

ABSTRACT

Title of Thesis: POCKET CITY: PROMOTING HIGHER
DENSITY WALKABLE COMMUNITIES

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Preservation

As a result of the growing population of the United States our urban planners and architects have begun to research ways in which we can provide more sustainable housing for a diverse group of people. New practices have emerged with the aim of creating stronger communities within the setting of a suburb. Cohousing and pocket communities are two of these urban design strategies. While they differ in some of their practices, they both follow a few specific beliefs: walkability, a sense of community and place, and a feeling of privacy. However, the practice of creating a sense of privacy, for the most part, is conducted strictly by creating mostly single-family homes or duplexes. The Pocket City explores how urban growth can be changed to focus more on a human scale community. This community focused city works to create the missing density of our current urban growth patterns. With connectivity through public transportation options, it looks to see if a new car free urban design strategy can thrive within the sprawling context of the United States.

POCKET CITY: PROMOTING HIGHER DENSITY WALKABLE
COMMUNITIES

by

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Pocket City at White Flint.....PCWF

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Chapter 1: Urban Sprawl & The Current Growth Pattern

Introduction to Urban Sprawl

To fully understand the need for the Pocket City, one must first understand the devastation that is embodied in current Urban growth patterns. The United States population is growing at an alarming rate and thus the subdivision of residential neighborhoods must grow with it. This growth of the typical repeating residential neighborhood is known as suburban sprawl. While suburban sprawl is devastating it is important to encompass all parts of urban growth. The developmental pattern taking place to allow for this immense amount of subdividing is called urban sprawl. Urban sprawl encapsulates both suburban sprawl and city centers while creating a dense car network of connectivity between the two. Urban sprawl's pattern of growth incorporates an abundance of congested highways, strip mall shopping centers, office park, and subdivided neighborhoods, all separated from one another in an isolated form¹. Urban sprawl, while it allows for neighbors, it doesn't truly allow the creation of a community. As urban sprawl takes form, natural ecosystems are destroyed, human relationships are missed, and cultural centers are scattered.

¹ Tachieva, Galina. Sprawl Repair Manual. Island Press, 2010.

Environmental Impact of Urban Sprawl

Environmentally urban sprawl has caused a great setback to create a sustainable lifestyle. Sprawl not only has affected land use, but it also has a great impact on air quality. As communities expand, agricultural production and natural reservoirs begin to be demolished² (Figure 1). With the increasing loss of our farmland, the United States has resorted to importing food from overseas³. Importing food itself has a great impact on the environment and human health as well. With imported food the US is subject to risks of local infestation and decreased food quality. Moreover, when discussing sprawl, it is impossible to not mention transportation. With the growth of low density, highly segregated areas driving becomes mandatory for almost every daily activity⁴. Sprawl begins to abandon the neighborhood structure in favor of car dependent design. As people begin driving everywhere CO2 emissions are beginning to skyrocket. The more growth in this pattern means more cars and with it comes more parking. Parking lots and car garages begin to take up a huge portion of all infrastructure in cities, towns, and developments.

² <https://campuspress.yale.edu/pioneer/urban-sprawl-a-growing-problem/>

³ <https://campuspress.yale.edu/pioneer/urban-sprawl-a-growing-problem/>

⁴ Tachieva, Galina. Sprawl Repair Manual. Island Press, 2010.



Figure 1: Suburban Developments by SimonP (By author, April 24th, 2009)

Social Impact of Urban Sprawl

The car dependent world we live in is not only affecting the environment but it's also affecting our socioeconomic lifestyles. Studies have shown that sprawl is damaging to both physical and social health, isolating people in car-dominated environments where they are deprived not only of the physiological benefits of walking, but also of the natural human interactions typical of complete communities⁵. If you visit almost any suburb in America, you would be able to see firsthand the lack of community that sprawl creates (Figure 2). The typical suburban homeowner after a long day of work will simply drive right into their garage and into their home. This lacks any real

⁵ Tachieva, Galina. *Sprawl Repair Manual*. Island Press, 2010..

connection with neighbors or community members. Zach Harrell, an old member of the College Park Wood development described his relationship as a lackluster attempt at being friendly. “Through my two years of living there, I may have spoken to my neighbors a total of three times...” This might be an extreme example, yet cases like this expel what living in these neighborhoods could be like. Sprawl doesn’t create communities; it creates isolated buildings in space.



Figure 2: Community Planning by La Citta Vita (By author, December 17th, 2010)

These cars dominated societies, tend to cause more and more time in the car as the population grows. Due to the fact that urban sprawl structurally divides land use into sectors, people tend to spend more time going to and from work. As development sprawls farther away from the city, more cars are on the road longer creating more traffic and traffic jams (Figure 3).



Figure 3: Worst Drivers in America? by NBC, Jim Gorzelany, Forbes (By author, August 29th, 2012)

Political Impact of Urban Sprawl

The effects of sprawl on social life even goes past that of the neighborhood scale. One big impact of isolated communities is that of increased segregation and racial disparities. These segregated communities are often due to redlining and economic disparities⁶. With the creation of these segregated communities, social and political information is often misconstrued, and these communities tend to lose power and political stability (Figure 4).

⁶ Goldberg, Dakota. "What Is Urban Sprawl?" California Environmental Voters. <https://www.envirovoters.org/2021/03/02/what-urban-sprawl/>.



Figure 4: Racial Equity in Housing by Ted Eytan (By author, October 18, 2018)

Health and Safety Impact of Urban Sprawl

Urban sprawl affects the internal health of the human body while also affecting the external safety within the communities. Both health and safety could easily be affected by urban growth patterns and it's easy to see why.

First it is important to look at the effects of a car-based society on the individual. Of course, you have the increased risk of lung infections, and lung disease due to the high CO₂ levels being emitted due to car emissions. "Fine particles and ozone pose serious public health problems. Exposure to these pollutants causes lung damage and aggravates existing respiratory disease such as asthma⁷." Other impacts of increased air pollution include aggravated existing diseases such as emphysema and bronchitis, increased frequency of

⁷ United States Environmental Protection Agency. Diesel Exhaust in the United States. 2003.

lung infections, and increased risk of chronic obstructive pulmonary disease⁸. Persistent breathing around high traffic environments have immense effects on your breathing as well. One who experiences too much pollution or exposure to smog can have shortness of breath, gain a cough or sore throat, and even inflamed or irritated airways⁹ (Figure 5). Urban Sprawl affects health far beyond the point of respiratory destruction. Sprawl also affects physical and social health. With the car centric environment people are deprived from even the slightest bit of walking and the health benefits that come with it¹⁰. Walking helps strengthen the immune system while also increasing the body's cardiovascular functions. Without a community focused on walking, some individuals would be subject to very little or no physical activity on a daily basis.

⁸ "Research on Health Effects, Exposure, & Risk from Mobile Source Pollution." EPA. Accessed December 16, 2021. <https://www.epa.gov/mobile-source-pollution/research-health-effects-exposure-risk-mobile-source-pollution>.

⁹ "Research on Health Effects, Exposure, & Risk from Mobile Source Pollution." EPA. Accessed December 16, 2021.

¹⁰ Tachieva, Galina. *Sprawl Repair Manual*. Island Press, 2010.



Figure 5: Global health impacts of vehicle exhaust by Flickr.com / Kim Hansen CC BY-SA (By author, 2015)

One of the largest public safety concerns comes from car centric urban design planning. A staggering 1.35 million people are killed on roadways per year¹¹. With the increased importance of commuting to work as developments grow further from city centers, this number isn't going to change anytime soon. These statistics above don't even show the whole picture as many more people are harmed by car crashes.

¹¹ "Global Road Safety." Centers for Disease Control and Prevention. December 14, 2020. <https://www.cdc.gov/injury/features/global-road-safety/index.html>.

Chapter 2: Investigation of the Pocket Community

What is a Pocket Community?

The Pocket Community, while being a relatively new urban design strategy, has made waves in growing towns around the United States. Pocket communities have been defined as a sort of micro neighborhood where a cluster of small homes surround a greenspace and community building¹². The pocket itself consists typically of 10-20 small 1–2-person single family homes¹³. While the pocket itself isn't always fully intertwined with surrounding projects, the pocket community is often part of a larger developmental project or city.

Walkability and Accessibility

The pocket community has tried to remove one of the biggest problems that came with sprawl and current urban design strategies. That problem is that cities are built at the car scale and not the human scale. The pocket city brings back what made towns and space so great, building for the human and for human interaction. The communities themselves remove the car entirely. Each community has a small parking lot near the edge of the community where members, if they wish, can have their car. The majority of

¹² Ross Chapin Post Author. Ross Chapin Architects. <https://rosschapin.com/cohousing-vs-pocket-neighborhoods-whats-the-difference/>.

¹³ "KEEL Concepts, Inc. - Greenville, SC Architect." Keel concepts. <https://www.keelconcepts.com/>.

the community is a collection of pathways and open space which pushes for personal interactions. The pathways lead to homes, amenities, and even reach out to existing walking paths. The communities are also typically built with bike paths as well as public transportation in mind (Figure 6).



Figure 6: Oak Terrace Preserve, a sustainable community by North Charleston (By author, April 18th, 2012)

Another important thing to consider when designing a human scale city is accessibility issues. Most communities are built with a relatively flat plot of land so that people in wheelchairs can easily move throughout the whole community. The pedestrian pocket provides for many types of housing needs, elderly clusters are an easy stroll from park, services, and trolley lines¹⁴. With that being said the pocket community is designed for generational residents.

¹⁴ The Pedestrian Pocket Book: New Suburban Design Strategy. New York, NY: Princeton Architectural Press in Association with the University of Washington, 1989.

Goals of the Pocket Community

The pocket community looks to take what we learned from sprawl and transform it into a human scale project. This being said, the pocket community has a lot to offer when trying to decipher what makes a community actually good. The community itself holds pride in its community-oriented design practices, relatively high sense of privacy, and its sustainable practices.

The pocket community itself is built with community and human interaction in mind. With the parking being pushed to one side, the design strategy forces humans to walk past neighbors. Old design strategies, specifically urban sprawl pushed users who were coming home to drive right into their garage and miss important interactions with members of the community. With pocket communities you not only get that opportunity to have meaningful conversations with your neighbors, but you are also encouraged too. The communities often have amenities that cater to such interactions. One of the main ones is the community garden (Figure 7). The garden itself allows for each member of the community to grow their own plants as well as share plants amongst themselves. Another amenity that most communities include is that of the community building, or club house. The club house itself can include gyms, game rooms and other such amenities, however, its main feature is that of the community kitchen. Oftentimes in a pocket community there are community events such as potlucks, charity dinners, or just simply weekly community meals. While attendance isn't

mandatory for these events, they often times are still packed as guests and other members of the larger community are invited.



Figure 7: Marymoor Park community garden by King County Parks Your Big Backyard (By author, September 16th, 2011)

With all this community-based design, one would think that there would be a privacy concern, however, this is not the case. For the most part pocket communities are filled with small single-family homes or duplexes¹⁵. This design strategy, while it has its flaws, it allows for members of the community to feel like they have their own space. Oftentimes attached to the homes, homeowners will have a private yard, which is usually at a small scale due to the amount of public space centrally in front of the homes. There have also been various building strategies that have helped more specific projects

¹⁵ "Pocket Neighborhoods." Interview by Ross Chaplin. Youtube. August 11, 2015. <https://www.youtube.com/watch?v=k749w3cHSPk>.

increase privacy. Third street cottages in Langley Washington is one of many projects that takes privacy to another level with design strategies. Third Street Cottages design each one of the houses to have windows facing just the east, south, and west sides, leaving the north to be blank. This design strategy allows for a small yard on the south side of each of the single-family homes. These yards have increased privacy with foliage along the community greenspace side of the project.

The pocket community has a strong presence in sustainable design. Sustainability isn't one of the main specified goals of the pocket community, however, a lot of its ideals lead to sustainable design. One of the biggest factors being that of the carless nature of the community itself. With a higher focus on walkability the community drops its CO2 emissions tremendously. This also leads to increased greenspace due to the decline of hard surfaces for parking and roadways. The increase of natural space allowed for a better stormwater management design. On the other hand, you have an increased focus on greenspace and foliage. Most pocket communities try to incorporate an open greenspace as well as tree clusters to allow for shade and oxygen emission. Of course, one of the sustainable practices comes with the green space and that is the community garden. The community garden takes back a sense of that farmland that was lost due to sprawl. In turn the garden itself decreases the importance of importing food as the community thus becomes more self-sustainable.

Pocket Community Case Studies

The pocket community has sprouted up in many different experimental projects. While some look toward healing special areas others have tried incorporating these ideals within a larger site. It is important to understand that while pocket communities have certain ideals, they can easily be transformed to follow context-based issues.

Canalside, Pocket Neighborhoods, Canastota, NY

One project, Canalside Pocket Neighborhoods, focuses on the revitalization of the Erie Canal. The Erie Canal runs through more than 200 New York communities and is in fact one of the reasons most of them exist¹⁶. While the communities may have started due to the canal's location, much of the public space around the canal has been neglected. The Canalside Pocket Neighborhoods are pushing to create human scale neighborhoods built right next to this natural feature. The pocket itself would focus on creating community amenities surrounded by the canal and other open green spaces¹⁷. The canal itself could be home to multitudes of the communities that could each benefit of each other. The canal core would be reestablished, and these "villages" would act as cultural hubs¹⁸. With the location being directly on the canal, public transportation could take form of small boats from town to town. An important focus of bringing in pocket communities here is the lack of

¹⁶ "Canal Corporation." Reimagine the Canals.
<https://www.canals.ny.gov/reimagine/neighbourhood.html>.

¹⁷ "Canal Corporation." Reimagine the Canals.
<https://www.canals.ny.gov/reimagine/neighbourhood.html>.

¹⁸ "Canal Corporation." Reimagine the Canals.
<https://www.canals.ny.gov/reimagine/neighbourhood.html>.

population in these areas. The current communities have infrastructure and have commerce they just need more people, and this is where their pocket community comes in¹⁹.

Culdesac Tempe, AZ

The second project to take a look at is Culdesac Tempe: A Car-Free Neighborhood. This precedent is an extremely interesting precedent to explore what the pocket city might look like. However, unlike the pocket city this project neglects an understanding of current growth patterns, as well as avoids important pieces for human interaction. Culdesac Tempe is a 16-acre project that focuses on bringing 7 mix residential types into a car free neighborhood²⁰. The project itself fully removes cars from community living, not even providing a single parking space. However, the community does provide, lyft access, Bird scooters and bike share access²¹. Much like the normal pocket communities this project incorporated amenities such as a community green space as well as a gym and a pool. It also includes slightly higher density residential developments. Culdesac Tempe is designed to bring life back to the human scale while taking precedent from the medieval European city²². Some problems with this design, like mentioned, includes the lack of single cars, the minimal commercial focus, only rental options for

¹⁹ "Canal Corporation." Reimagine the Canals.

<https://www.canals.ny.gov/reimagine/neighbourhood.html>.

²⁰ "Culdesac Tempe: A Car-Free Neighborhood." Opticos Design. December 09, 2021.

<https://opticosdesign.com/work/culdesac-tempe/>.

²¹ "Cities For People Not Cars." Culdesac. <https://culdesac.com/>.

²² "Culdesac Tempe: A Car-Free Neighborhood." Opticos Design. December 09, 2021.

<https://opticosdesign.com/work/culdesac-tempe/>.

residents, lack of infrastructure beyond main amenities, lack of diverse housing options, and the relative lack of pervious services. The project itself is something that the pocket city wants to build off of, in hopes to create a greener, more successful urban growth pattern.

Criticism with the Pocket Community

Despite being a great start to a new urban design strategy, the pocket community is far from perfect. Through the pocket community we still find issues in building type and residential density. This leaves multiple areas with room for improvement as we look towards the pocket city.

While the pocket community thrives for residential living, there is still an aspect of community that is lost. A truly self-sustaining community incorporates all aspects of development, including both commercial projects and office spaces. Most of the typical pocket communities lack the commercial aspect while all of the pocket communities disregard citywide infrastructure. The commercial aspect to the city allows for more community gathering and a reason to visit this area rather than to go home. If the pocket community is still separated from the commercial realm, then sprawl still stands as a problem. One other interesting question to discuss is the lack of infrastructure within the majority of pocket communities. This problem itself is due to the pure density issues that come with pocket communities. While a community building can act as a hub what other community infrastructure could be incorporated to help strengthen the community as a whole.

The second issue and probably one of the biggest issues with the pocket community is its residential density. The pocket communities main focus is to combat sprawl; however, it still takes the form of sprawl but with decentralized cars and a focus on community. Most of the typical pocket communities consist of single-family homes or duplexes, due to privacy importance²³. The incorporation of a denser residential housing typology such as missing middle housing, could be beneficial in centralizing pocket communities and their residents. Until an urban focus is pulled farther away from single family homes and a larger variety of housing options are provided, the problems of urban sprawl are still an issue

²³ "Pocket Neighborhoods." Interview by Ross Chaplin. Youtube. August 11, 2015. <https://www.youtube.com/watch?v=k749w3cHSPk>.

Chapter 3: Investigation of New Urbanism

What is New Urbanism

New Urbanism is a planning approach that came about in the 1980s to combat urban sprawl. New Urbanism focuses on creating a higher density community-oriented design. Unlike planning that came before it, it tried to break away from the car centric urban planning and thus focuses on human scaled urban design. Despite this push for human scale design cars still make an impact on these communities as they begin to grow. What they praise as a 5-minute community, slowly has grown past this. As the investigation of New Urbanism continues, the charter for new urbanism was created around 1993 by the congress for new urbanism. This document and now website highlights the ideals, changes, goals, and motives of New Urbanism.

