying the four situations modelled, a final financial model was determined and implemented into the project. This final model focuses on maximizing resident quality of life and community development, while also incorporating as many units and commercial storefronts as possible to ensure return of investment for a developer.

This final model used several types of housing (figure 26). The

FINANCIAL MODEL

DEVELOPMENT COSTS	
Total Square Feet	1,928,000 s.f.
Development Price per Square Foot	\$300.00
Total Square Feet of Land	984,456 s.f.
Cost of Land per Square Foot	\$5.50
Total Units	1315 units
\$583 MILLION 1315 UNITS	
FUNDING OPTIONS	
Government Funding Programs	
LIHTC	9%
CDBG & HOME Funds	5%
Potential Investors & Not for Profit Management	
Health Care Corporations, Real Estate Investment	
City Involvement and Policy Changes	
Long Term Tax Exemption	
City A.H. Trust Funds, Portion of A.H. Annual Budget	
INVESTORS WITH GOVT. FUNDING & NON-PROFIT MANAGEMENT	
INCOME OPPORTUNITY	
Total Square Feet of Commercial Space	482,600 s.f.
Annual Commercial Revenue	\$9,652,000
Private/High-End	\$35 s.f./yr
Public/Service	\$15 s.f./yr
Floors of Commercial Space	2
Total Parking Spaces	1,000
Annual Parking Revenue at \$200 Per Space	\$2,400,000
\$12.1 MILLION POTENTIAL ANNUAL REVENUE	
COST TO RESIDENT	
Affordable Rental Rate per Square Foot- 660 Units	\$14 s.f./yr
Market Rate Rental Rate per Square Foot- 285 Units	\$30 s.f./yr
Transfer to Ownership Rental Rate per Square Foot- 370 Units	\$18 s.f./yr
Annual Transportation Expense	\$1,080
Outside Amenities	Moderate
\$860 AVG. MONTHLY RENT WITH MODERATE EXPENSES	
QUALITY OF RESIDENT LIFE	
Quality of Units	4/5
Size and Availability of Amenities and Outdoor Space	5/5
Resident Investment in the Property	5/5
Access to Community Resources	4/5
4.5/5 TOTAL QUALITY OF LIFE SCORE	
COMMUNITY ENGAGEMENT	
Appeal to Outside Community	4/5
Quality of Street	4/5
Scale and Context Integration	4/5
Potential for Future Growth	4/5
4/5 TOTAL COMMUNITY ENGAGEMENT SCORE	

FUTURE EFFECTS

DEVELOPMENT COSTS	
Total Annual Commercial Revenue	\$12,100,000
Total Annual Market Rate Rental Revenue	\$2,600,000
Total Annual Revenue	\$14,700,000
Revenue Accumulated After 15 Years	\$220,500,000
Years to Receive Return on Investment	35 years
40% OF DEVELOPMENT COSTS ACCUMULATED	
FUNDING OPTIONS	
Withstanding City Involvement and Aid	
Long Term Tax Exemption	
City Affordable Housing Trust Funds	
Return to Investors After 15 Years	\$220,500,000
Management Structure	
Not-for-Profit Management of Rent to Own	
Regular Management Company for Rental Units	
MAINTAINING RETURN TO INVESTORS W/ HYBRID MANAGEMENT-	
INCOME OPPORTUNITY	
Total Square Feet of Commercial Space	482,600 s.f.
Annual Commercial Revenue	\$12,100,000
Floors of Commercial Space	2
Annual Market Rate Rental Income	\$2,600,000
Total Parking Spaces	1,000
Annual Parking Revenue at \$200 Per Space	\$2,400,000
\$14.7 MILLION TOTAL ANNUAL REVENUE	
COST TO RESIDENT	
Affordable Annual Rental Rate	\$7,000
Market Rate Annual Rental Rate	\$15,000
Down Payment Credit for Rent to Own After 15 Years	\$150,000
Annual Transportation Expense	\$1,080
Outside Amenities	Moderate
\$11,000 ANNUAL AVG. 30% RESIDENTS TRANSITION TO OWNERSHIP	
QUALITY OF RESIDENT LIFE	
Quality of Units	4/5
Size and Availability of Amenities and Outdoor Space	5/5
Resident Investment in the Property	5/5
Access to Community Resources	5/5
4.75/5 TOTAL QUALITY OF LIFE SCORE	
COMMUNITY ENGAGEMENT	
Appeal to Outside Community	5/5
Quality of Street	4/5
Scale and Context Integration	4/5
Potential for Future Growth	3/5
4/5 TOTAL COMMUNITY ENGAGEMENT SCORE	

Figure 26. Final Financial Model

primary u-buildings became mixed income with units at both market rate and affordable prices. The infilled parking buildings on either end of the site were designated as rent to own units. The towers along the rail line are micro units and the two smaller towers are used as all affordable housing for section eight and multi-generational families (figure 27). Each building is also composed of two stories of commercial space which will be charged at a variety of rates to provide return on developer investment.

The results of the current financial model and projected future scenario in approximately ten to fifteen years proves to be promising for financial return. This financial model, developed alongside the master plan, strengthens the feasibility of this type of development. Due to the scale of the project, development was divided into a series of phases to further strengthen feasibility (figure 28). Through focus on certain aspects of design, affordable and mixed income housing, with a focus on community, can be achieved while still being profitable.



Figure 27. Rental Types

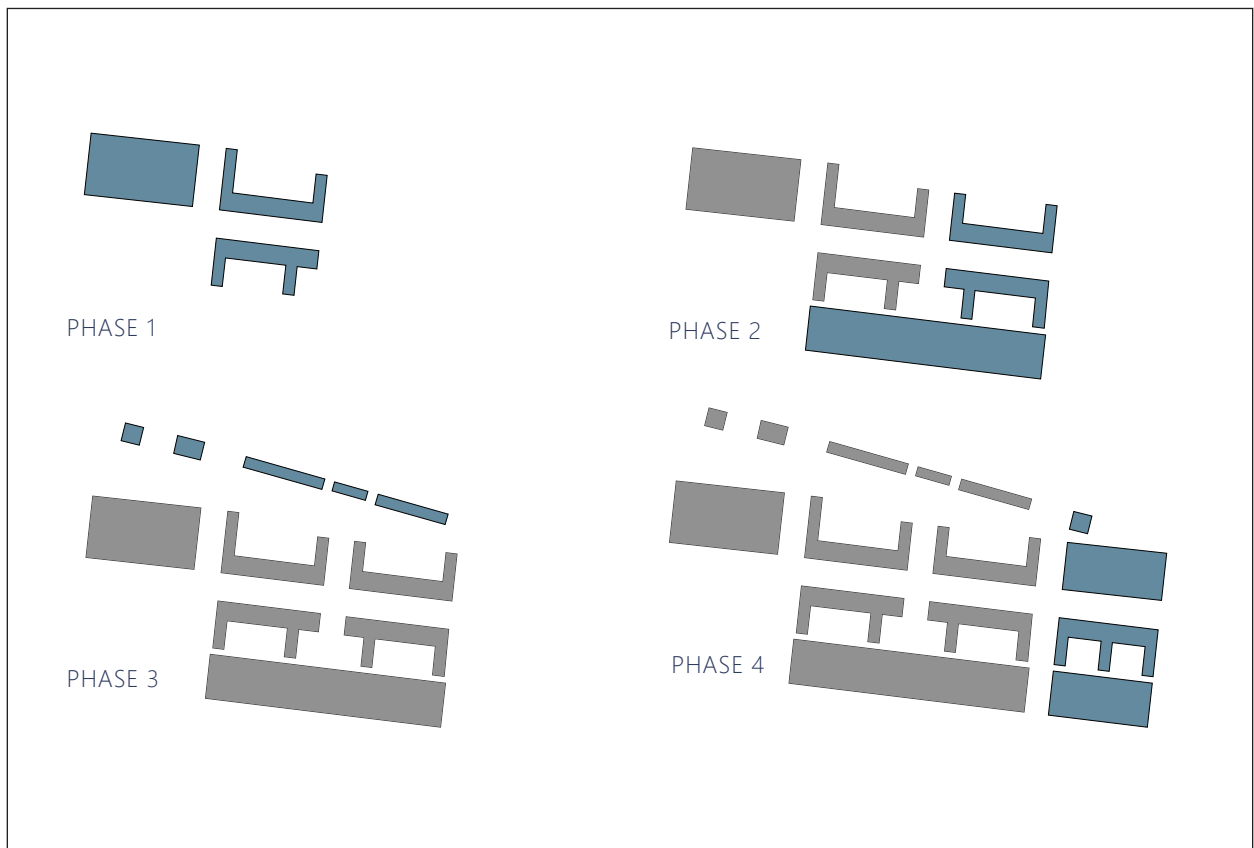


Figure 28. Project Phasing

A Program for Community Engagement

A program was developed that encouraged community engagement at all levels. In order for the site to function as a site for community engagement, a variety of programmatic elements had to be put in place to attract a variety of people. With the focus on holistic health, each program element connects into this major concept. The program connects various housing types with different elements of holistic health (figure 29). Indoor and outdoor spaces were meant to function together to create a continuation of space throughout the site. Different spaces are defined to serve residents, as well as the outside community.

The holistic health platform is broken down into physical health, mental and spiritual health, social health, senior health, and children's health (figure 30). Physical health includes gyms, outdoor fitness classes, bike trails, outdoor sports facilities, clinics, and health food stores. Mental and spiritual health includes meditation and yoga, an art park, art classes and galleries, therapy rooms, and classrooms and educational facilities. Social health includes community gardens and kitchens, market areas, transit connections, cafes and public event space. Senior health includes community gardens, outdoor gathering spaces, pharmacies, senior health clinics, and assisted senior care. Children's health includes a daycare, playground, game area for older children, and a pediatric office. Consideration was given to the adjacencies of these program types to further enrich the lives of those occupying the various spaces.

The housing types included in the program include workforce housing, micro units, artist housing, service enriched housing, and multi generational housing (figure 31). A breakdown of the various units and housing design method is included in the following section.



Figure 29. Program



Figure 30. Health Program

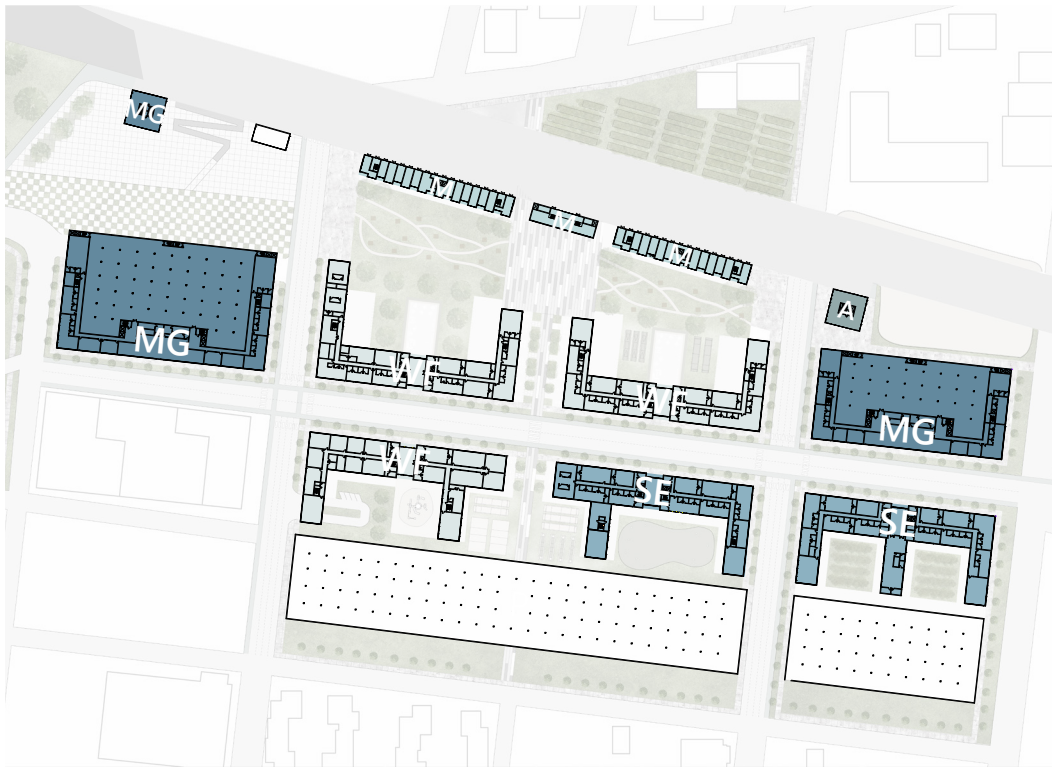


Figure 31. Housing Program

By integrating many different programmatic functions and assigning a specific program function to each area of the site (figure 32), it is more likely that the entire site will be utilized in such a manner and wasted space without utilization will be avoided. Assigning program functions promotes healthy living and a healthy community. If these spaces were left open and unassigned for residents to engage them in however they see fit, unattractive spaces could result, dismissing the goal of the entire development. With each space having a specific function and being utilized in a specific manner, it is more likely residents will want to invest in these spaces. They will be more likely to care for and maintain spaces, promoting this style of living and promoting the community itself.