Goals of New Urbanism

New Urbanism as a design strategy, has strict ideals that it pushes for all communities. They stand for the restoration of existing urban centers and towns within coherent metropolitan regions the reconfiguration of sprawling suburbs into communities of real neighborhoods and diverse districts, the conservation of natural environments, and the preservation of our built

legacy²⁴. Through the ideals of new Urbanism one can see placemaking, pragmatics, and holistic design.

Placemaking is key to the creation of a thriving community. For New Urbanism design strategies focus on walkable blocks, mixed use typologies, and accessible public urban spaces²⁵. The focus of these development pushes towards streets being for people rather than for cars. These streets while trying to remove cars will also sometimes allow for public transportation, bikes, and sustainable alternatives. This human scale ideal has worked great at the beginning of community planning, however as they grow, streets have been expanded and cars have slowly been reintroduced. Placemaking isn't simply about creating a human scale design, it's about designing communities with an identity. Through networking streets and the creation of public squares, parks and event spaces, new urbanism attempts to create a community with increased public interaction.

Based on the charter for new urbanism is pragmatic. The planning for each New Urbanism development goes through many people so that the development not only works for current density but will allow it to thrive for future generations. One major thing with new urbanistic design that must be considered, is that it doesn't fully remove the car from the city. As discussed for the pocket community, fully removing cars and not focusing on public transportation has caused residents to become more isolated. For New

²⁴ What Is New Urbanism?" Congress For New Urbanism. December 19, 2019. <https://www.cnu.org/resources/what-new-urbanism>.

²⁵ What Is New Urbanism?" Congress For New Urbanism. December 19, 2019. <https://www.cnu.org/resources/what-new-urbanism>.

Urbanism the planners recognize the issue with extreme leaps from car centric design to human scale design will cause a divide between the community itself and the outside world. Thus because of this car are still accounted for and within the design, however, the walkability option becomes more enticing for its residents. When looking deeper into this issue with the level of cars vs human planned cities, both new urbanism and pocket communities struggle to truly create a human scale community that has a connection to the rest of urban development patterns. When it comes to the charter for new urbanism, I question this section the most as the growth of the community seems to fall into issues of single-family household sprawl once again.

The last design criteria for the charter for new urbanism is designing a holistic community. This is an interesting strategy to make the community feel more as one element. Each building must relate to its neighbor allowing for a flow from one building to another. This, thus, creates a cohesive network of community planning instead of a restricted mass in place strategy. Whether the city's designers are creating residential, commercial, or mixed-use buildings, each must be able to work off the other. These buildings and connections are used to help create urban plazas, private parks, and even major pedestrian only streets.

The city itself can be broken down by elements. The first of all is that of the city as a whole. Cities and towns should be shaped by physically defined and universally accessible public spaces and community institutions²⁶.

²⁶ "The Charter of the New Urbanism: Who are we?" Congress for New Urbanism. March 03, 2021.

The city itself must show a respect for historical patterns while also organizing itself with geographical boundaries²⁷. The ideals behind this design pattern is to follow that of surrounding communities while also building to keep community edges and defining what they stand for. Within the city edges you should find a broad range of affordable housing and public private uses. The private uses allows for the city to act as its own economic unit providing funds for the community members. On the other hand, the affordable housing has tended to lack in the New Urbanist communities that have been investigated. Due to the nature and expense of these communities and their locations, prices have skyrocketed, and the housing market has peaked. Because of these increases in price the diversity of these communities have diminished.

One can begin to divide these communities even further based on that of the charter for New Urbanism. Each city is divided into neighborhoods, districts, and corridors. These neighborhoods are truly where the 5-minute walkability is sought out as each district must be pedestrian friendly and walkable. All daily activities must be within walking distance of one's home. As for the district divisions, each one must incorporate a wide range of housing typologies while also providing mixed use buildings and civic, institutional, and commercial activity. Despite the focus on these aspects the city itself still has a core in which most of the commercial buildings are, and thus, the residential space builds around this core. These neighborhoods

²⁷ "The Charter of the New Urbanism: Who are we?" Congress for New Urbanism. March 03, 2021.

should truly form identifiable spaces around the city whether through greenspace, plazas, or parks²⁸.

The Charter for New Urbanism breaks neighborhoods even farther down and discusses that of what streets, blocks, and buildings should look like. The specific goal for these smaller spaces is to form that of a network of public areas. Through the interaction of buildings with other buildings, a visitor of a New Urban town could experience a very ceremonial walk as moving through the core of the town. The buildings must also match with that of the geological region and climate²⁹. Doing this will help to promote a sense of place. Finally, these smaller elements must adequately accommodate automobiles while also respecting the emphasis on pedestrian pathways. Because of the higher focus on the pedestrian, safety is key for the street networks of these developments. This often leads to smaller roadways with larger sidewalks and community spaces

New Urbanism Case Studies

New Urbanism has taken a variety of forms throughout its short history. It is important to now look through and analyze some precedents that while they might be very different, they can begin to exemplify ideals the

²⁸ "The Charter of the New Urbanism: Who are we?" Congress for New Urbanism. March 03, 2021. <https://www.cnu.org/who-we-are/charter-new-urbanism>.

²⁹ "The Charter of the New Urbanism: Who are we?" Congress for New Urbanism. March 03, 2021.

pocket city will attempt to incorporate while also bringing up issues with new urbanism that needs to be acknowledged.

Celebration, Florida

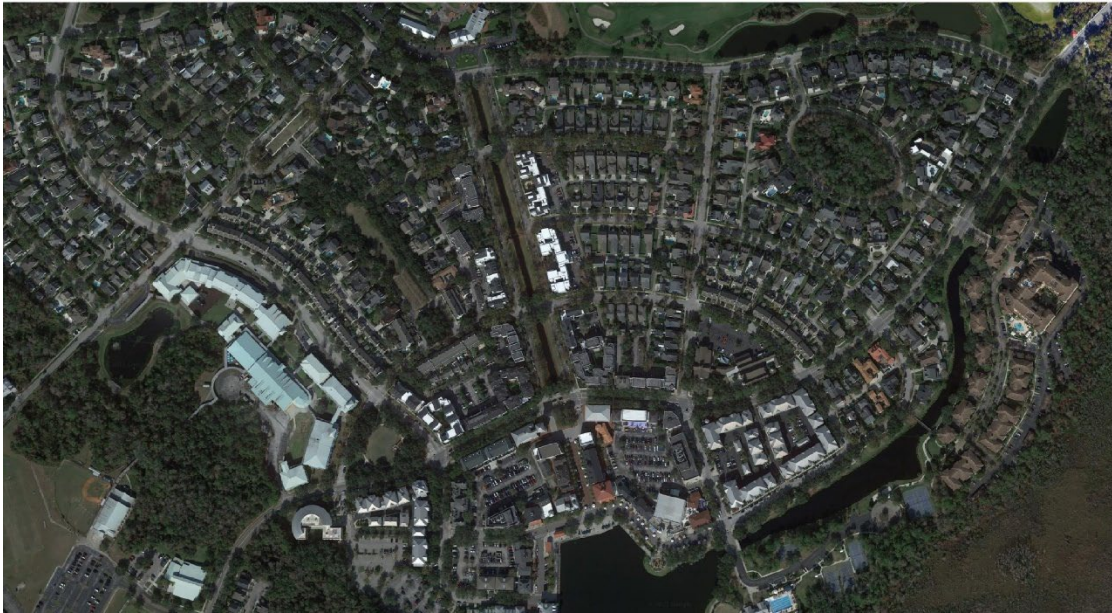


Figure 8: Celebration Florida Plan by Google Earth

The First city that can be explored arrived in the early 1990's as an experiment done by Disney trying to create the perfect town. The city Disney created was that of Celebration. Built along the edge of Walt Disney World, Celebration is a 10.7 square mile census-designated place and master-planned community (Figure 8)³⁰. The community itself has a population of 9,923 people as of 2021³¹. The goal of this community was to put an emphasis on the inclusion of parks and green spaces as well as pools, and even a golf course.

³⁰ "Celebration." Congress For New Urbanism. May 07, 2019. <https://www.cnu.org/what-we-do/build-great-places/celebration>.

³¹ Celebration, Florida Population 2021. (Demographics, Maps, Graphs). 2021. <https://worldpopulationreview.com/us-cities/celebration-fl-population>.

All these included urban spaces are within a walkable radius of the community center. Because of the importance of walkability and connectivity the community had to form space in a way that subjected easy pathing from one area to another (Figure 9). At the center of these community pathways are a network of shops and restaurants used to create emphasis on commerce (Figure 10). The creation of a cohesive community was a difficult task, however, the community planners were able to get architects such as Robert Venturi and Denise Scott Brown to design buildings to be created with their own style while also reacting to community needs. Beyond the importance of community planning the designers pushed every envelope of cohesivity. To do so, the logo of the community can even be seen on every element of the community, from the buildings to the street signs.

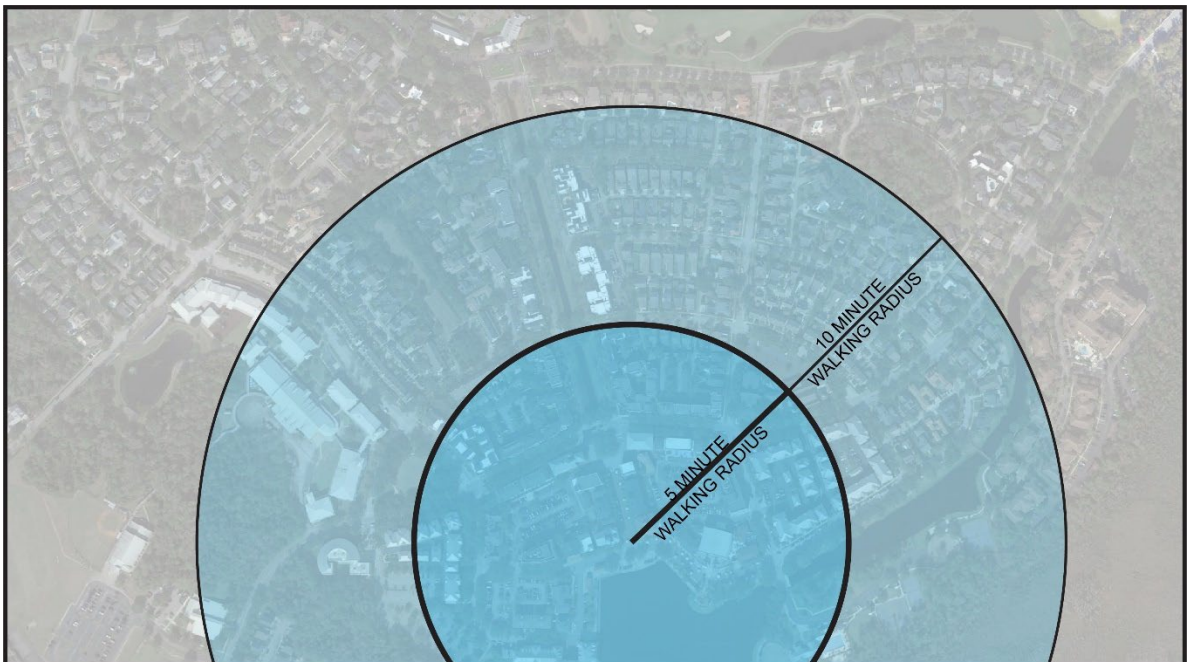


Figure 9: Celebration Florida Walking Radius by Own Work



Figure 10: Celebration Florida Open Space Networking by Own Work

With every good community of the past some elements can be overlooked, and community values may be displaced. The problems with this community come in various forms. The First issue comes with its social diversity due to its lack of affordable and mixed-income housing options. According to the most recent census 91.75% of people that live in Celebration, Florida are Caucasian (Figure 11)³². Of those residents the average income is \$145,091 a year and the average age is 40 years old (Figure 12). These increases in average age and income could be due to the higher rents at least \$1,754 a month (Figure 13)³³. The city itself also begins to struggle with that of growth and public transportation options. As of now the

³² Celebration, Florida Population 2021. (Demographics, Maps, Graphs). 2021

³³ Celebration, Florida Population 2021. (Demographics, Maps, Graphs). 2021

majority of residents within this area focus on single use car travel.

Celebration as a concept begins to understand the creation of a unified walkable community that will be stride for within the pocket city. However, despite it presenting some ideal special creations, the community itself lacks the diversity, socially and economically, in which the pocket community will

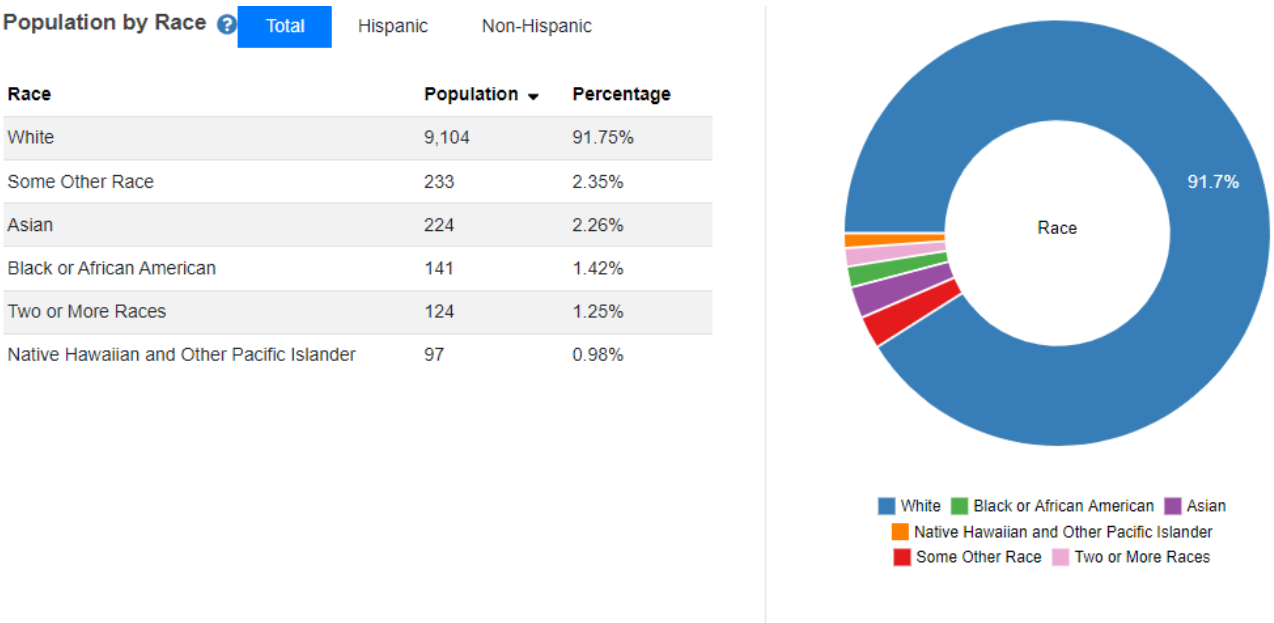


Figure 11: Celebration Florida Diversity Data by US Census 2019 ACS 5-Year Survey (Table B03002)

stride for.

Celebration Population Pyramid \$2021



Celebration Median Age

40.4 43 36.7



Celebration Adults

There are 7,584 adults, (1,434 of whom are seniors) in Celebration.

Celebration Age Dependency

61.3 Age Dependency Ratio

23.3 Old Age Dependency Ratio

38 Child Dependency Ratio

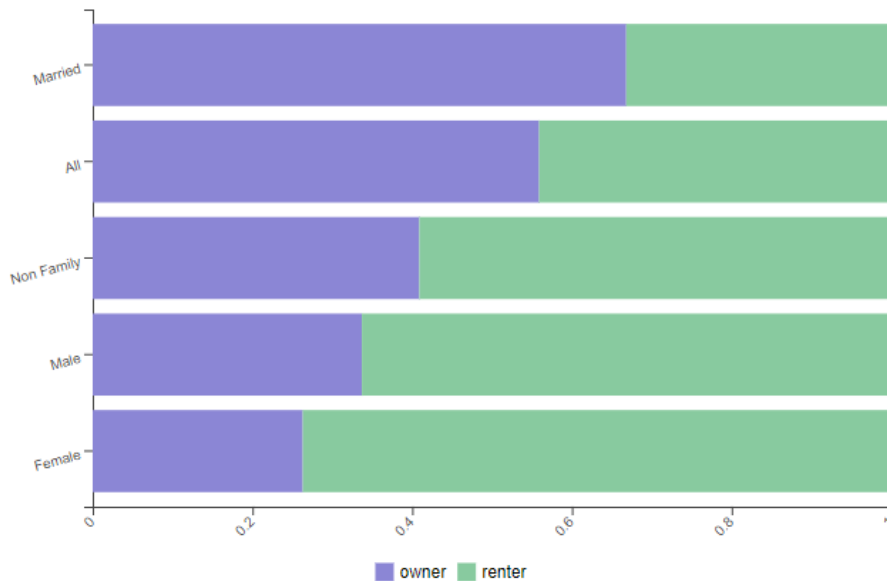
Celebration Sex Ratio

Female 5,327 53.68%

Male 4,596 46.32%

Figure 12: Celebration Florida Gender Data by US Census 2019 ACS 5-Year Survey (Table S0101)

Celebration Renter vs Owner Occupied by Household Type



Celebration Household Types

Type	Owner	Renter
Married	66.8%	33.2%
All	55.9%	44.1%
Non Family	40.9%	59.1%
Male	33.7%	66.3%
Female	26.3%	73.7%

55.9% Rate of Home Ownership

Figure 13: Celebration Florida Rental Data by US Census 2019 ACS 5-Year Survey (Table S1101)