A variety of program types, as well as a focus on commercial development and transit, will encourage outside community members to visit and occupy the site. By providing a variety of resources, not just for residents but for the surrounding community as well, the negative associations with affordable housing communities can begin to diminish. The goal with this type of programming is to change the perception associated with affordable or workforce housing. Instead of associating a workforce housing community with negative and dangerous stigmas where one would never visit voluntarily, these places can instead become the anchors of community in a neighborhood. One may come to visit and occupy the site and will not know how much the person upstairs is paying for their monthly rent, or that it may be subsidized. Or in the event that they do know, the community is one of workforce housing, it will no longer matter to them and they will not view the public space any differently.



Figure 32. Program Locations on Site

Adaptive Unit Design

A variety of people and family types are in need of workforce housing and the typical affordable housing structure does not accommodate most family types. For example, the affordable housing system does not consider the multi-generational family in its typical unit design. In order to change the standard of the workforce housing system and the design process behind it, it was important to provide a wide range of unit types, as well as units that could adapt and transform to fit multiple family types. In addition to providing a variety of units for residents, this also appeals to developers and gives them the opportunity to choose a configuration that will best suit their goals in terms of return on investment. Unit types were designed and configured for each building type.

The u-shaped buildings (figure 36) at the core of the site were designed off a grid (figure 33). Using those dimensions, a series of unit modules were then created to fit into the grid (figure 35). The modules are different sectors of a standard apartment and have many possible connections and configurations. These modules can then be implemented anywhere into the grid. This flexibility in the design process provides several advantages. The developer can make decisions as to which unit types fit their needs at the design development stage. These modules can also provide a cost savings by presenting the option to prefabricate them off site and then implement them during the construction phase. Based on various adjacencies, units are then able to grow and adapt with the resident as their family grows and changes (figure 34). By providing several adjacencies for different conditions, a family can acquire additional modules as needed (figure 37).

In addition to this standard plan, other options of flexibility were explored. This includes implementing only standard blocks, such as bathrooms, kitchens, and closets, that could then slide and create completely customized units by the