Seaside, Florida

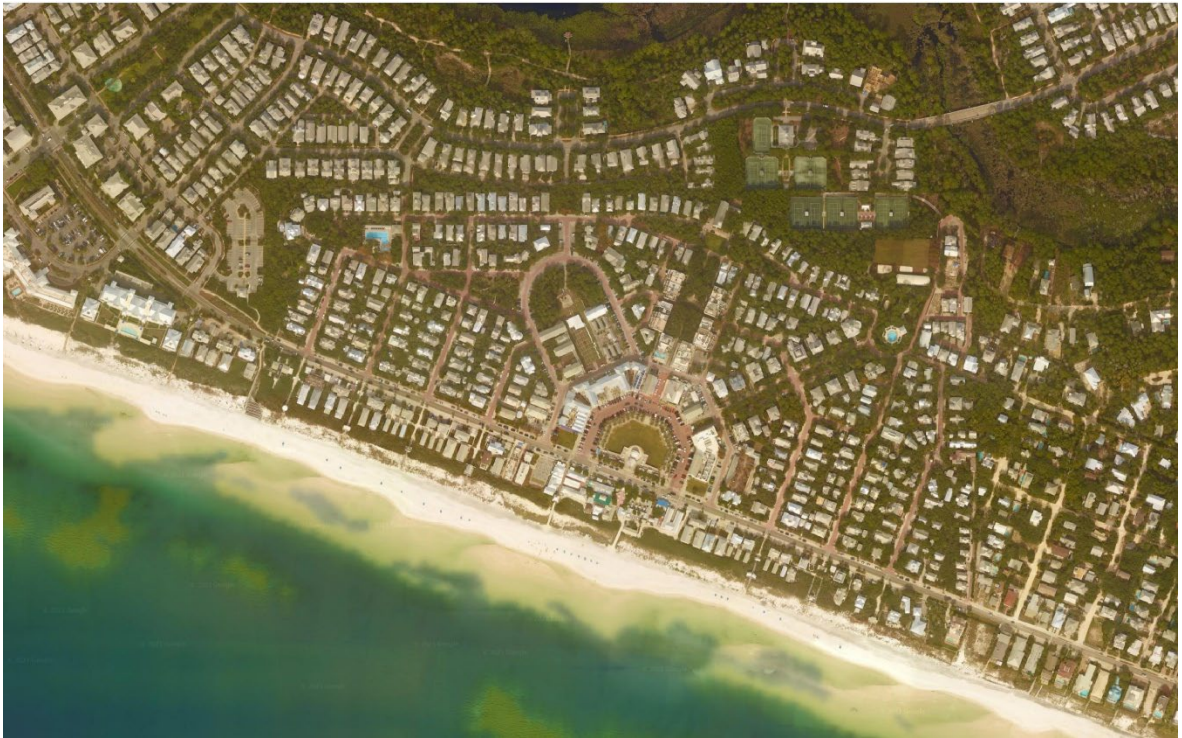


Figure 14: Seaside Florida by Google Earth

The next precedent we can take a look at is Seaside Florida. Seaside was planned out by a man named Robert Davis. Robert along with his father wanted to design a new development in Florida that strayed away from current post war urban planning designs and thus they came up with what is thought by many to be the first new urban town. The town itself broke ground in 1981, between Panama City and Fort Walton Beach in the Florida Panhandle and has been growing ever since³⁴. Along with trying to focus on pedestrian friendly streets and squares, The designer Rober Davis pushed for a more

³⁴ "Charming Seaside, Florida Defines New Urbanism." Florida Back Roads Travel. November 23, 2021. <https://www.florida-backroads-travel.com/seaside-florida.html>.

traditional style of architecture. That being a small wooden framed house that usually included larger porches that may end up wrapping around the sides.

When looking to the goals of the city one might find the basic forms of what makes New Urbanism. The designer's goal has not only been to provide a sense of connectivity, but also to enhance the sense of community values.

Walkability Like the other community, it is key to the success of Seaside (Figure 15). Lush gardens and native trees dot the landscape (Figure 16), and a front porch built on almost every cottage ensures you never meet a stranger while in Seaside³⁵. Much like the other example of new urbanism, seaside enforces the commercially lined street coming off of a main city center. The city center for seaside itself is covered with lush greenery that is surrounded by a roadway and commercial shopping centers and community infrastructure.

Beyond infrastructure needs, one of the most important things in designing a successful community is the incorporation of community events. Seaside provides events that include daily vinyasa yoga, weekly farmers markets and specialty events. While the mentioned events are kept on a pretty strict schedule, members of the community are also welcomed to create events as well as plan holiday events for the town itself.

³⁵ "A Simple, Beautiful Life." Seaside. <https://seasidefl.com/>.

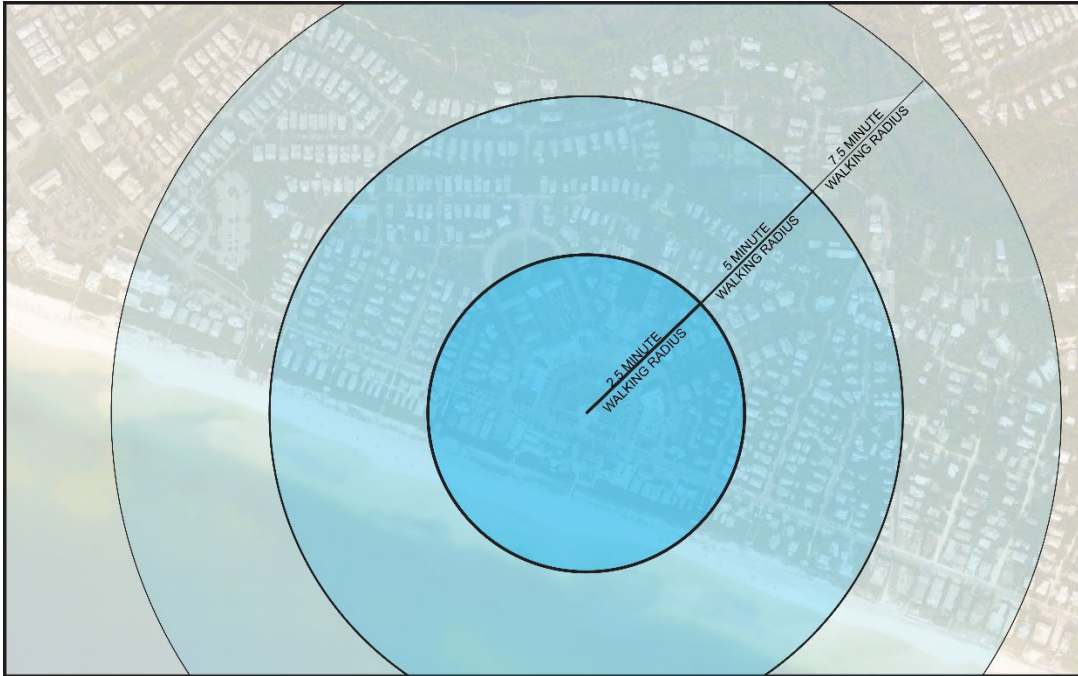


Figure 15: Seaside Florida Walking Radius by Own Work



Figure 16: Seaside Florida Built Greenspace by Own Work

Despite its successful creation of a community-oriented design strategy there have been quite a few design flaws that have appeared over the years. Most community members are seasonal, creating a lackluster community involvement during colder months of the year. One of the largest being that the town has slowly become just a vacation summer home for higher class residents. Because of this the economic diversity of the town became very limited through employment (Figure 17). The creation of a town strictly based on that of a summer attraction is not the goal of the pocket city. The pocket city pushes for the creation of a community home which will be self-sufficient year-round. Because of this season issue, seaside began to have an economic segregation which led to a lack of diverse working class people (Figure 18). Expensive rental homes began popping up and existing homes prices began to skyrocket from the original \$15,000 to over \$1 million³⁶. Thus, the town lacks a diverse housing opportunity with very little affordable housing options (Figure 19). With the majority of the community being based on retired individuals or individuals visiting for vacation, the community focus that was put on walkability becomes completely diminished. The addition of car parks and roadways appear throughout the city as a majority of the transportation is done by private cars (Figure 20).

³⁶ "Charming Seaside, Florida Defines New Urbanism." Florida Back Roads Travel. November 23, 2021.

Occupational Employment in Seaside

top ^

Y-o-Y Change		
White Collar	4,027	-2.0%
Blue Collar	914	-4.2%



Y-o-Y Change		
Self Employees	1,006	-7.9%
Private Companies	2,883	-6.0%
Governmental Workers	587	25.4%
Not for Profit Companies	465	6.7%

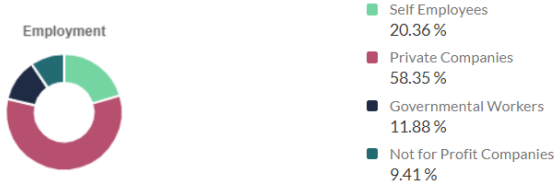


Figure 17: Seaside, Florida Employment Graphic by Point2 US Census Data

Seaside Population Demographics

top ^

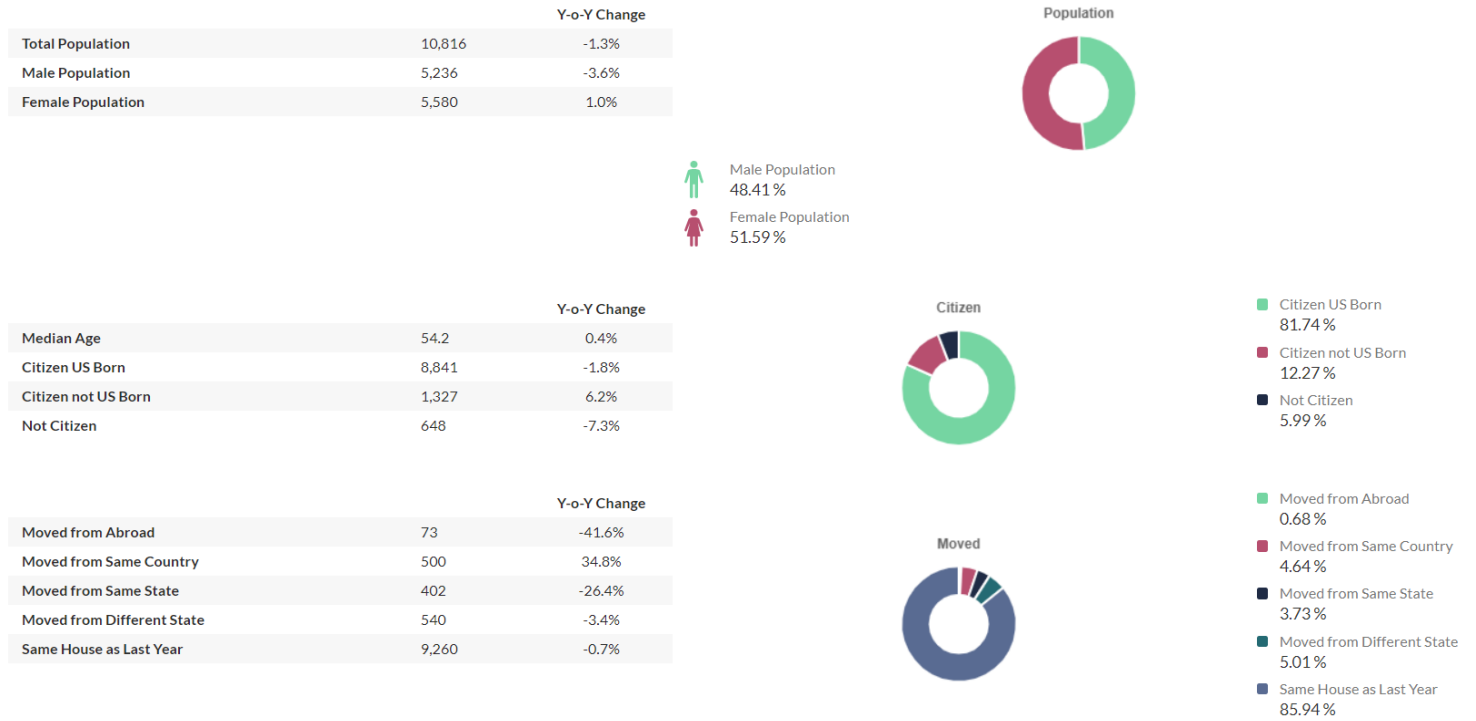


Figure 19: Seaside, Florida Population Graphic by Point2 US Census Data

Number of Households in Seaside

top ^

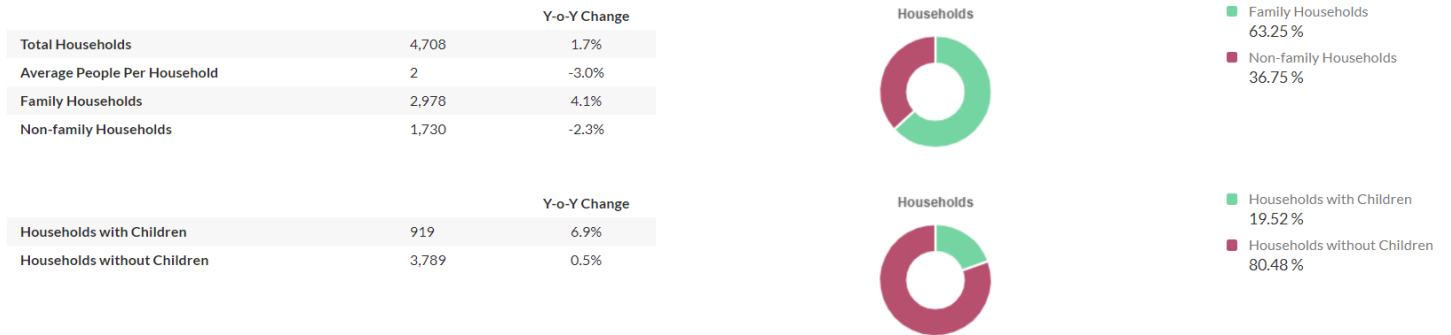


Figure 18: Seaside, Florida Housing Graphic by Point2 US Census

Means of Transport to Work in Seaside

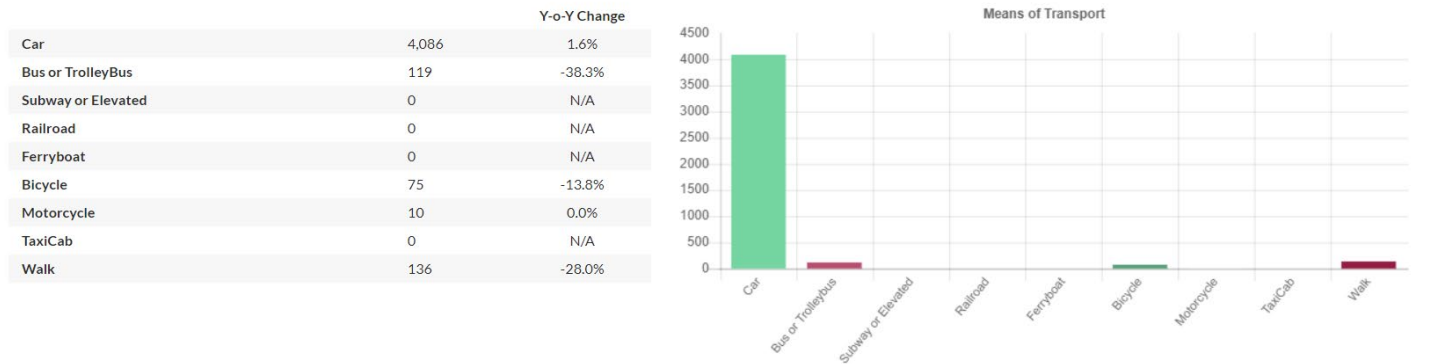


Figure 20: Seaside, Florida Housing Graphic by Point2 US Census

Criticism with New Urbanism

Though New Urbanism begins to show very similar ideas to that of the Pocket City, it makes it focus more on the connectivity of urban spaces than that of community relationships. Through this past chapter there have been key elements to start to consider when discussing the pocket city. Things such as emphasis on walkability, connectivity of community spaces, as well as interweaving of building typologies will be crucial to the success of new developing communities. However, there are some elements with New Urbanism that while they fall within their mission lack when the communities come to fruition. The first is the future growth of the community. The design strategy itself focuses more on walkability rather than car-based scales, however, due to a majority of the housing being single family homes, effects of sprawl begin to take place as the communities grow. This then creates a

smaller scaled urban sprawl. That brings up the second issue, which comes in conjunction with housing and community diversity. The two precedents discussed looked deeply into the community census data and how the diversity of the community lacks. A large portion of this lack in diversity is due to the extensive increase in housing costs in these communities and the lack of housing options. Like mentioned before, the majority of the housing options are single family homes that cost upward of \$1 million dollars, causing many families and people that are looking for other types of housing to look to other more affordable communities. These few issues with New Urbanism start to create a very segregated and weaker community structure, however, with a few changes could begin to become a stronger community dynamic. The Pocket City will take the successes and issues from New Urbanism to help morph it into a stronger community.

Chapter 4: Missing Middle Housing Typologies

What are Missing Middle Housing Typologies

Missing middle housing is a set of housing typologies that push for a more diverse and well-regulated housing market. The term Missing Middle was found by Daniel Parolek while he pushed for a new housing movement that would provide more housing options. The term itself comes from two separate ideologies. The missing part originates from the fact that many of these housing typologies had been illegal to build since the 1940s³⁷. The term middle originates from the fact that the typologies sit between low-density single-family homes and between mid to high rise apartment buildings³⁸. This range of housing typologies allow for different sizes of families that are at different parts of their life to live within a close proximity while also living within a housing type built for them (Figure 21). When creating a pocket city it is important to provide housing types for a variety of people, to do so it is imperative to discuss the important characteristics and types of missing middle housing.

³⁷ "Diverse Choices for Walkable Neighborhood Living." Missing Middle Housing. May 06, 2021. <https://missingmiddlehousing.com/>.

³⁸ "Diverse Choices for Walkable Neighborhood Living." Missing Middle Housing. May 06, 2021.

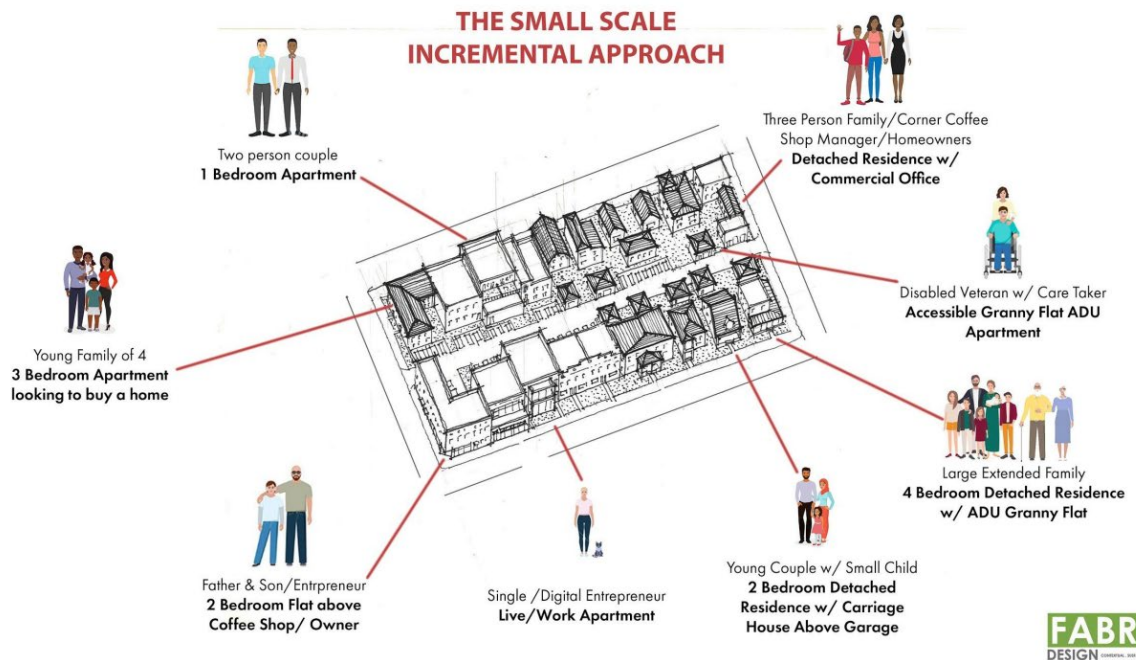


Figure 21: Missing Middle Diverse Housing by Marques King (Original Fabric Design)

Goals & Characteristics of Missing Middle Housing

When diving into the goals of Missing Middle housing typologies one would discover a very similar goal set to that of the pocket community and New Urbanism. However, unlike those cases, Missing Middle housing looks more into the ability and opportunities that come with the density of these housing typologies. Things such as walkability, small-footprint buildings, lower perceived densities, smaller well-designed units, fewer off-street parking spaces, simple construction, and community orientation appear in the many goals of the Missing Middle

Walkability

Unlike urban sprawl, due to the densities that using missing middle allows for, communities become more connected and walkable (DIAGRAM). The Missing Middle works best in a walkable context as it derives from close nit housing typologies. Walkability is often looked at as a 5–10-minute walking radius, because of the overall density of the missing middle communities can become more walkable between residents and civic centers. One key element of Missing Middle housing is that with an increasing density from single family homes more commercial buildings can appear closer to residential buildings (Figure 22).

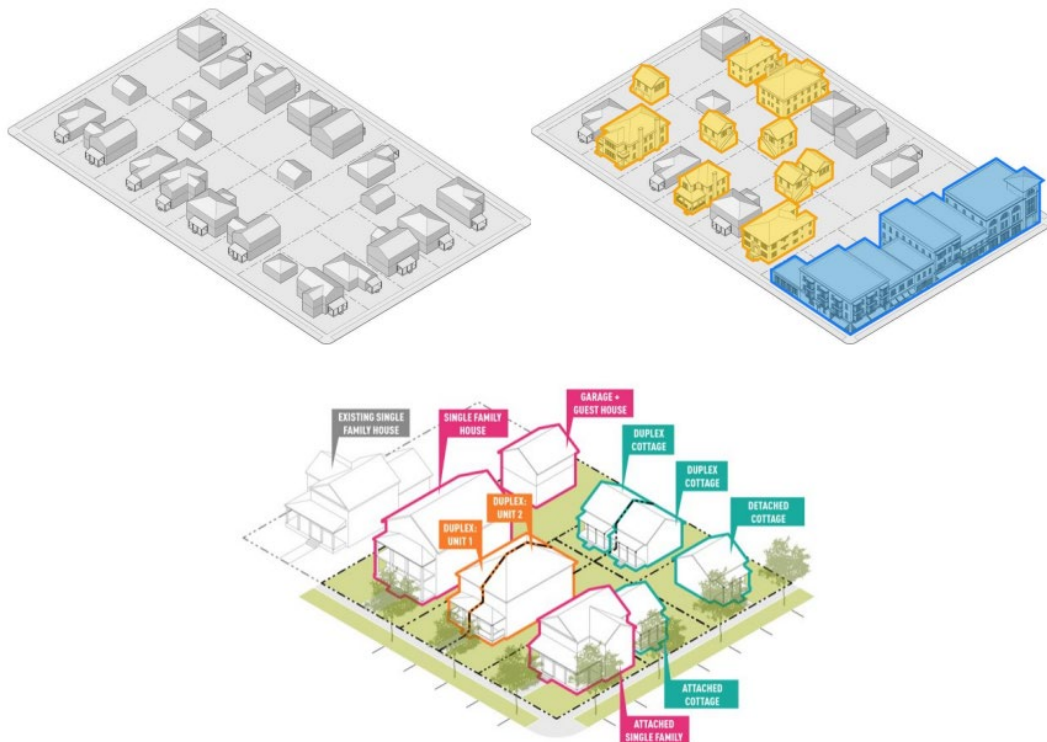


Figure 22: Missing Middle Emerging Commercial Buildings by Marques King (Original Fabric Design)

Smaller-Footprint Buildings

Missing middle housing typologies are usually small to medium sized footprints. This being said the width, depth, and height are typically no larger than a single-family home (Figure 23)³⁹. While this is the case for a majority of the typologies some of the larger missing middle typologies begin to grow slightly over that size. The important thing here is to recognize that despite the different forms of housing the missing middle includes, all of the housing types are compact in form.

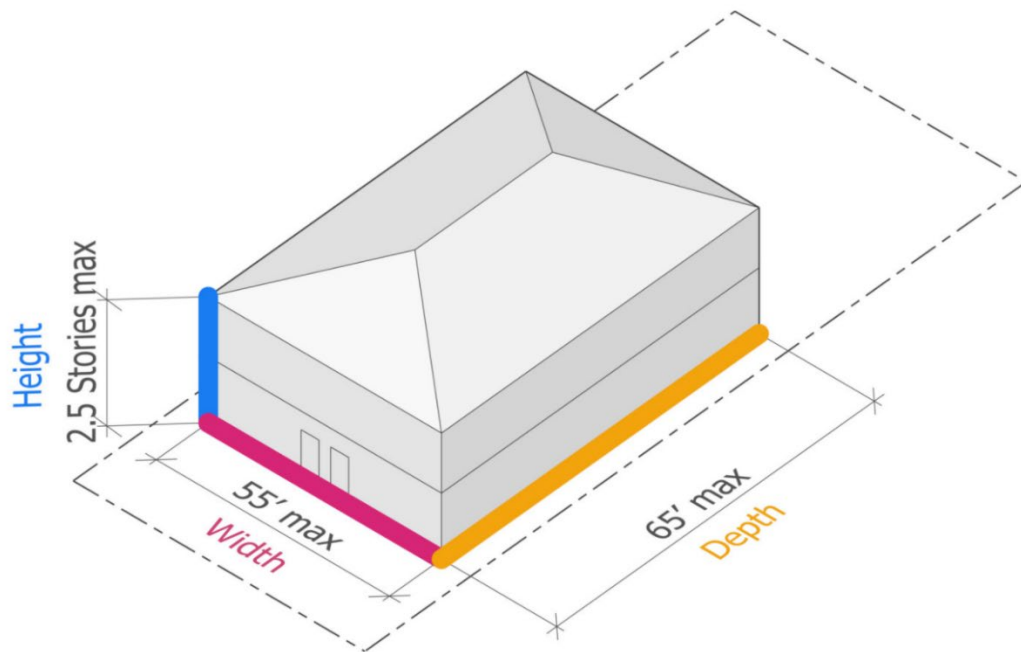


Figure 23: Single Family Typical Housing Dimensions by OPTICO Missing Middle

³⁹ "Diverse Choices for Walkable Neighborhood Living." Missing Middle Housing. May 06, 2021.

Smaller-Footprint Buildings

The perceived density of missing middle housing is actually quite low despite its ability to be extremely dense. Densities of both a mid-rise building with a large parking lot can in some cases be the exact same density as missing middle typologies on the same site (Figure 22). When looking at the other side of the spectrum, incorporating missing middle housing typologies within a single family dominated area you can begin to have a large enough density to incorporate commercial use (Figure 22)⁴⁰. This being said, to create a more diverse community with commerce and infrastructure missing middle housing can become the successful path.

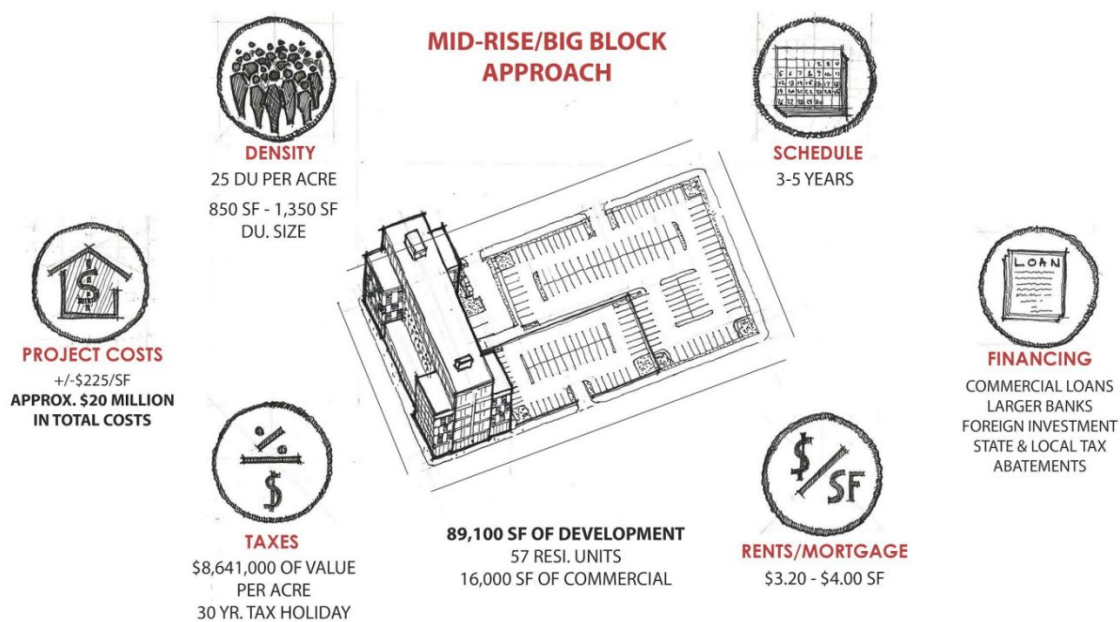


Figure 24: Mid-rise Density statistics by Marques King (Fabrick Design)

⁴⁰ "Diverse Choices for Walkable Neighborhood Living." Missing Middle Housing. May 06, 2021.

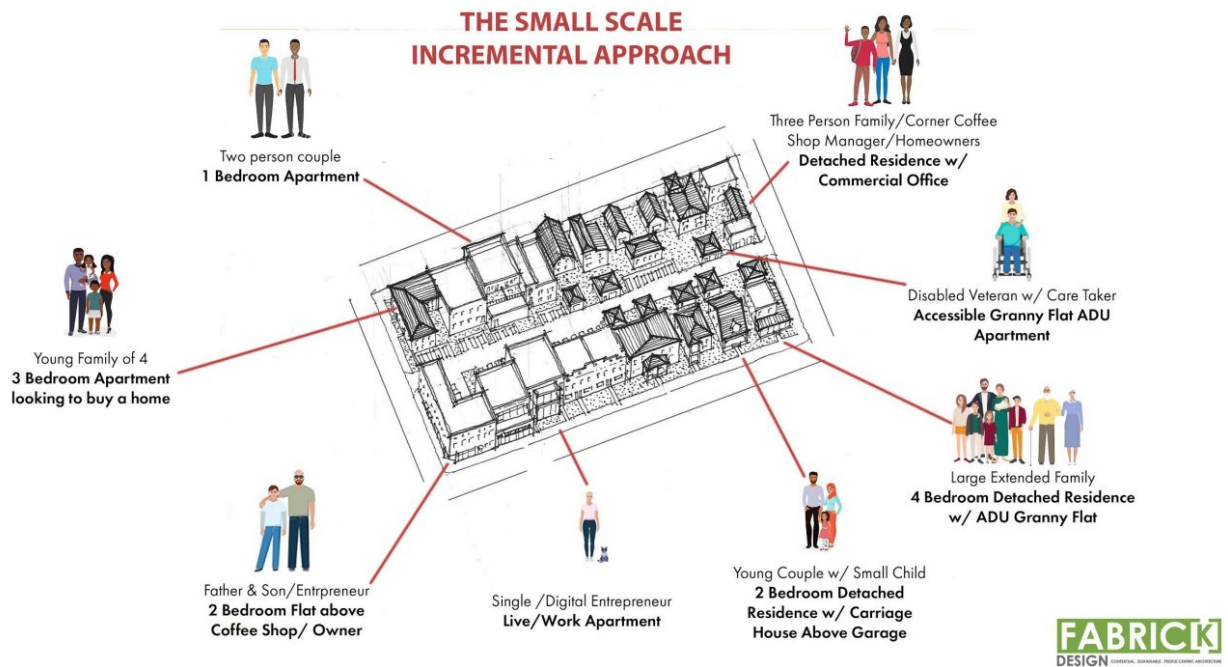


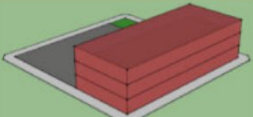
Figure 25: Missing Middle Black Matching Midrise block size by Marques King (Fabrick Design)

Smaller-Footprint Buildings

Smaller units are a key to missing middle housing. Ultimately unit size depends on the type and size of family however, the quality of the home does not change. Though units may be smaller they tend to incorporate good design criteria to allow for an attractive home, nonetheless. While smaller homes are obviously not for everyone, typically some missing middle typologies allow for the connection of one unit to another to allow for the diversity of unit types to increase further, especially when trying to incorporate larger family sizes.

Fewer Parking Spaces

Missing middle housing itself doesn't specifically allow for fewer parking spots. However, indirectly due to its density and typical project location next to public transportation and walkable options the parking spaces could easily be decreased. o Typically for missing middle housing it is looked at that one spot per unit is efficient however, the fewer the better⁴¹. The difficulty with the missing middle is that zoning typically requires two parking spots per unit, typically this can be overcome by street parking, however, it is still one of the biggest difficulties for creating missing middle housing.

	Number of Parking Spaces Required	Average Monthly Rent Impact (Per Bedroom)	Income Required for Affordability
	2 spaces	\$1,404	\$51,000
	1.5 spaces	\$1,195	\$41,000
	1 spaces	\$993	\$36,000

Source: Fregonese Associates

Figure 26: Parking on site vs cost and affordability by OPTICO Missing Middle (Original, Fregonese Associates)

⁴¹ "Diverse Choices for Walkable Neighborhood Living." Missing Middle Housing. May 06, 2021. /

Missing Middle Creates Community

Despite only really being a large range of housing typologies the overall understanding of missing middle housing pushes toward more community-oriented design. Missing Middle Housing creates community through the integration of shared community spaces within the building type, or simply from being located within a vibrant neighborhood with places to eat, drink, and socialize⁴². Through denser housing typologies communities will tend to find a larger portion of sites being opened up to greenspace and community gathering spaces.

Missing Middle Marketability

With the growing population and the changing of the working generation, there has been a change in the need for certain housing types. Despite this change the supply and demand of housing opportunities have yet to even out. (Figure 27) A lot of the younger generations as time has gone on have focused more on smaller housing options within a larger walkable area (Figure 28). This change has pushed the single-family design typology away from being the dominant housing type and created a more diverse opportunity for missing middle housing to thrive.