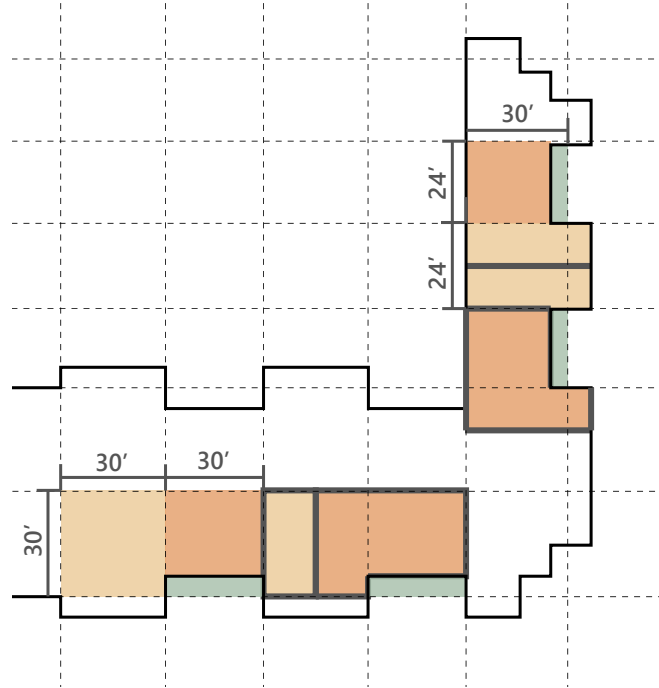


Figure 33. Grid Development for Units

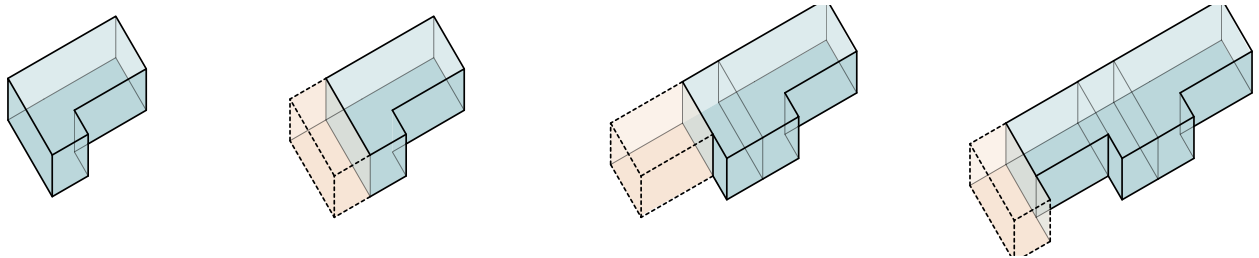


Figure 34. Growing Unit Modules



Figure 35. Unit Modules

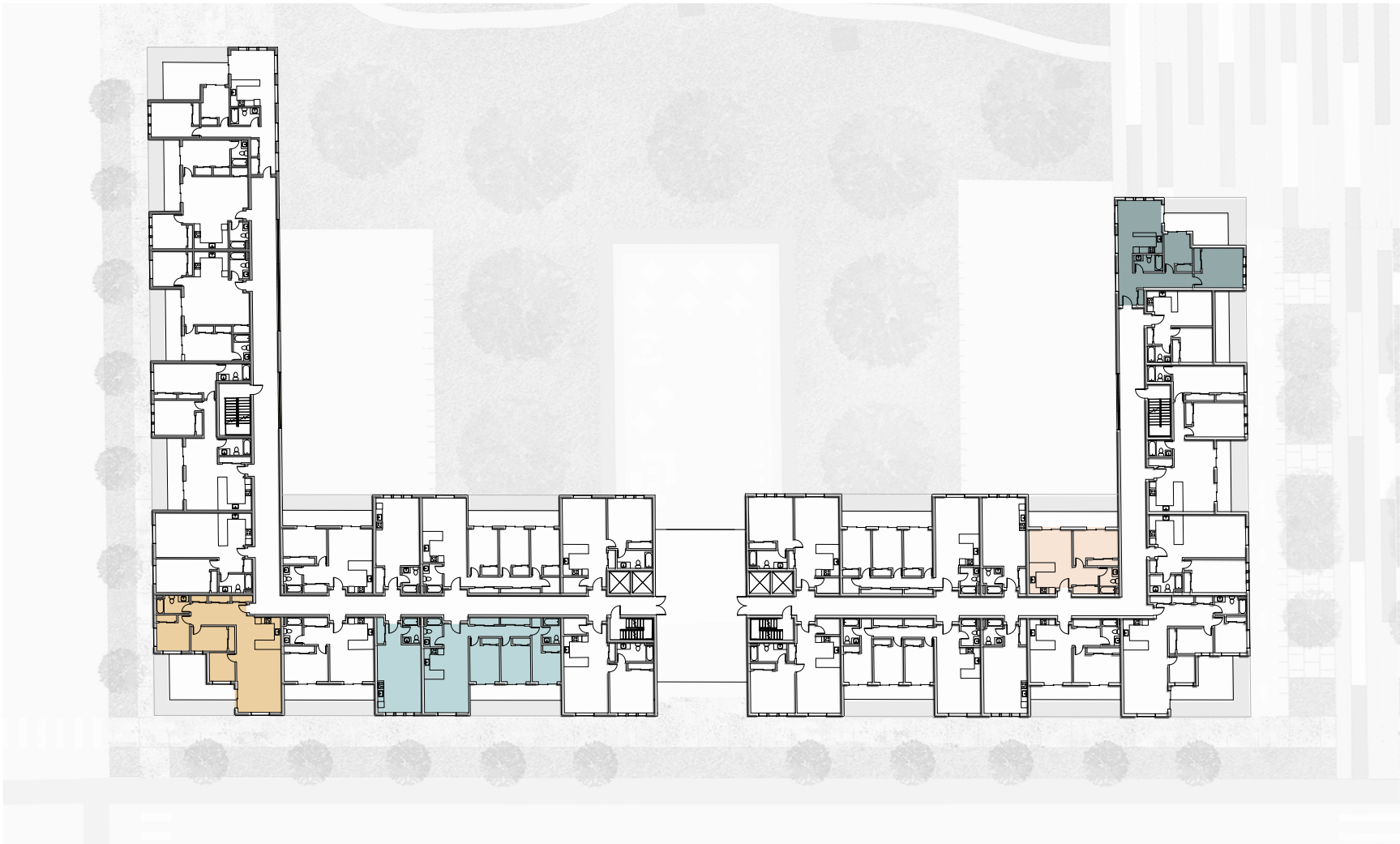
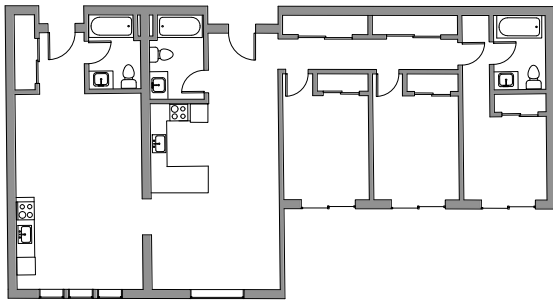
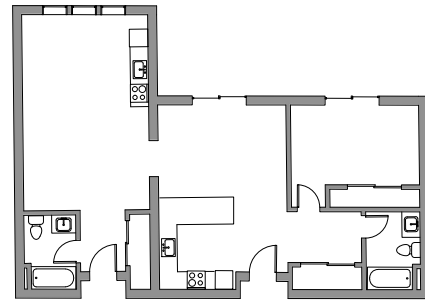


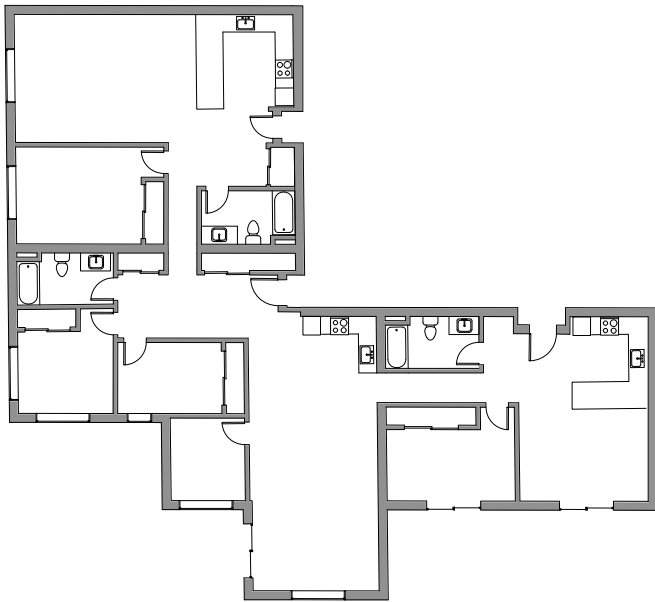
Figure 36. U Building Floor Plan



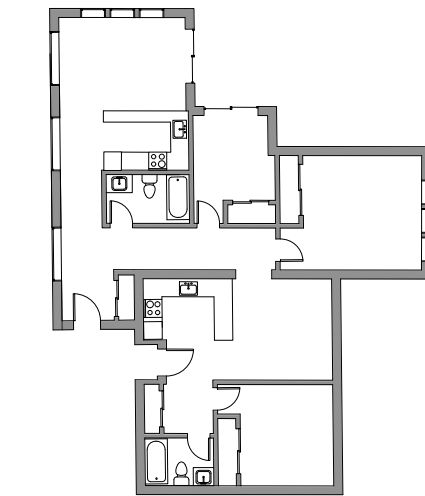
FAMILY CARE
2-3 bedroom + studio



AGING IN PLACE
1-2 bedroom + caretaker studio



MULTI-GENERATIONAL
2-3 bedroom + 1 bedroom + 1 bedroom



EXPANDING FAMILY
1 bedroom + 2/3 bedroom

Figure 37. Unit Adjacency Types

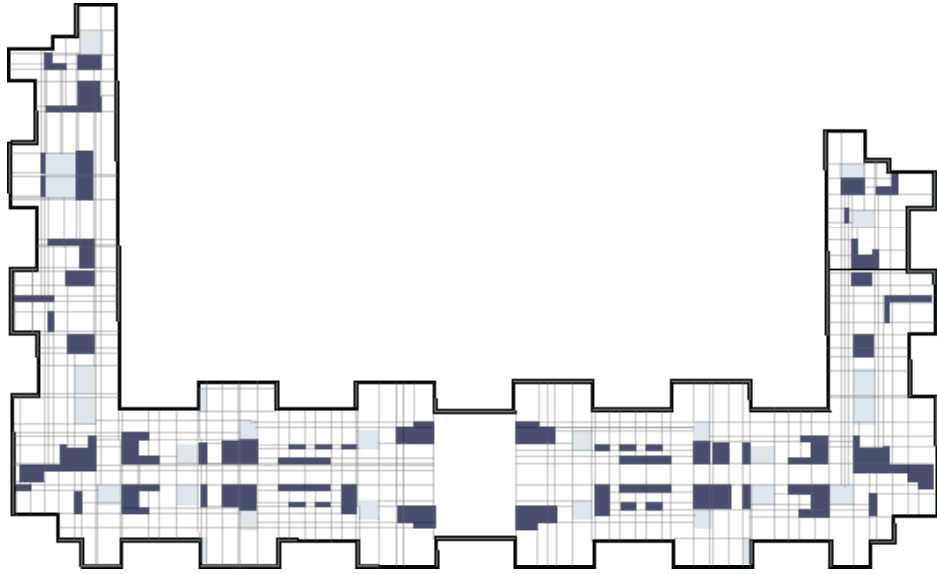


Figure 38. Moving Blocks Study

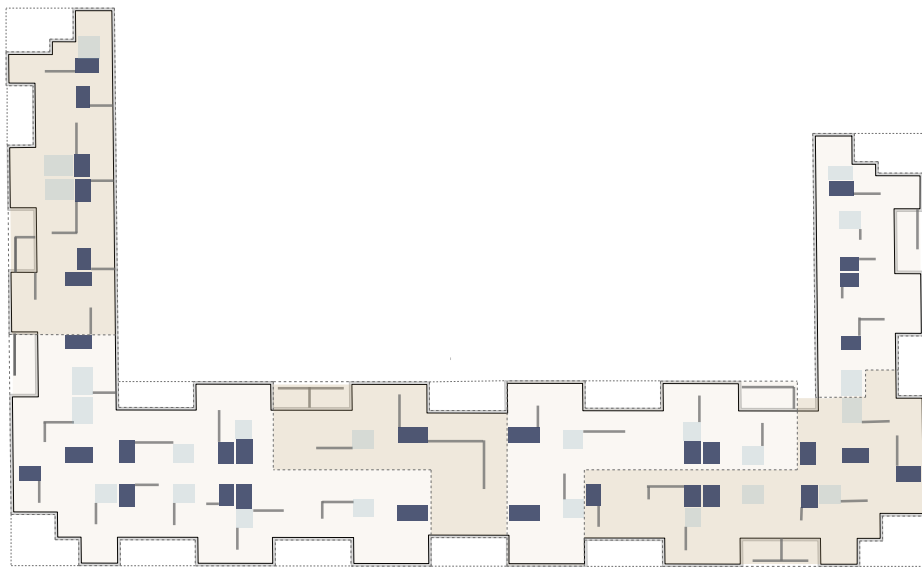
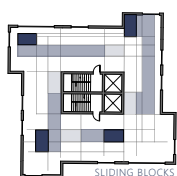
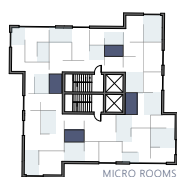
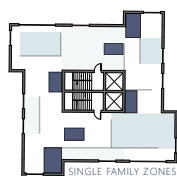
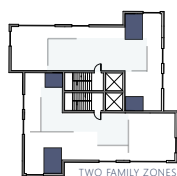
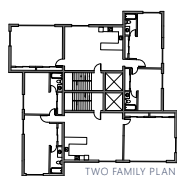
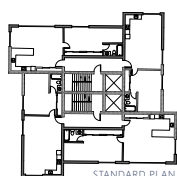


Figure 39. Infill Study



Figure 40. Resident Courtyard Perspective



resident (figure 38). Another example is creating several walls and open spaces without standard units and allowing residents to infill the space they need as their family grows (figure 39).

The rent to own units were designed in a similar fashion (figure 45). Using a grid similar to that of the u buildings, a series of modules were created (figure 43). These modules can be combined in larger configurations to accommodate the larger families that would grow over time in these long term rentals (figure 44). Micro units were designed in the towers on the northern edge of the site (figure 48). Micro units can be utilized by a number of people from those in need of lower rental rates to those needing a short term rental. These spaces were designed to maximize square footage (figure 46). Even though there are limited unit types with the low square footage, several varieties were designed to accommodate the different micro unit residents (figure 47). To balance the small living quarters, an emphasis is placed on community space, with additional amenities on each floor, as well as direct access to transit and public community space below. The two towers on the northern corners of the site were designed with experimental floor plans to see the possibilities of such living conditions (figure 49). The enclosure was infilled with two types of standard plans (figure 41). This then grew to study how leaving open space could be designed by the resident once they occupied it. This included providing solid blocks that could slide, implementing temporary and moveable walls, and having complete blocks that could be utilized on their own.

With all building and unit types, there is an emphasis on outdoor space (figure 40). Typically, with affordable housing, outdoor space is not considered because it is an additional expense. In this system, outdoor space is available to almost every resident. This places value on the resident, allows them to value and enjoy their space more, and further activates the street scape and outdoor community spaces with people enjoying these spaces from above (figure 42).