⁴² "Diverse Choices for Walkable Neighborhood Living." Missing Middle Housing. May 06, 2021. /

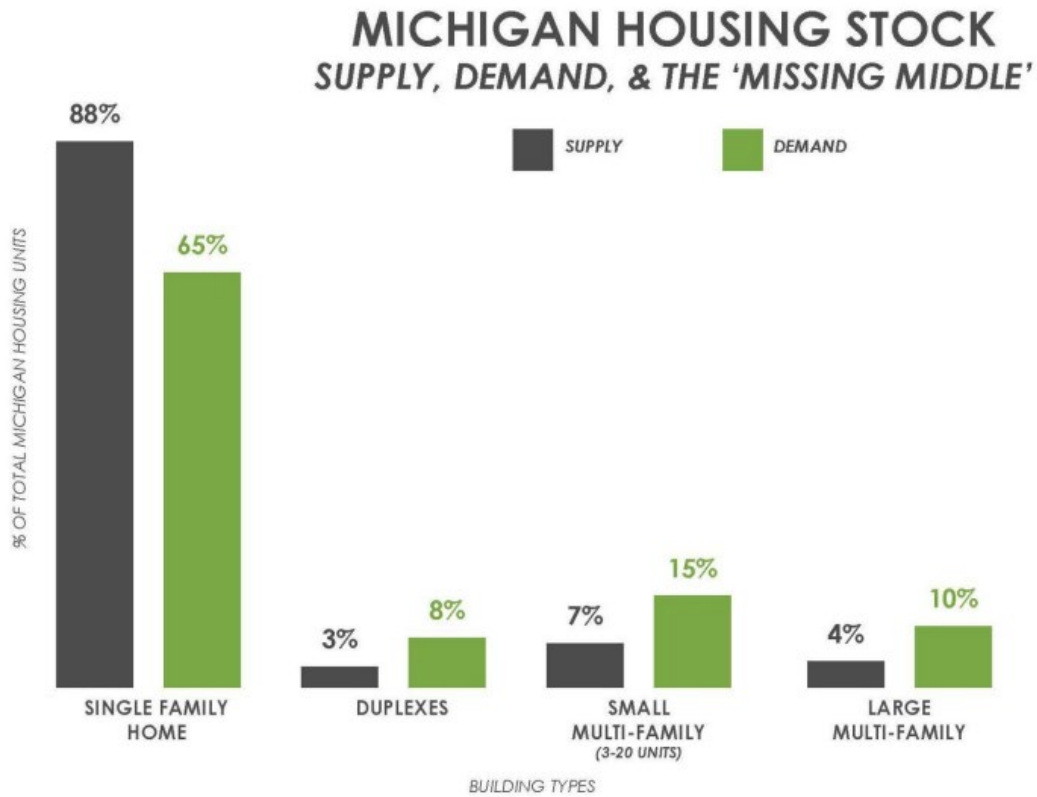


Figure 27: Michigan Housing Supply and Demand by Marques King

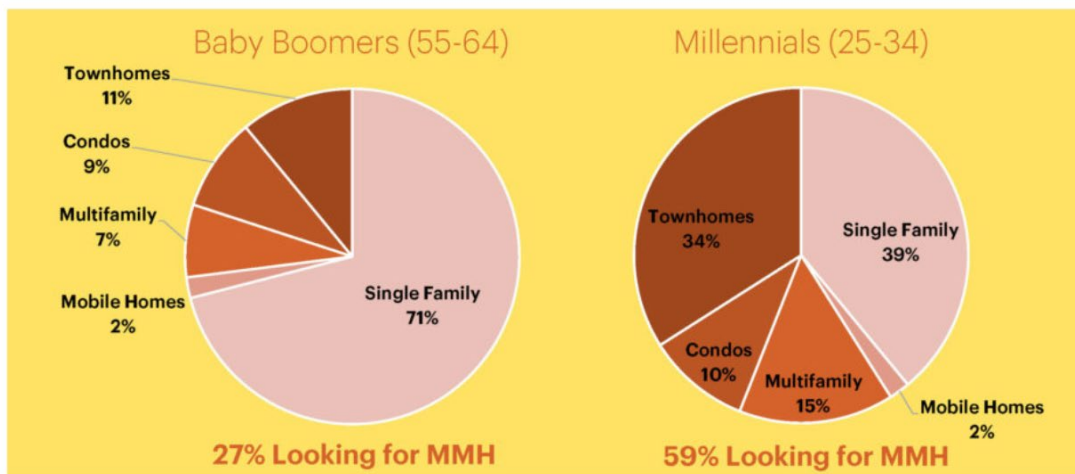


Figure 28: Generational Housing Needs by OPTICO Missing Middle

Types of Missing Middle Housing Typologies

Most missing middle housing typologies are within the 4–8-unit range, while also ranging from 1-3 stories. Larger cases of missing middle housing can be upwards of 12 units per building or lot while raising up to 4 stories. With such a wide variety of housing typologies it is important to understand the difference and benefits of each type of dwelling unit.

Duplex



Figure 29: Duplex by Sightline Institute (April 2019)

Small 2-unit structure where the building can either be side by side or stacked on top of each other⁴³. Typically, these types of units have a front entry from the street face. For the stacked duplex, units will typically be a single floor having one unit on top of the other. For this typology both entrances are still on the front however instead of both opening to a living space, one will open directly to a staircase up to your unit. Stacking duplexes

⁴³ "Diverse Choices for Walkable Neighborhood Living." Missing Middle Housing. May 06, 2021.

are used in cases with smaller lot widths and often are able to small backyards in the rear of the building.

Typical Specifications

Lot	Front-loaded	Rear-Loaded
Width*	55–75 feet	40–70 feet
Depth*	100–150 feet	100–150 feet
Area*	5,000–11,250 sq. ft.	4,500–10,500 sq. ft.
	0.11–0.26 acres	0.10–0.24 acres
Units		
Number of Units	2 units	2 units
Typical Unit Size	600–2,400 sq. ft.	600–2,400 sq. ft.
Density		
Net Density	8–17 du/acre	8–19 du/acre
Gross Density	6–13 du/acre	7–14 du/acre
Parking		
Parking Ratio*		
On-street Spaces	2–3	2–3
Off-street Spaces	1 per unit max.	1 per unit max.
Setbacks		
Front*	10–25 feet	
Side*	5–12 feet	
Rear (main building)*	30–60 feet	
Between Main and Accessory Buildings	10–20 feet	
Building		
Building Size		
Width	28–55 feet	
Depth	28–60 feet	
Height (to eave)*	14–24 feet	
Floors	1-2 stories	
* <i>Varies based on context</i>		

Figure 30: Typical Side-by-side Duplex Metrics by OPTICO Missing Middle

Typical Specifications

Lot	Front-loaded	Alley-Loaded
Width*	45–75 feet	40–70 feet
Depth*	100–150 feet	100–150 feet
Area*	4,500–11,300 sq. ft.	4,000–10,500 sq. ft.
	0.13–0.26 acres	0.09–0.24 acres
Units		
Number of Units	2	2
Typical Unit Size	600–2,400 sq. ft.	600–2,400 sq. ft.
Density		
Net Density	8–19 du/acre	8–25 du/acre
Gross Density	7–16 du/acre	7–16 du/acre
Parking		
Parking Ratio*	1–2 per unit	1–2 per unit
On-street Spaces	1–3	1–3
Off-street Spaces	1 per unit max.	1 per unit max.
Setbacks		
Front*	10–25 feet	
Side*	5–12 feet	
Rear (main building)*	30–60 feet	
Between Main and Accessory Buildings	10–20 feet	
Building		
Building Size		
Width	28–55 feet	
Depth	28–60 feet	
Height (to eave)*	20–24 feet	
Floors	2–2.5 stories	
* <i>Varies based on context</i>		

Figure 31: Typical Stacked Duplex Metrics by OPTICO Missing Middle

Triplex



Figure 32: Stacked Triplex by OPTICO Missing Middle

Similar to the duplex, the triplex is a small 3 story unit that can either be side by side or stacked. Because a side-by-side triplex starts to mimic a rowhouse, the triplex is typically considered to be stacked. Again, much like the duplex the triplex tends to be single story units stacked directly on top of each other. The two units above the ground floor usually have a shared entrance while the one on ground floor will have its own.

Typical Specifications

Lot	Front-loaded	Alley-Loaded
Width*	40–65 feet	40–55 feet
Depth*	100–150 feet	85–150 feet
Area*	4,000–9,750 sq. ft.	3,400–8,250 sq. ft.
	0.092–0.22 acres	0.078–0.19 acres
Units		
Number of Units	3	3
Typical Unit Size	700–1,600 sq. ft.	700–1,600 sq. ft.
Density		
Net Density	13–32 du/acre	15–38 du/acre
Gross Density	11–30 du/acre	13–35 du/acre
Parking		
Parking Ratio*	1–2 per unit	1–2 per unit
On-street Spaces	1–2	1–2
Off-street Spaces	1 per unit max.	1 per unit max.
Setbacks		
Front*	10–25 feet	
Side*	5–12 feet	
Rear (main building)*	5–30 feet	
Between Main and Accessory Buildings	10–20 feet	
Building		
Building Size		
Width	24–40 feet	
Depth	40–55 feet	
Height (to eave)*	30–45 feet	
Floors	3–3.5 stories	
* <i>Varies based on context</i>		

Figure 33: Typical Triplex Stacked Metrics by OPTICO Missing Middle

Fourplex / Quad



Figure 34: Fourplex by Finetooth (July 2018)

The quad is a single detached structure that includes 4 units. This typology could be described as two stacked duplexes pushed into one structure. This unit typology begins to push the density of a single lot further than most of the other typologies. Some Quads have multiple entries however the typical quad has a singular entry for all the units before having separate unit entries.

Typical Specifications

Lot	Front-loaded	Alley-Loaded
Width*	50–75 feet	45–65 feet
Depth*	100–150 feet	100–150 feet
Area*	5,000–11,250 sq. ft.	4,500–9,750 sq. ft.
	0.11–0.26 acres	0.10–0.22 acres
Units		
Number of Units	4	4
Typical Unit Size	500–1,200 sq. ft.	500–1,200 sq. ft.
Density		
Net Density	18–29 du/acre	21–35 du/acre
Gross Density	14–22 du/acre	15–25 du/acre
Parking		
Parking Ratio*	1-2 per unit	1-2 per unit
On-street Spaces	2–3	2–3
Off-street Spaces	1.5 per unit max.	1.5 per unit max.
Setbacks		
Front*	10–25 feet	
Side*	5–12 feet	
Rear (main building)*	30–60 feet	
Between Main and Accessory Buildings	10–20 feet	
Building		
Building Size		
Width	34–56 feet	
Depth	32–60 feet	
Height (to eave)*	20–28 feet	
Floors	2-2.5 stories	
* <i>Varies based on context</i>		

Figure 35: Typical Quad Metrics by OPTICO Missing Middle

Multiplex



Figure 36: Multiplex by Mark MCclung (October 2018)

The multiplex takes the ideals from the Quad, Triplex and Duplex and densifies it even further. The multiplex typology can be anywhere from 5 to 12 units. These units tend to be stacked and side by side along a plotted row. The issue with this housing type is that it takes the built surface over nature. This being said, you would gain higher density and economic output but lose out amenity space and sustainable construction.

Typical Specifications

Lot	Front-loaded	Alley-Loaded
Width*	95–120 feet	75–100 feet
Depth*	100–150 feet	100–150 feet
Area*	9,500–18,000 sq. ft.	7,500–15,000 sq. ft.
	0.22–0.41 acres	0.17–0.34 acres
Units		
Number of Units	5–12 units	5–12 units
Typical Unit Size	500–1,200 sq. ft.	500–1,200 sq. ft.
Density		
Net Density	12–55 du/acre	14–70 du/acre
Gross Density	10–50 du/acre	12–63 du/acre
Parking		
Parking Ratio*	1-1.5 per unit	1-1.5 per unit
On-street Spaces	3–4	3–5
Off-street Spaces	1.25 per unit max.	1.25 per unit max.
Setbacks		
Front*	10–25 feet	
Side*	5–12 feet	
Rear (main building)*	30–60 feet	
Between Main and Accessory Buildings	10–20 feet	
Building		
Building Size		
Width	50–80 feet	
Depth	35–75 feet	
Height (to eave)*	25–40 feet	
Floors	2-2.5 stories	
* <i>Varies based on context</i>		

Figure 37: Typical Multiplex Metrics by OPTICO Missing Middle

Cottage Court



Figure 38: Cottage Court by Julia Tellman

The cottage court is similar to a pocket community, whereas it is a small cluster of single family 1-2 story detached housing structures. The cottages themselves surround a shared courtyard space that allow for small community gatherings.

Typical Specifications

Lot	Front-loaded	Alley-Loaded
Width*	115–160 feet	100–150 feet
Depth*	100–150 feet	100–150 feet
Area*	11,500–24,000 sq. ft.	10,000–22,500 sq. ft.
	0.26–0.55 acres	0.23–0.52 acres
Units		
Number of Units	5–10	5–10
Typical Unit Size	500–800 sq. ft.	500–800 sq. ft.
Density		
Net Density	13–38 du/acre	19–44 du/acre
Gross Density	10–20 du/acre	15–31 du/acre
Parking		
Parking Ratio*	1–2 per unit	1–2 per unit
On-street Spaces	5–7	5–7
Off-street Spaces	1 per unit max.	1 per unit max.
Setbacks		
Front*	10–25 feet	
Side*	5–15 feet	
Rear (main building)*	5–15 feet	
Between Main and Accessory Buildings	5–10 feet	
Building		
Building Size		
Width	18–24 feet max.	
Depth	24–36 feet max.	
Height (to eave)*	12–18 feet max.	
Floors	1–1.5 stories (Rear-most building sometimes 2 stories)	
* <i>Varies based on context</i>		

Figure 39: Typical Cottage Court Metrics by OPTICO Missing Middle

Courtyard Building



Figure 40: Courtyard Building by OPTICO Missing Middle

Like the Cottage Court the courtyard building has its units facing a centralized greenspace that can be used for gathering. The difference here lies in the fact that the courtyard building is a single structure with multiple units inside it. The courtyard building tends to site from 1-3 stories and can include 6-25 units⁴⁴.

⁴⁴ "Diverse Choices for Walkable Neighborhood Living." Missing Middle Housing. May 06, 2021.

Typical Specifications

Lot	Front-loaded	Alley-Loaded
Width*	100–135 feet	85–125 feet
Depth*	110–150 feet	100–150 feet
Area*	11,000–20,250 sq. ft.	9,350–18,750 sq. ft.
	0.25–0.46 acres	0.21–0.43 acres
Units		
Number of Units	6–25	6–25
Typical Unit Size	500–1,300 sq. ft.	500–1,300 sq. ft.
Density		
Net Density	26–60 du/acre	33–70 du/acre
Gross Density	21–56 du/acre	24–61 du/acre
Parking		
Parking Ratio*	1–2 per unit	1–2 per unit
On-street Spaces	3–6	3–6
Off-street Spaces	1 per unit max.	1 per unit max.
Setbacks		
Front*	10–15 feet	
Side*	5–12 feet	
Rear (main building)*	10–20 feet	
Between Main and Accessory Buildings	10–20 feet	
Building		
Building Size		
Width	50–100 feet	
Depth	40–80 feet	
Height (to eave)*	20–40 feet	
Floors	1–3.5 stories	
* <i>Varies based on context</i>		

Figure 41: Typical Courtyard Building Metrics by OPTICO Missing Middle

Live-Work Housing



Figure 42: Live-Work Building by David Morris

The live work housing typology is quite different than any of the other missing middle typologies. The live work typology can be described as a small to medium 2-3 story structure that consists of residential living space above a commercial/ nonresidential ground floor⁴⁵. Many downtown areas around the United States consist of a continuing live work typology. The residential units of the buildings typically have a separate fire rated entrance to the side of the main retail frontage.

⁴⁵ "Diverse Choices for Walkable Neighborhood Living." Missing Middle Housing. May 06, 2021.

Typical Specifications

Lot	Front-loaded	Alley-Loaded
Width*	N/A	18–25 feet
Depth*		85–120 feet
Area*		1,530–3,000 sq. ft.
		0.04–0.07 acres
Units		
Number of Units	N/A	1
Typical Unit Size		1,000–3,000 sq. ft.
Density		
Net Density	N/A	14–29 du/acre
Gross Density		11–20 du/acre
Parking		
Parking Ratio*	N/A	1–3 per unit
On-street Spaces		1–2
Off-street Spaces		2 per unit max.
Setbacks		
Front*		10–25 feet
Side*		0–12 feet
Rear (main building)*		30–60 feet
Between Main and Accessory Buildings		10–20 feet
Building		
Building Size		
Width		18–25 feet
Depth		35–55 feet
Height (to eave)*		25–40 feet
Floors		2–3.5 stories
* <i>Varies based on context</i>		

Figure 43: Typical Live-Work Metrics by OPTICO Missing Middle

Chapter 5: Sustainable Neighborhood Design

How do we define a Sustainable Neighborhood?

When looking to design the Pocket City, it is important to understand what makes a walkable city successful. Throughout recent years different initiatives and rating system have been enacted to help improve sustainability on a building scale. While these initiatives help those specific buildings it is increasingly important to look toward community wide initiatives. Sustainable neighborhoods don't follow one specific set of criteria, instead it look to incorporate as many sustainable practices from a set of goals and outlooks. Things such as LEED Neighborhoods, the 15-minute city and human scale design all push toward what sustainable cities might begin to look like in the future.

LEED Neighborhoods

Leadership in Energy and Environmental Design or LEED is a program that creates rating systems for sustainable design projects. While LEED has been rating buildings for over a few decades, they have begun to rate neighborhoods. This new programs LEED Neighborhoods or LEED ND was created in 2007 with a partnership between the U.S. Green Building Council (USGBC), Natural Resource Defense Council (NRDC) and the Council for New Urbanism (CNU)⁴⁶. This rating system was able to

⁴⁶ "LEED for Neighborhood Development." CNU. August 06, 2015. <https://www.cnu.org/our-projects/leed-neighborhood-development>.

gain traction quickly as it grew of the success of LEED accreditation. The main overarching goal of the rating system is to create more sustainable, well-connected neighborhoods while reducing the current impact of construction operation and maintenance of buildings on greenhouse gas emissions⁴⁷. LEED ND, Like New Urbanism, is smart growth. Trying to combat sprawling landscapes LEED ND brings in metrics and requirements for developing towns that will push for affordable housing, revitalized towns, stronger communities, and a healthier natural ecosystem. “Over eight years, LEED-ND's standardized and highly coveted benchmark has strongly accelerated the pace of high-quality infill development, green-context planning, and revitalizing existing urban areas with walkable neighborhoods. The resulting shift is reducing the number of automobile trips per capita, reducing greenhouse gas emissions, restoring vibrancy in American downtowns, and preserving critical undeveloped open space.”⁴⁸ It pushes to provide a wide variety of housing around local businesses, thus creating a thriving community with increased walkability and foot traffic. Because of the focus on walkability, transit become very important for the success of these communities

Goals of LEED ND

According to the LEED ND reference guide there are 7 main goals for the rating system. These specific goals while they all act as separate entities work toward one cohesive project. The goals are as followed. Reverse contribution to climate change, enhance human health and wellbeing, restore water resources, protect biodiversity, promote regenerative materials and resource cycles, promote a greener economy, and enhance social equity, environmental justice,

⁴⁷ "LEED Certification for Neighborhood Development." U.S. Green Building Council. <https://www.usgbc.org/leed/rating-systems/neighborhood-development>.

⁴⁸ "LEED for Neighborhood Development." CNU. August 06, 2015.

community health, and quality of life⁴⁹. While each of these goals act separately, they are all put into specific credit categories where the neighborhood will then be rated (Figure 44).

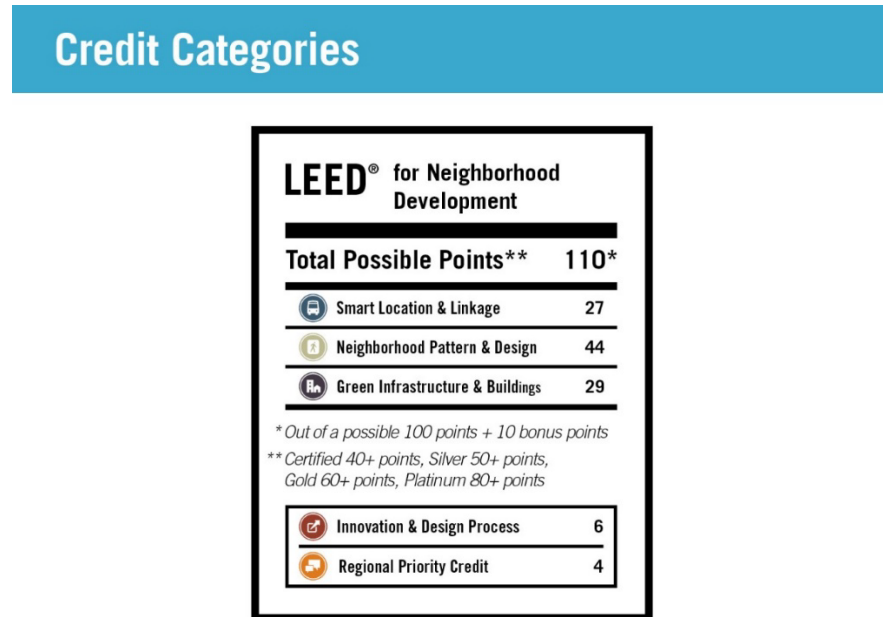


Figure 44: LEED Credit Categories (Source: USGBC)

The rating system above break down the categories in which points can be scored. For a community to be classified as a LEED ND development they will be required to follow a few prerequisites as well as reaching a certain number of points. One these are met the neighborhood will be give a status of either Certified (40-49 points), Silver (50-59 points), Gold (60-79 points), or platinum 80 points or higher⁵⁰.

⁴⁹ USGBC. LEED Reference Guide for Neighborhood Development. 4th version, vol. 4, U.S. Green Building Council, 2014, USGBC, <https://www.usgbc.org/resources/leed-reference-guide-neighborhood-development>.

⁵⁰ USGBC. LEED Reference Guide for Neighborhood Development. 4th version, vol. 4

Smart Location and Linkage (SLL)

Smart Location and Linkage despite being the smallest of the three main credit categories incorporates key factors to what makes these neighborhoods work. Like mentioned before it is important to take note that LEED ND designs can only be incorporated into new communities or communities up to 75% constructed⁵¹. This being said when it comes to this category it is important to understand the site context especially. Thus, this section is broken into the measuring of surrounding context as well as the enhancing of site.

The first thing they look into is that of measuring the location. They do so by calculating densities, connect ability and diversity within the surrounding area. Doing so started to create a real understanding of how much traffic this area might get when populated with a LEED ND community. Beyond this it is important to begin to look at the currently provided infrastructure as well as goods and services. This aspect looks closer toward partially constructed communities to see if they are able to provide the necessary productivity needed for a LEED ND Development. Most of the developmental credits that come from this section focus on the aspects of combating that of sprawl⁵². This being said a focus on public transportation is used to combat local traffic issues and thus leads to a

⁵¹ "LEED Certification for Neighborhood Development." | U.S. Green Building Council.

⁵² USGBC. LEED Reference Guide for Neighborhood Development. 4th version, vol. 4

decreased private automobile usage. On the other hand, the SLL category begins to cover the land usage, and provides points based on slope, walkability, longevity of use, as well as decreased overconsumption of farmland as well as marshland.

Neighborhood Pattern and Design (NPD)

The neighborhood pattern and design category being the largest of the three main categories focuses on compact, walkable, mixed-use neighborhoods that are well connected with other surrounding cities⁵³. Current communities tend to struggle due to connectivity issues with a lack of walkable options. With the NPD category communities main focus is on efficiencies for residents as well as visitors of the community.

When discussing the importance of mixed use within the project the NPD Category pushes for a few specific design elements. The first being historic buildings. Historic buildings are not only important because they are the most sustainable for construction, but also because they continue the culture of existing towns within the area. Another key element of LEED ND communities is a diverse array of housing typologies. Housing typologies need to range from missing middle duplexes to smaller apartment buildings and in some cases mid to high rise communities. Creating this diverse housing

⁵³ USGBC. LEED Reference Guide for Neighborhood Development. 4th version, vol. 4

market allows for a diverse group of people among many different socioeconomic levels to reside within the community. Other than buildings and infrastructure needs, LEED ND communities also incorporate networking civic spaces and community gardens. These spaces create the heart of the community while also allowing for community events and farmers markets⁵⁴.

Green Infrastructure and Buildings (GIB)

Building construction and maintenance accounts for over one third of the environmental impact within the United States⁵⁵. Because of this LEED Nd has a category dedicated that that of building in infrastructure with increased interest of sustainability. This category has four major focus groups; To reduce energy use, to reduce CO2 emissions, to decrease water usages, and to diminish waste⁵⁶. To accomplish these goals, LEED Nd try to incorporate self-sufficient practices among the entire community. Thus, along these communities you can begin to see gardens, orchards, green roofs, and much more sustainable elements (Figure 45).

⁵⁴ "LEED for Neighborhood Development." CNU. August 06, 2015.

⁵⁵ "LEED Certification for Neighborhood Development." U.S. Green Building Council.

⁵⁶ "LEED for Neighborhood Development." CNU. August 06, 2015.



Green Infrastructure & Buildings

Green Infrastructure as Neighborhood Amenities



Image courtesy of Dattner Architects/Grimshaw/Lee Weintraub Landscape

Figure 45: Green Neighborhoods-CNU (Source: Dattner Architects)

Twinbrook Station Rockville, MD



Figure 46: Twinbrook LEED ND (Source: USGBC Database)

Twinbrook metro station, located in Rockville Maryland, is a certified LEED ND community. The project itself is 26 acres and has achieved gold accreditation with 66 points⁵⁷. The site itself began as a greenfield site but now sits tall as it gains traffic from the current DC metro stop located next to it.

The idea for this development came from its current public transit focused array. As one looks deeper into the designation of planned building uses, one will begin to see what it truly mean to be mixed use. The master plan accounts for 1,595 Residential units, 325,000 sf of office space, and 225,000 sf of retail space⁵⁸. Of these newly constructed buildings 80% are planned to be LEED certified which will help drop water usage down by over 30%⁵⁹.

The 15 Minute City

The 15-minute city, while it is not as in depth as LEED ND, can begin to be explored as a smart growth technique based on walkable city ranges. The 15-Minute city was a concept created by Dan Luscher where the spaces of a community can become more ambitious, inclusive, human scaled and effectively implemented with the urban fabric⁶⁰. The idea behind the 15-minute city is that all people

⁵⁷ "LEED for Neighborhood Development." CNU. August 06, 2015.

⁵⁸ "LEED for Neighborhood Development." CNU. August 06, 2015.

⁵⁹ "LEED for Neighborhood Development." CNU. August 06, 2015.

⁶⁰ "15 Minute City Putting People at the Center of Urban Transformation." :15 Minute City. 2021. <https://www.15minutecity.com/>.

withing a city or community should have access to all essential services within a 15-minute walk or bike ride. In some cases, other sustainable traveling methods can be included as well, such as an electric scooter or bike⁶¹. On the other note there has been some debate on whether or not a city can be considered a 15-Minute city because of public transit. While there is an argument that public transportation is extremely important for connectivity of these communities to that of the larger urban growth network, for a city to be truly a 15-minute city, those connections must be made on a fully human scale.

The future of urban growth has begun to change due to the events of 2020. Peter Yeung discusses this idea of what Paris was like during the events that transpired during COVID.

That conveyor belt of choice came crashing to a halt with the coronavirus pandemic. But for Fraioli, the two-month lockdown that began on 17 March – confining her to a 1km radius of her home – gave her a nuanced, enriching view of her neighborhood. “I discovered it’s possible to feel like you’re in a small village in Paris,” she says. “To get to know your neighbors, to maintain good links with shopkeepers, to favor local craftsmen and shops over large supermarkets. I even joined a citizens’ movement where people prepare food baskets for homeless people. I thought I would have a hard time living the lockdown, but I was perfectly at home, in a quiet place.”⁶²

This change within the urban fabric of the “go go go” Paris lifestyle, began this talk of what can truly be obtained within one own block, cul-de-sac, or development. Due to this cultural shock that came

⁶¹ "15 Minute City Putting People at the Center of Urban Transformation." :15 Minute City. 2021.

⁶² Yeung, Peter. "How '15-minute Cities' Will Change the Way We Socialize." BBC Worklife. January 14, 2021. <https://www.bbc.com/worklife/article/20201214-how-15-minute-cities-will-change-the-way-we-socialise>.

with the coronavirus Paris official began to experiment with the idea of the 15-Minute city. Again, while the 15-Minute city has incorporated transit in the past, it now begins to incorporate that of global climate change and is pushing to create a greener take on what our communities can begin to be viewed as⁶³. While the 15-Minute city acts as a connection between a smaller area of a city, it really begins to look at that of a pocket or like discussed earlier a pocket community. These 15-Minute pockets can thus be connected through public transportation creating a large network of pocketing 15-minute master plans.

The Future of Sustainable Urban Design

Urban design has been evolving throughout many centuries, as the growth of the population continues to expand, densities have increased but more detrimentally, the urban growth patterns have sprawled out. With the evolution of LEED ND as well as the 15-Minute city, one can begin to understand what the future of design needs to incorporate.

One of these major key elements is that of a walkable city focused on a greener healthier lifestyle for the earth as well as the people living in it. As cities sprawl out the focus become more on high energy usage mass transit. Building began to take up more of our

⁶³ Yeung, Peter. "How '15-minute Cities' Will Change the Way We Socialize." BBC Work life. January 14, 2021.

green space, forests and farmlands. Building created a surge in the heat island effect and began spitting pollutants into the atmosphere. Worst of all, the earth becomes increasingly polluted every day to produce enough energy to power these inefficient buildings. With a creation of greener buildings and the introduction of more public greenspace and gardens within cities these errors can be reversed

On the other hand, one of the biggest issues in today's urban development patterns is that it is at the wrong scale. People being walking less and driving more, thus making developers draw out plans based on the car. Streets and roads begin to shape cities with the focal point being the automobile. The scale of cities are now at the car scale. Both LEED ND and the 15-Minute city realize the need for the city to revert back to the human scale. Pockets of walkability can be created and networked through increasingly proficient public transit such as the metro or trains. The human scale was where urban design began yet the future is where it will return.

Chapter 7: The Pocket City in Practice

The Main issues the pocket city looks to solve

As a brief reminder, the idea of the pocket city came about while investigating issues with current urban growth patterns leading to urban sprawl as well as density discrepancies (Figure 47). This, in turn pushed us into car dominated societies. Where building face the cars and people act as a secondary nature to this connection (Figure 48).

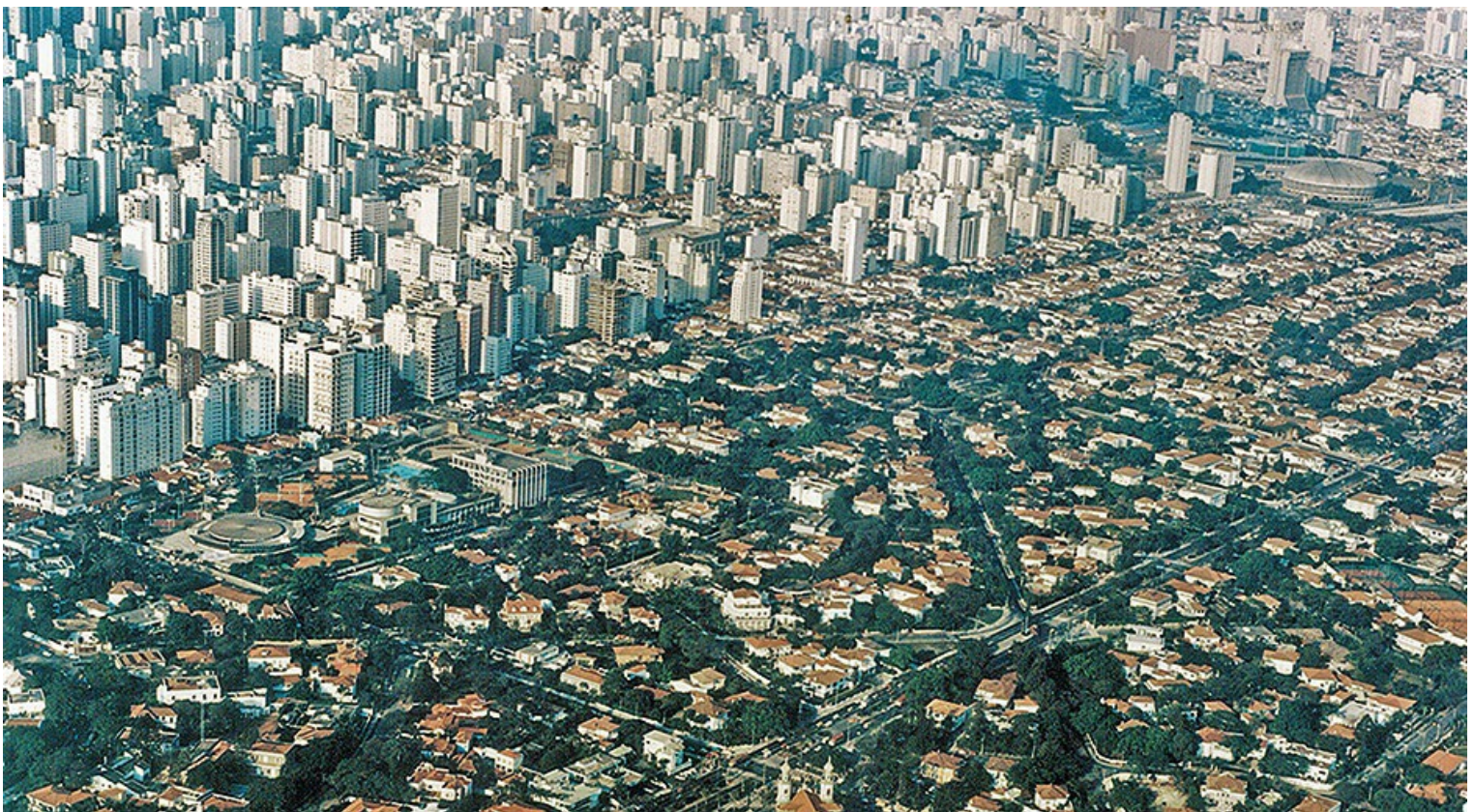


Figure 47: Jardim América, 1911–29, Brazil. (Source: Monacelli Press/Robert A.M. Stern Architects)



Figure 48: Bokeh Street traffic in New York City, night. (Source: shutterstock)

Current urban growth patterns hinder the social dynamic of our cities, causing friends, neighbor, relatives and loved ones to feel more isolated (Figure 49). This is due to the fact that a typical resident of our society drives straight up to or even into their home, skipping past many of the non-work social interactions of the day. On the other hand, the health of our earth and the human population has been rapidly declining since the creation of automobiles. While the earth suffers from deforestation, CO₂ emissions, and diminished soil qualities, humans have also lost a need for walking and the health benefits that come with them. In some severe cases air pollution has also been causing health issues for society and lastly, these major roadways that are required for our society to thrive have pushed towards a decreased

farmland and thus decreased food supply. Urban sprawl has also affected our society politically. Politically these larger cities and neighborhoods have led