Figure 41. Tower Studies



Figure 42. Main Street Perspective

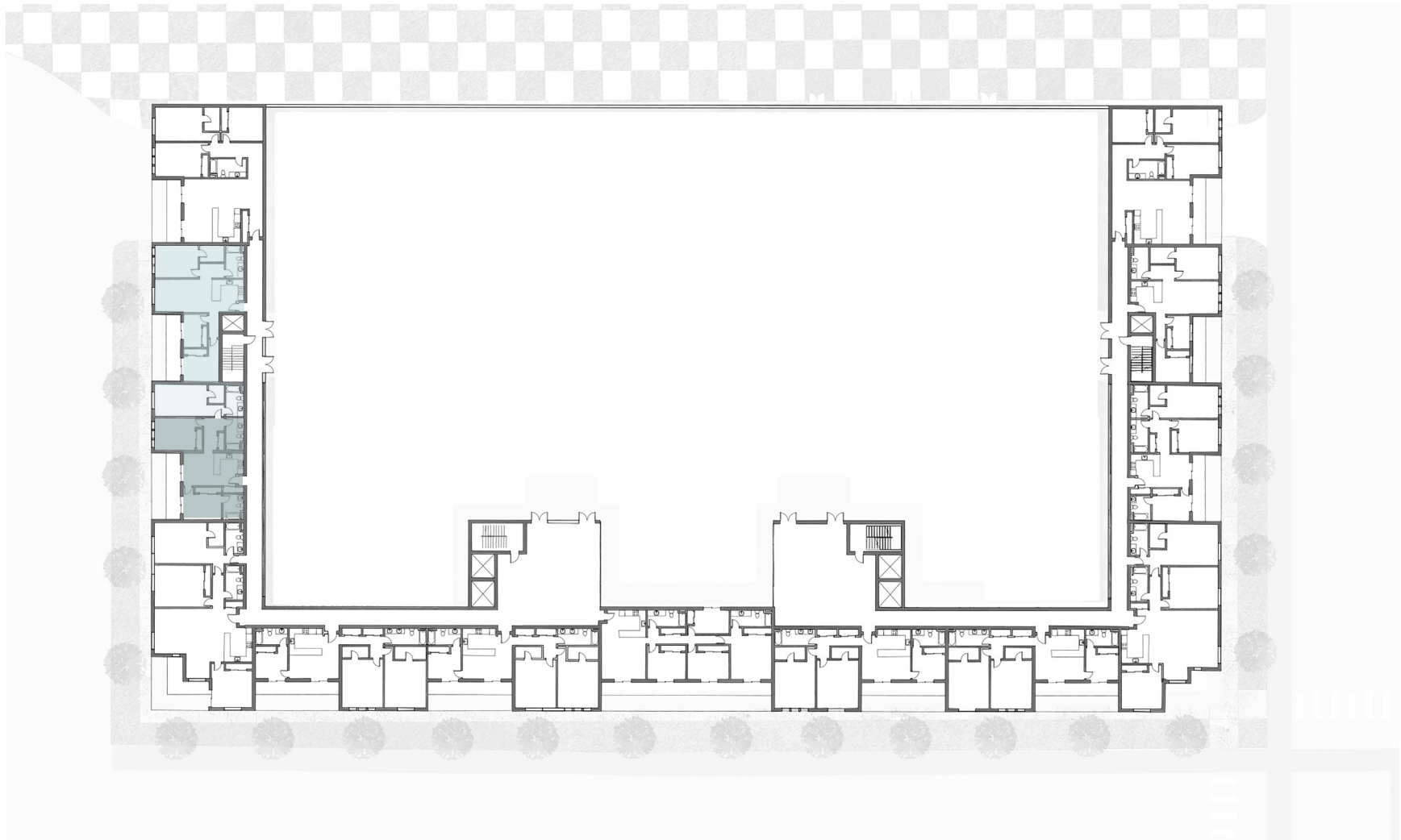
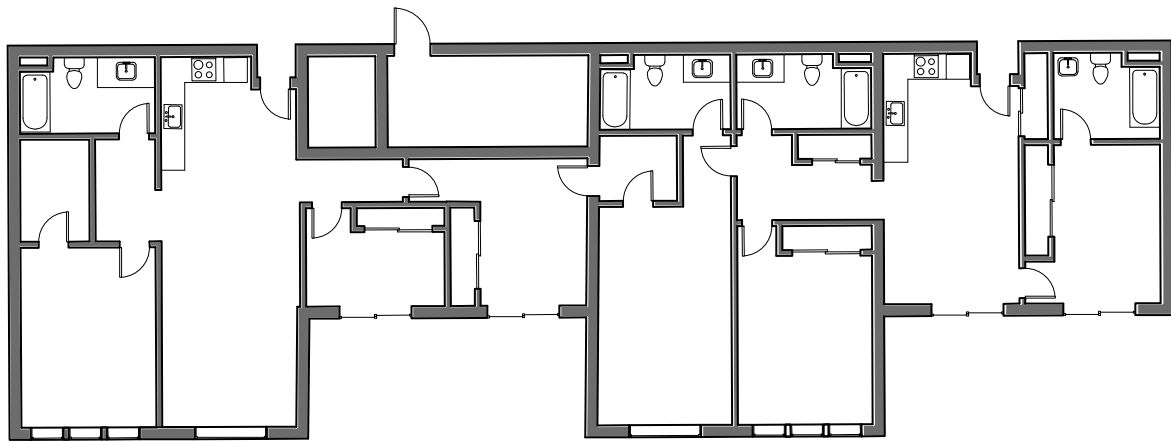


Figure 43. Rent to Own Floor Plan



EXTENDED UNIT
3 bedroom + 1 flex bedroom

FLEX BEDROOM
additional 4th bedroom

EXTENDED UNIT
3 bedroom + 1 flex bedroom

Figure 44. Rent to Own Unit Types

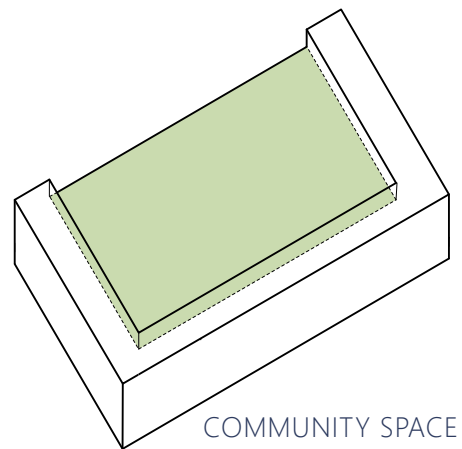
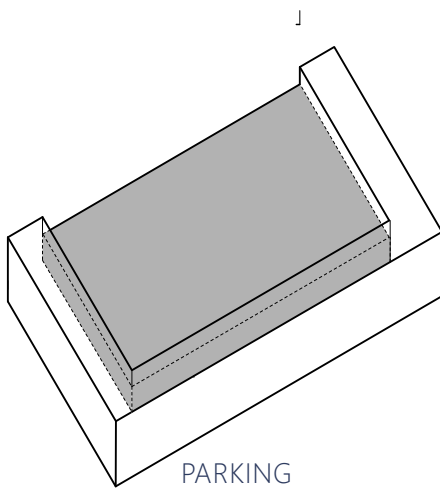
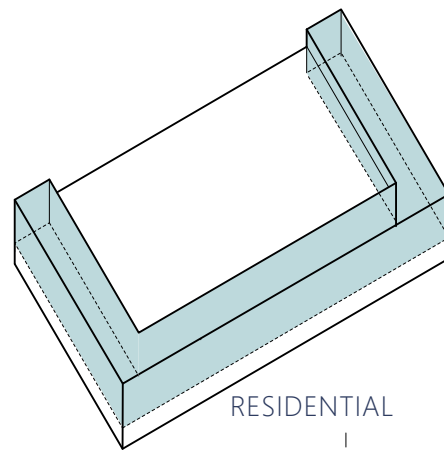
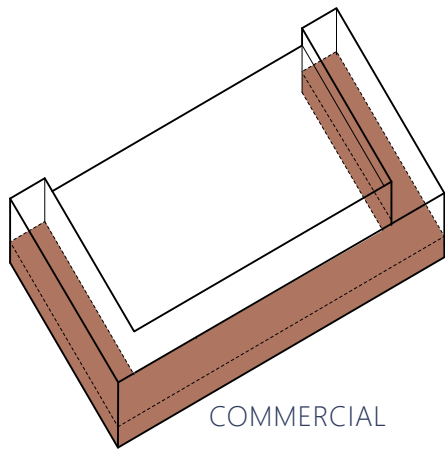