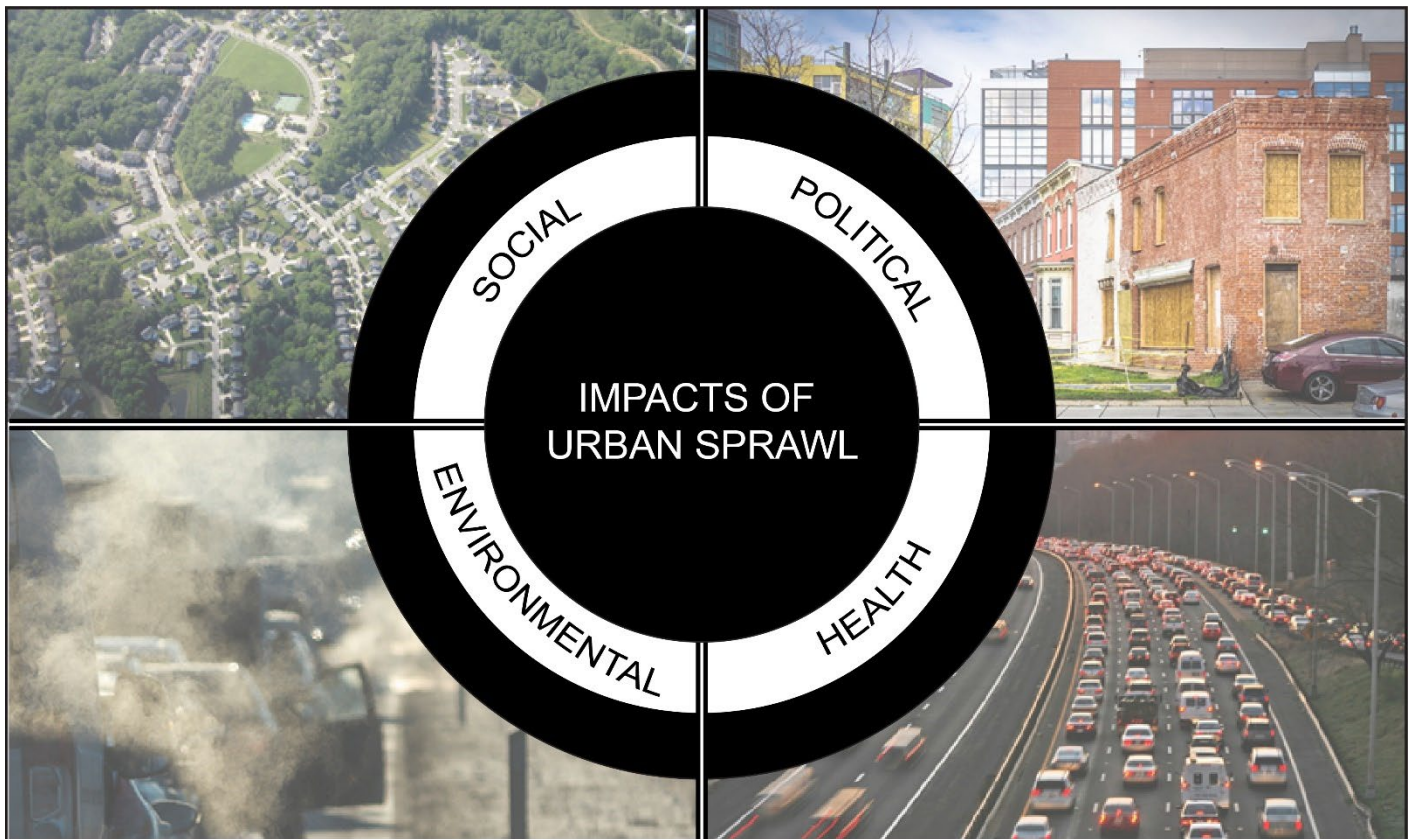


Figure 49: Impacts of Urban Sprawl (Own Work)

Another impact of urban sprawl as we saw earlier was the creation of a massive density discrepancy (Figure 50). Due the rapid growth around cities we begin to see smaller suburbs but up directly against large, towering skylines. The pocket city pushes to break that gap (Figure 50).

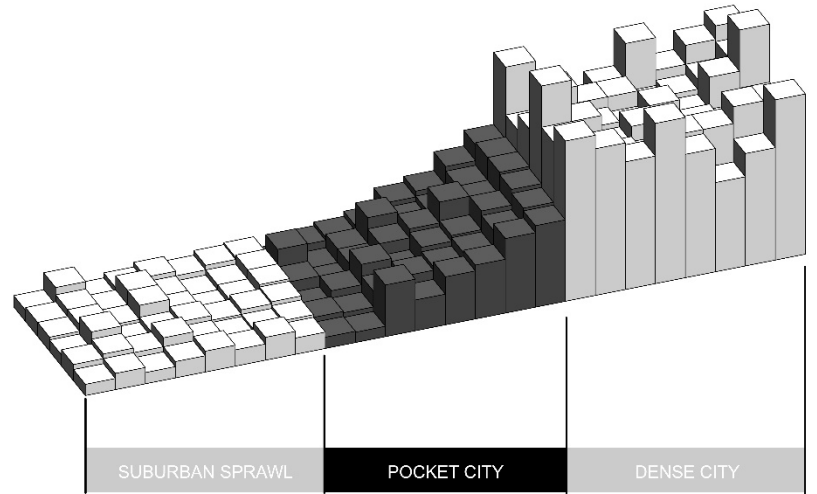
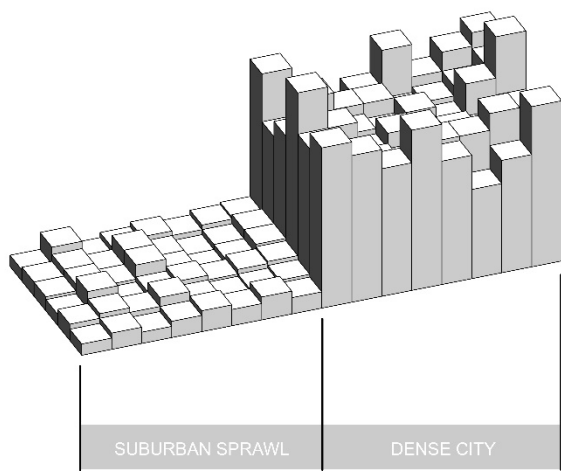


Figure 50: Density Discrepancies (Own Work)

One final issue is the useable ground coverage with our current urban growth patterns (Figure 51). Both the city and the suburb include an evenly distributed breakdown of road coverage, greenspace, and building footprint. Where the issue lies here is with that one third of all communities being unusable to the pedestrian. The pocket city breaks that mold while also converting the road coverage to pedestrian oriented road networking

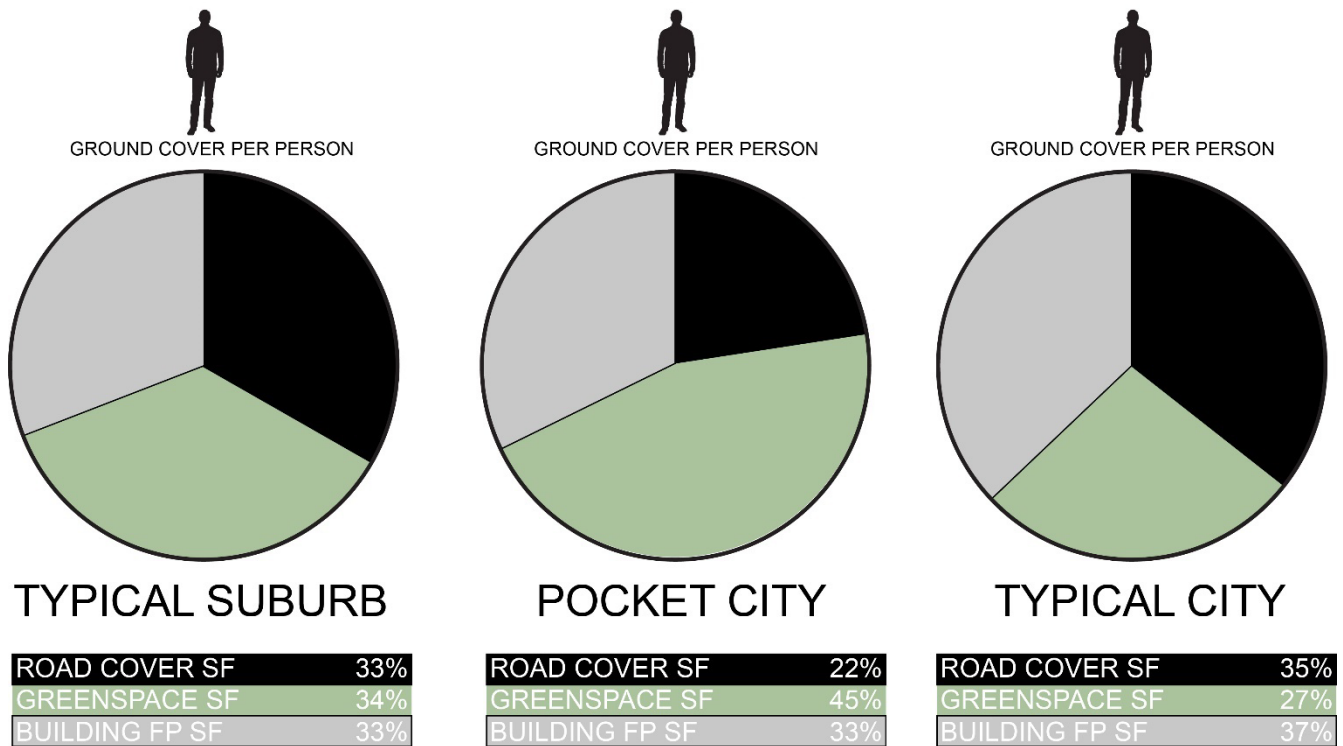


Figure 51: ground coverage (Own Work)

The Goals and the Nine Rules of the Pocket City

The goals are as stated before, to create a community-oriented city that brings us back to the scale of the human rather than that of the car (Figure 52). To do so there is an emphasis on public transportation over that of the individual privatized car. The Pocket city has nine specific rules to help improve upon that of the current urban growth patterns. These rules fall under three scales.

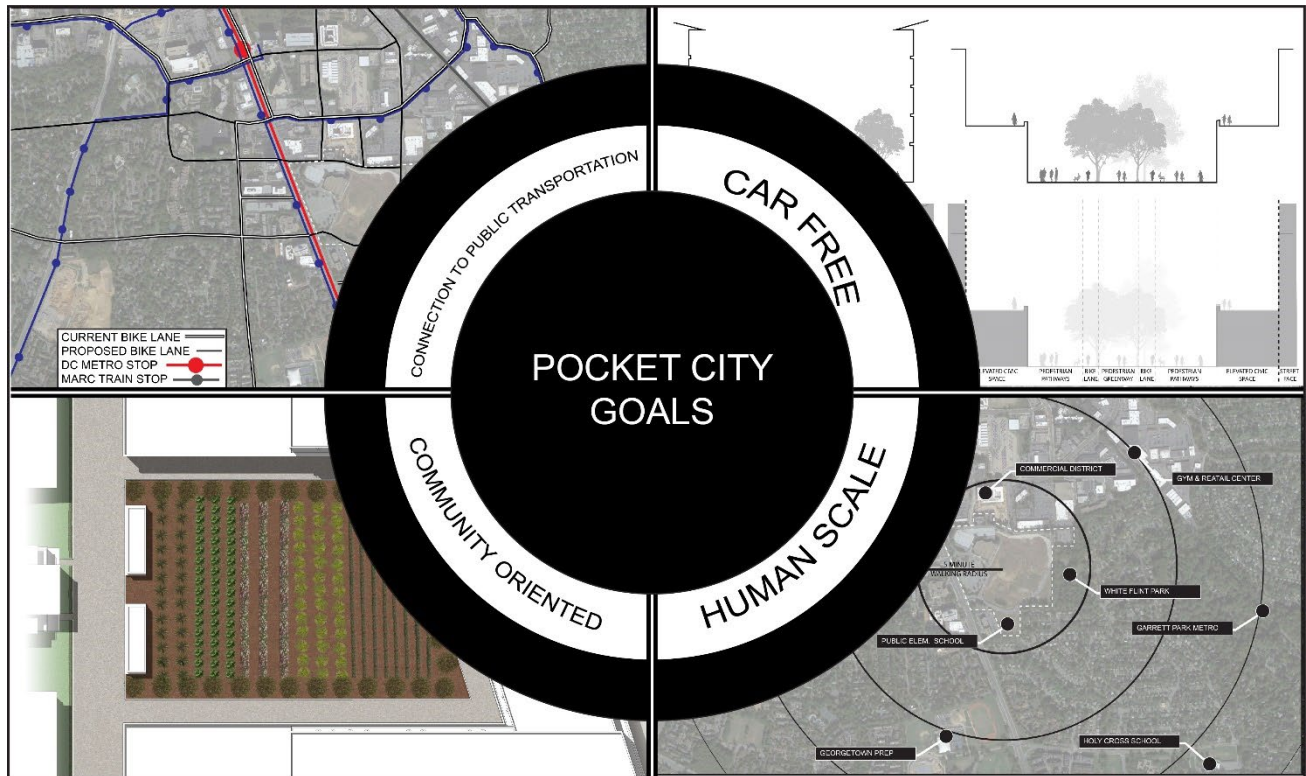


Figure 52: Goals of the Pocket City (Own Work)

The first scale to investigate is site vicinity. Firstly, It must be about a 20-30 acre site to keep within a relatively walkable range but allow for a multitude of community amenities (Figure 53). This site must also be a brownfield or mall redevelopment site to take advantage of these neglected sites alongside preexisting mass transit sites. Secondly, due to the push for a car free development the site must be connected to as many mass transit lines as possible (Figure 53). The third rule here is that the site must show existing growth within its area. This shows not only need but also beginnings of what might lead to density discrepancies that the pocket city then could help to improve (Figure 53).

The three rules of the pocket city have to do with the scale of the Pocket City as a whole. The first is obviously a completely car free civic network thus focusing on the people (Figure 53). However, as the pocket city can't neglect that of current urban growth patterns subterranean parking as well as ADA spots near residents will be provided based on need. Service routes will also be conducted underground similarly to that Disney world. Finally, all pedestrian streets are wide enough for emergency vehicles if needed. The second rules at this scale looks at ground coverage (Figure 53). The ground coverage of the site will be pushed more toward green walking paths to allow for nature to take stance as well as people to gather once again. The final rule at this scale investigates the programming of this site. The site must provide ample commercial and community amenities to allow for it to be a hub for surrounding neighborhoods as well as making this one thrive (Figure 53).

The last three rules investigate space and building planning. The first of the three harkens back to that of the pocket community. The pocket City must include a centralize gathering greenspace that can be directly reached by all entries to the site. This rule looks to create a Centrica nature to the pocket city (Figure 53). Rules 8 looks to centralize the city even more with community buildings surrounding the central gathering space of these community buildings a community garden must be included (Figure 53). The final rule looks towards the missing middle to provide ample housing

opportunities for people at different income levels and parts of their lives
(Figure 53).

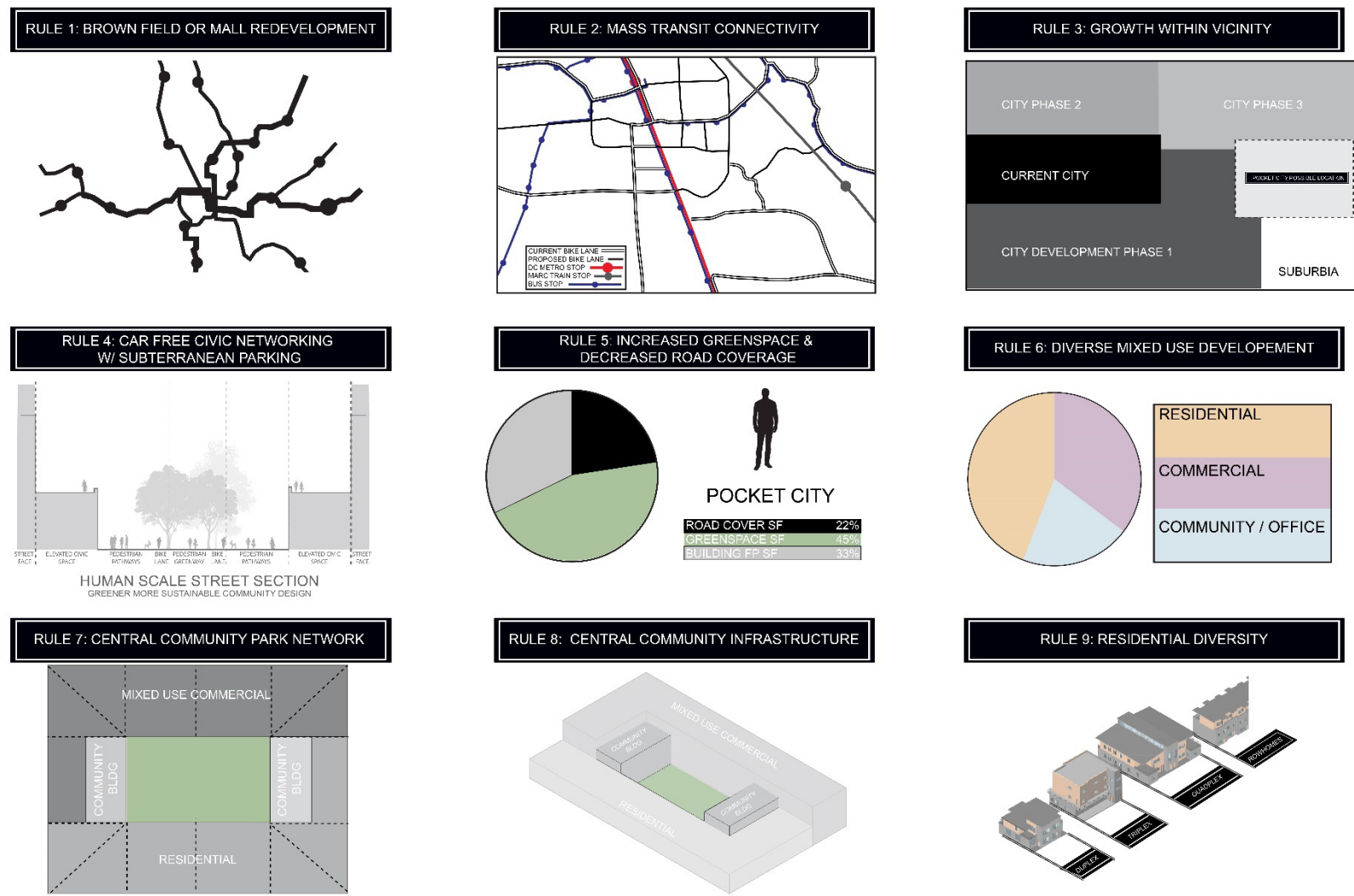


Figure 53: 9 Rules of the Pocket City (Own Work)

The Pocket City at White Flint

Now that the rules and the goals of the pocket community have been explored it is important to take some time and see the Pocket City in action. To fully understand the exploration of the pocket city in practice it would be best to explore it through that of the rules.