Figure 45. Rent to Own Diagrams

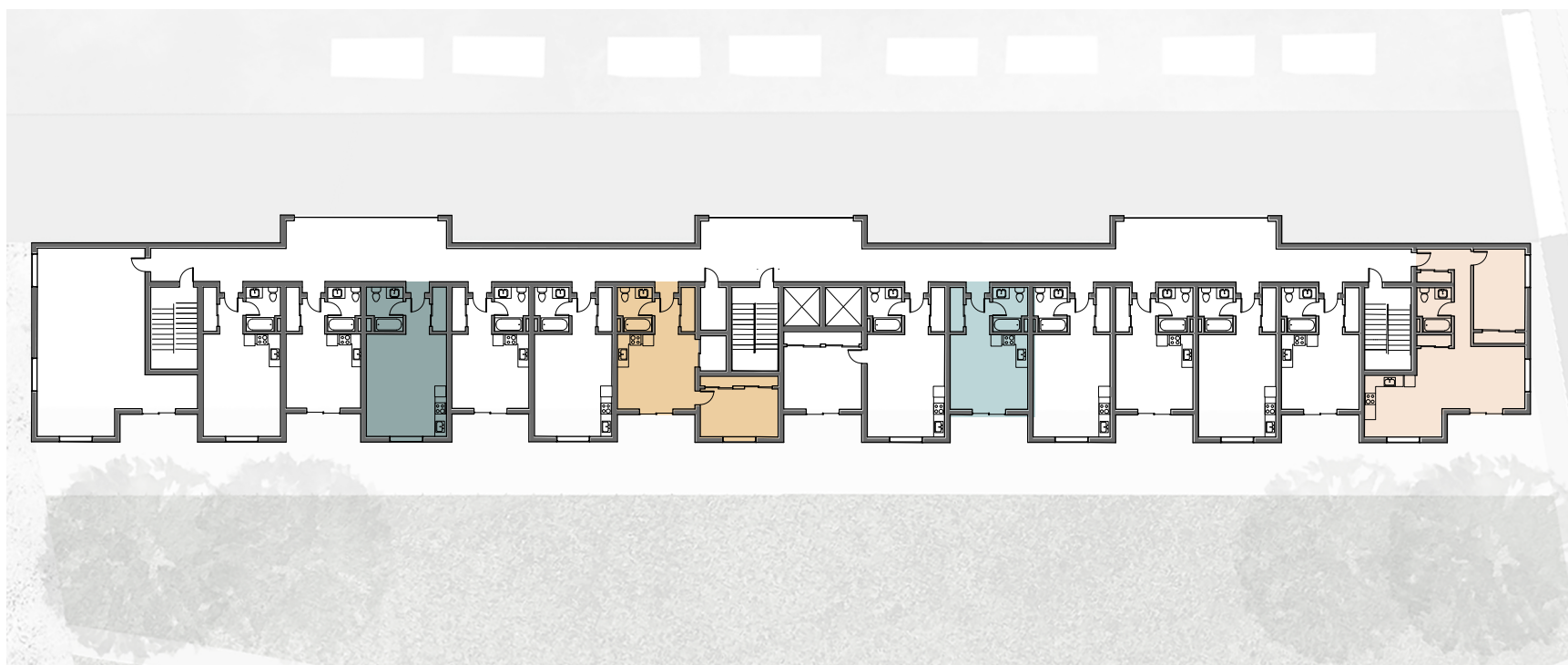
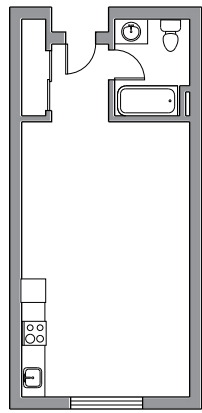
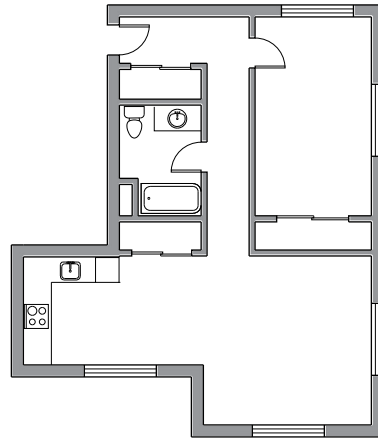


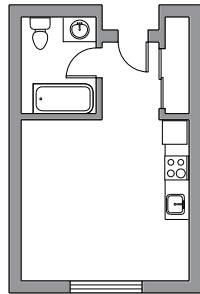
Figure 46. Micro Unit Plan



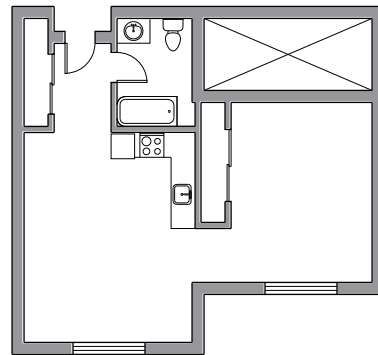
MICRO UNIT
standard studio



MICRO PLUS
1 bedroom corner unit



MICRO UNIT
small studio + outdoor space



EXTENDED MICRO UNIT
studio with bedroom extension

Figure 47. Micro Unit Model Plans

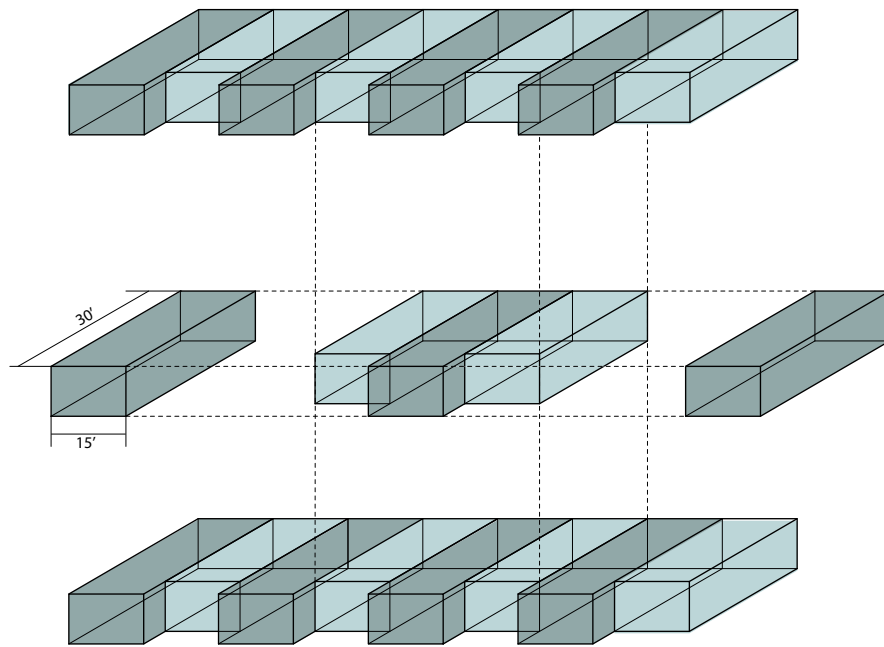


Figure 48. Micro Unit Diagram

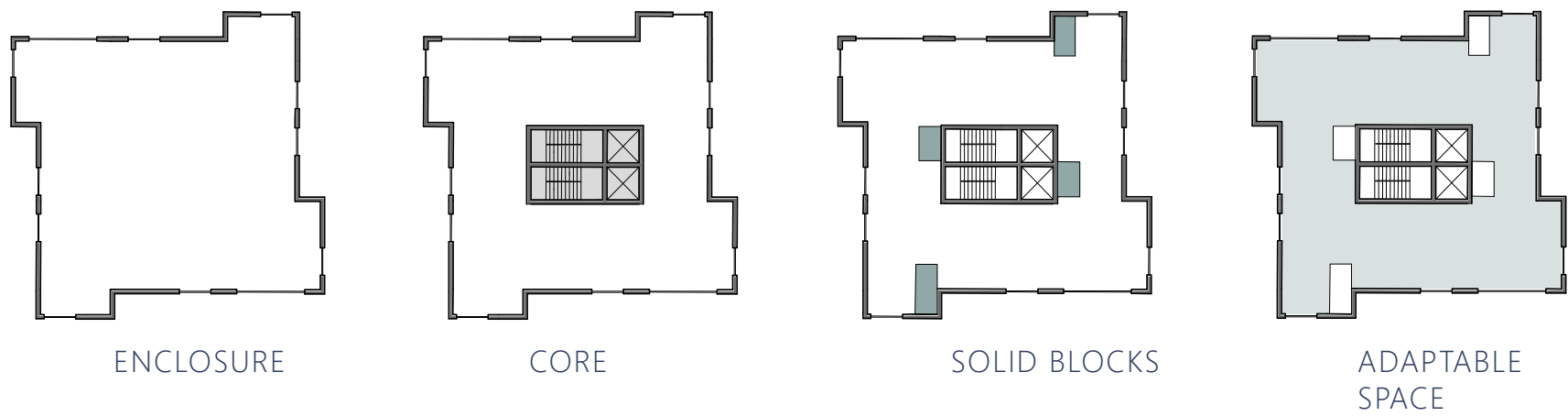


Figure 49. Tower Diagram



Figure 50. Pedestrian Walk Perspective

CHAPTER 4 | **Conclusions for a Transformative Future**

Through this process, it has been discovered that there is no formula for the creation and design of affordable housing. In fact, the creation of a set formula is the complete opposite of what this thesis has explored. Instead, an opportunity for flexibility and adaptability can be set up to cater to a variety of family types, income levels, and communities. A workforce housing development can be designed where a space can fit a city and where a family can find a space that fits their needs.

This thesis is meant to serve as an example of a model for workforce housing development. Other cities, aside from Jersey City, can adapt a similar approach in which they determine the underlying program that best serves their city. In this example, the program function is health, but that can be changed depending on the particular city's need. They can develop a series of housing types and adaptable units that fit the residents living in that particular area.

The goal of this type of development is for everyone to somehow find their place, their niche within this larger community whole. This development can become a place where everyone can find an area that suits them through the variety of program opportunities presented. It will also be possible for whoever is seeking housing to find a unit type that fits their needs and their family. Along with the proper financial analysis, it will be possible to create this type of community, as well as buildings that are high design, within certain financial limits (figure 50). The financial limits of workforce housing do not have to equal reduced thought in the design process.

These issues of affordable and workforce housing are extremely important. Throughout history, society has downgraded affordable, government, and workforce housing, and those that live in these communities. Architects and designers are in a unique situation in which to provoke change in this realm. By changing the approach to the design process of housing, it will be possible to create buildings, in this case homes, in

in which people feel valued. This is a right everyone deserves,
and one in which architects have the power to influence.

Works Cited

- "Bayview Hill Gardens." *David Baker Architects*. N.p., 2013. Web.
- Brennan, Maya. "Blending Housing Solutions for youth and Older Adults: Celadon at 9th and Broadway." *How Housing Matters*. N.p., 29 Nov. 2016. Web.
- Brennan, Maya. "To Reduce Government Costs, Spend Wisely on Housing." *How Housing Matters*. N.p., 14 Dec. 2016. Web.
- Cuthbert, Alexander R. *The Form of Cities: Political Economy and Urban Design*. Malden: Blackwell, 2009. Print.
- Davidson, Justin. "Low-Income? You're Kidding!; Two Architects Offer Far More than Lip Service to Affordable Housing." *New York Magazine* 2 Mar. 2009: n.pag. Web.
- Goodman, Robert Q. *After the Planners*. New York: Simon and Schuster, 1972. Print.
- Hamidi, Shima, and John Renne. "How Affordable Is HUD Affordable Housing?" *Housing Policy Debate* 26.3 (2016): 437-55. Web.
- Herrne, Luke, Jessica Yager and Nadia Mian. *Gentrification Response: A Survey of Strategies to Maintain Economic Neighborhood Diversity*. Publication. NYU Furman Center, n.d. Web.
- Hoffman, Alexander Von. "The End of the Dream: The Political Struggle of America's Public Housers." *Journal of Planning History* 4.3 (2005): 221-53. Web.
- Janisse, Flynn. "How Impact Investing Can Sustain the Affordable Housing Industry." *How Housing Matters*. N.p., 15 Nov. 2016. Web.
- Levy, Diane K., Zach McDade and Kassie Bertumen. "Mixed-Income Living: Anticipated and Realized Benefits for Low-Income Households." *Cityscape: A Journal of Policy Development and Research* 15.2 (2013): 15-28. Web.
- Magnusson, Warren. *Politics of Urbanism: Seeing like a City*. Abingdon Oxon: Routledge, 2011. Print.

- Marom, Nathan, and Naomi Carmon. "Affordable Housing Plans in London and New York: Between Marketplace and Social Mix." *Housing Studies* 30.7 (2015): 993-1015. Web.
- "Maverick Landing." *Icon Architecture*. N.p., 2006. Web.
- "Pacific Pointe Apartments." *David Baker Architects*. N.p., 2016. Web.
- Reynolds, Ann Morris. *Robert Smithson: Learning from New Jersey and Elsewhere*. Cambridge: MIT, 2003. Print.
- "Rivermark." *David Baker Architects*. N.p., 2015. Web.
- Schmitz, Adrienne. *Multifamily Development Handbook*. Washington, D.C.: ULI-the Urban Land Institute, 2000. Print.
- Shapely, Peter. *The Politics of Housing: Power, Consumers and Urban Culture*. Manchester: Manchester UP, 2007. Print.
- "Star Apartments." *Michael Maltzan Architecture*. N.p., 2014. Web.
- Susilawati, Connie, and Lynne Armitage. "Affordable Housing Solutions: Affordable Housing Providers' Perspective." *Pacific Rim Property Research Journal* 16.3 (2010): 273-90. Web.
- "Teachers Village." *Richard Meier & Partners Architects LLP*. N.p., 2017. Web.

Vita

Brianne Michelle Burdy grew up in Bergenfield, New Jersey. She graduated from Clemson University in 2015 with a Bachelor of Arts in Architecture and a minor in Business Administration. Upon graduation, Brianne went on to attend the University of Tennessee where she received a Master of Architecture in 2017.