When exploring rules 1 and 2 around the DC areas one would be able to find an ample number of sites. Specifically, looking at the map of the DC Metro line one can find at least 12 prime sites for the pocket city (Figure 54). Of these sites option number 2 the White Flint stop along the red line seems to create the biggest opportunity.

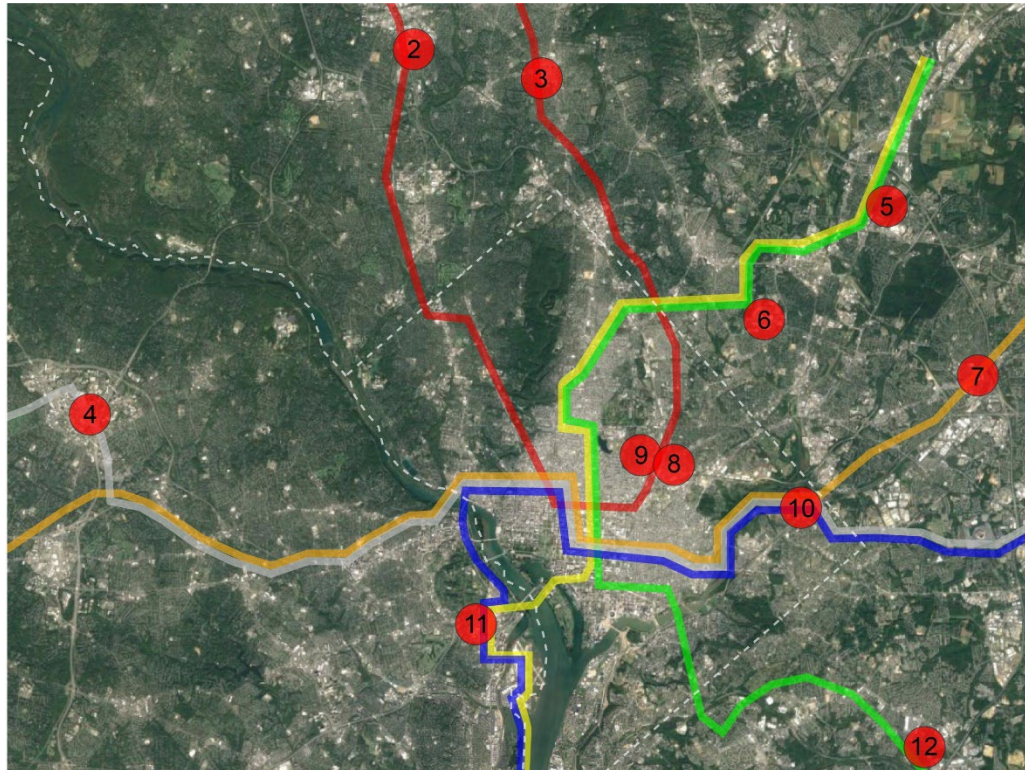


Figure 54: White Flint Transit (Own Work)

The site that sits along the White Flint metro stop is actually that of the White Flint Mall. This site thrived in the early years of the 2000s as the mall for all members of the surrounding area (Figure 55). Sadly, as of 2015 the site itself was demolished and as of 2022 the site still remains closed (Figure 56).

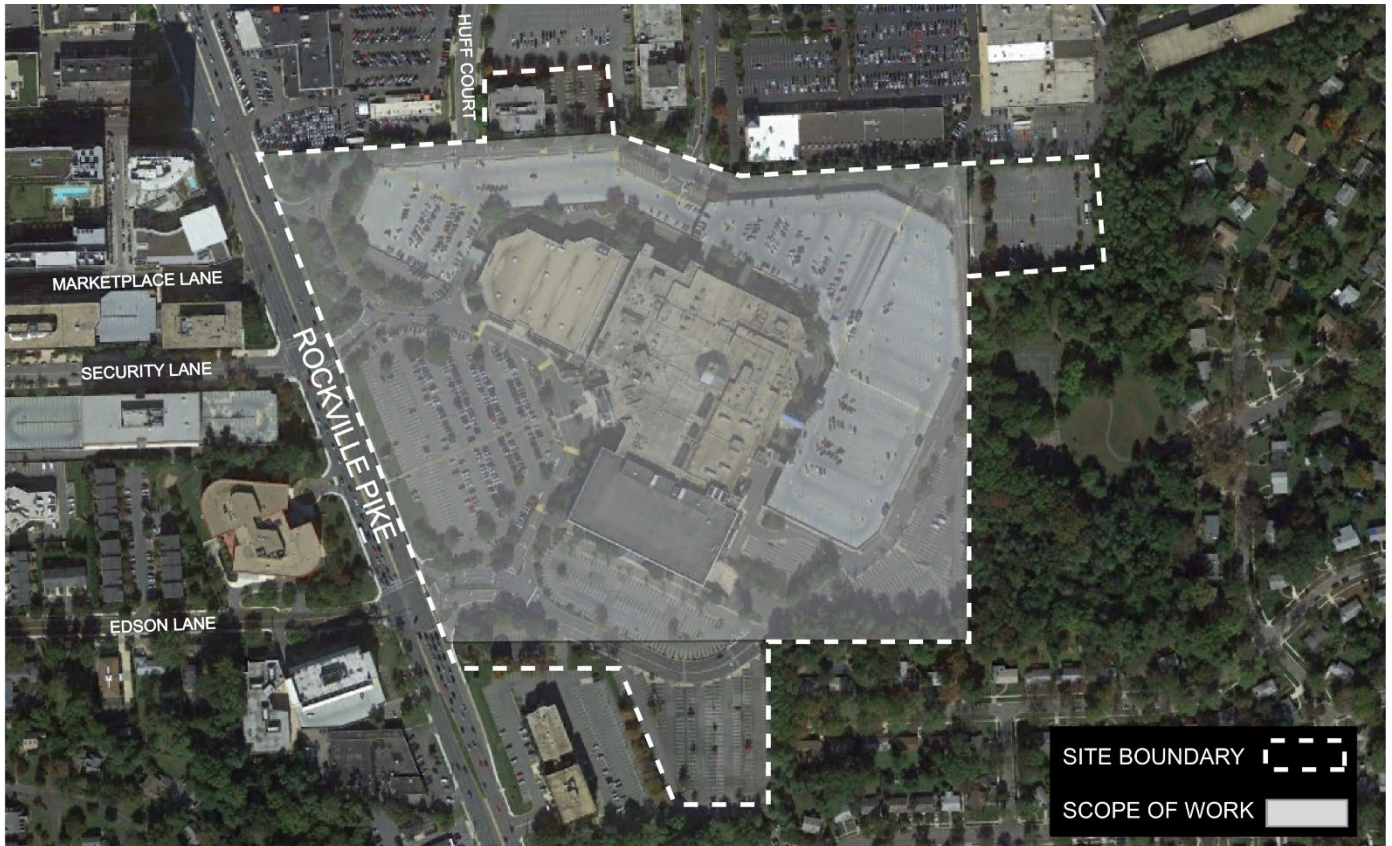


Figure 55: White Flint Mall 2009 (Own Work)



Figure 56: White Flint Mall 2022 (Own Work)

As one continues to investigate the first set of Pocket City rules on the site, they will see an ample amount of public transportation opportunities. Not only does the site include a DC metro stop, it is also in walking distance of the Garrett Park marc train stop, and I diverse bus and bike network (Figure 57). Allowing for the site to be within connections to ample cities including DC, Silver Spring, Bethesda, and Greenbelt.

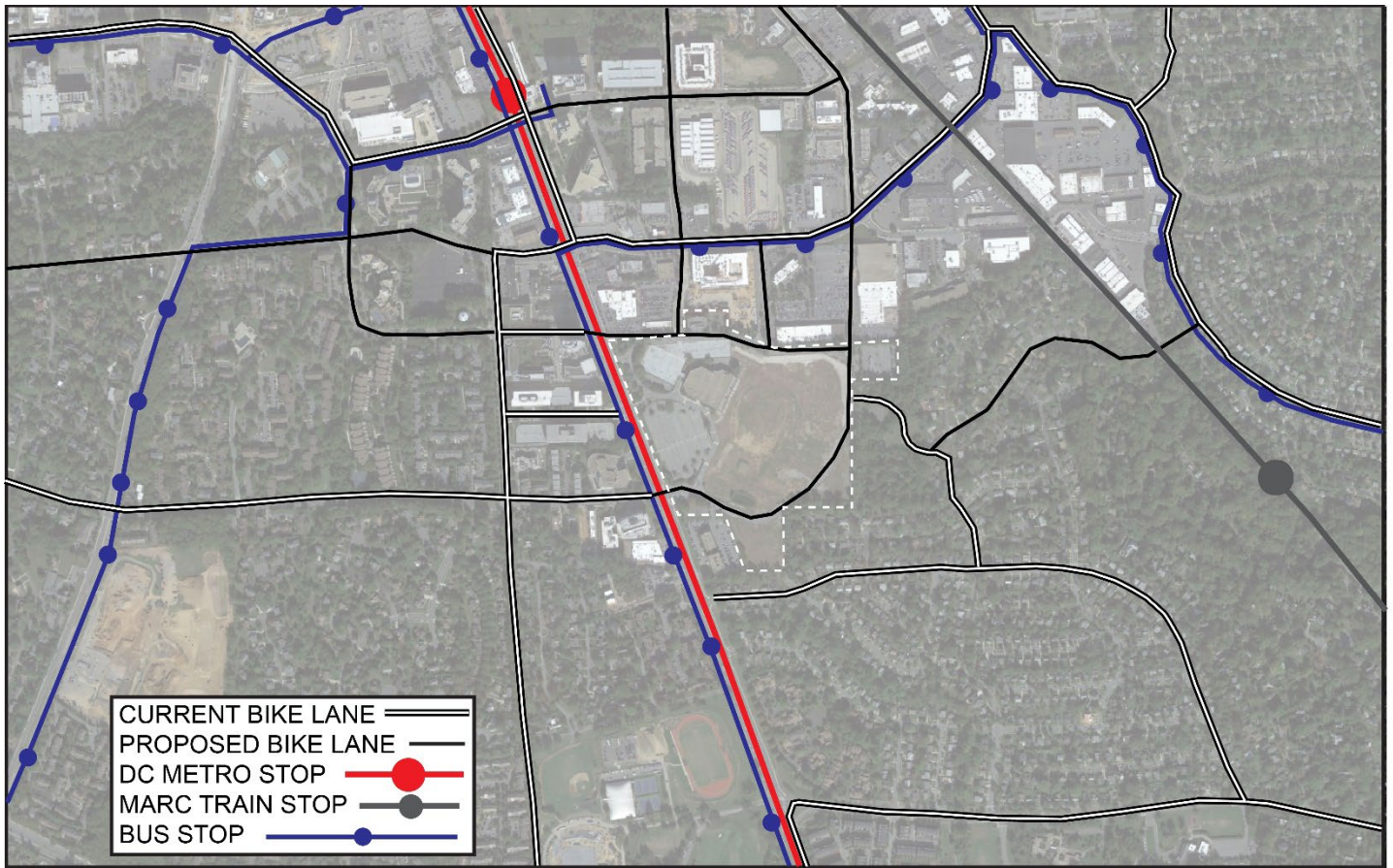


Figure 57: White Flint Transit Network (Own Work)

Rule 3 of the Pocket City points out that of a need-based development.

The rule itself directly relates with growth as well as a stoppage of the creation of a harsh edge between city and suburb (Figure 58). Within the site now one can begin to see this harsh edge of city vs suburban. However, the site is going through a lot of developmental changes that will allow for the mall site to act as the middle ground between the suburban and the city. The growth of the site is mainly to the north and west sides of the site (Figure 59). Of these areas development is occurring in commercial, market, and industrial

areas. New developments such as the Nobe gateway, Nobe 2, Soul Center, and Gables are beginning construction (Figure 60).

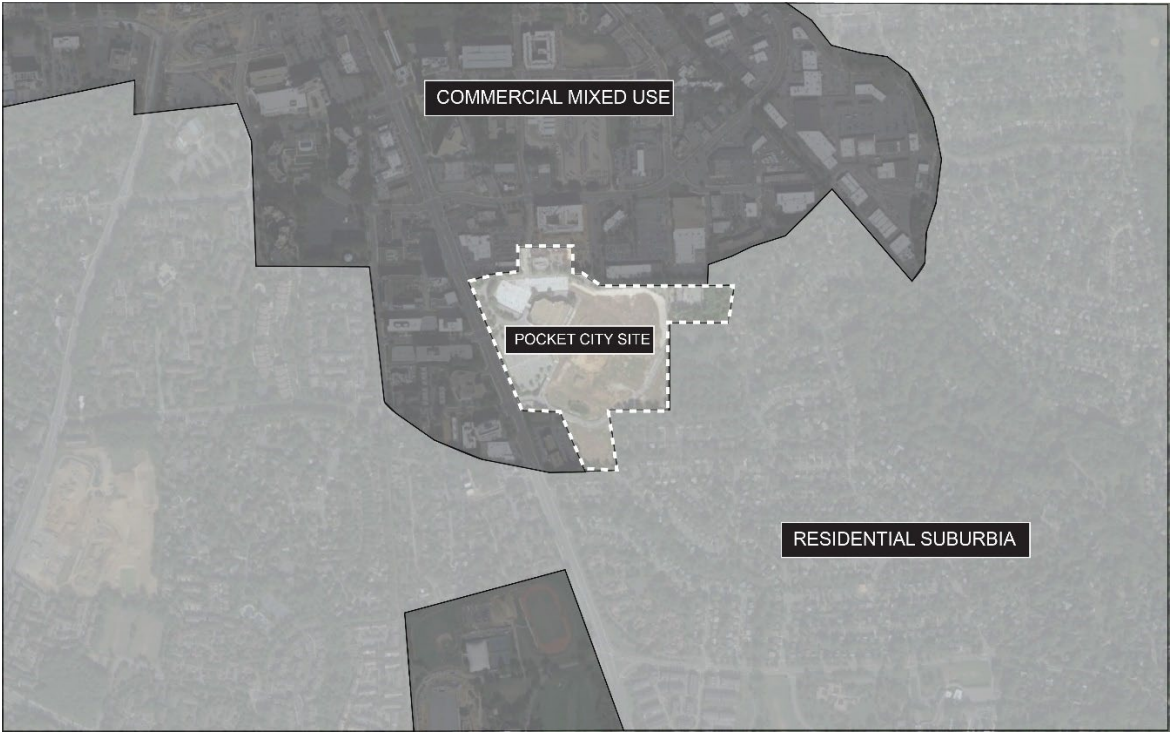


Figure 58: Hard Developmental Edge (Own Work)



Figure 59: White Flint New Development Overlook (Own Work)



Figure 60: White Flint New Development (Own Work)

Before looking Directly to the scale of the site now, it is important to investigate a few more surrounding needs and opportunities for a pedestrian friendly city. The first is the walkability of the area. The surrounding area of the site is relatively flat and includes a wide variety of amenities (Figure 61). On the other hand, because the site is a 27-acre dead zone without construction various axial connections as well as figural spaces have been disrupted (Figure 62).

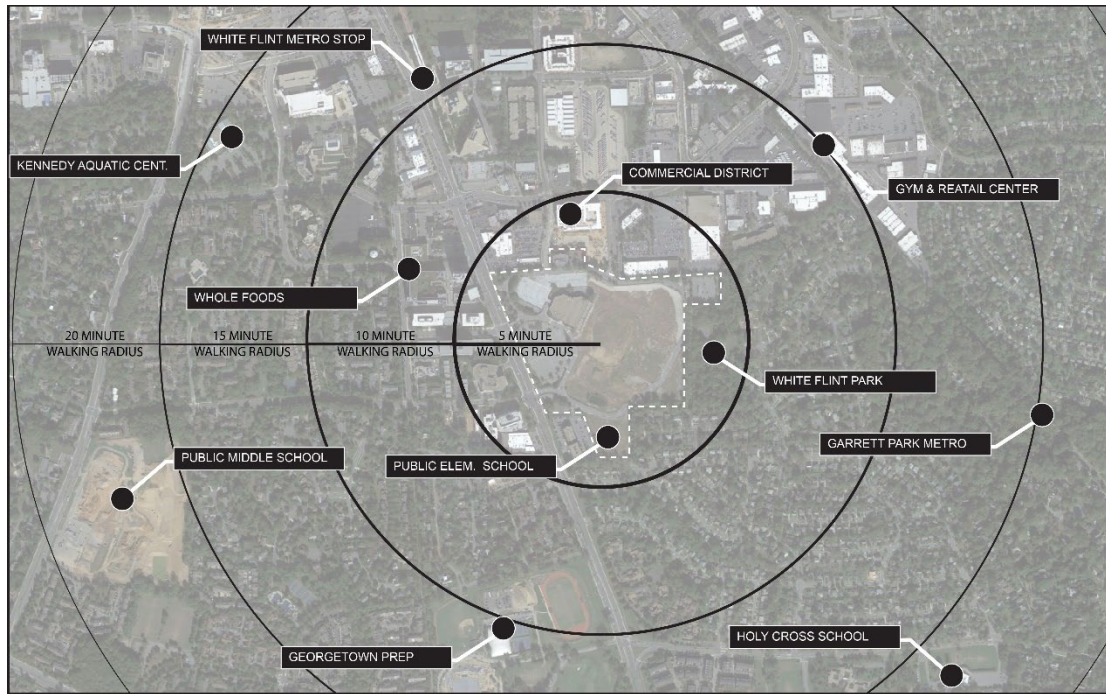


Figure 61: White Flint Pocket City Walkability (Own Work)

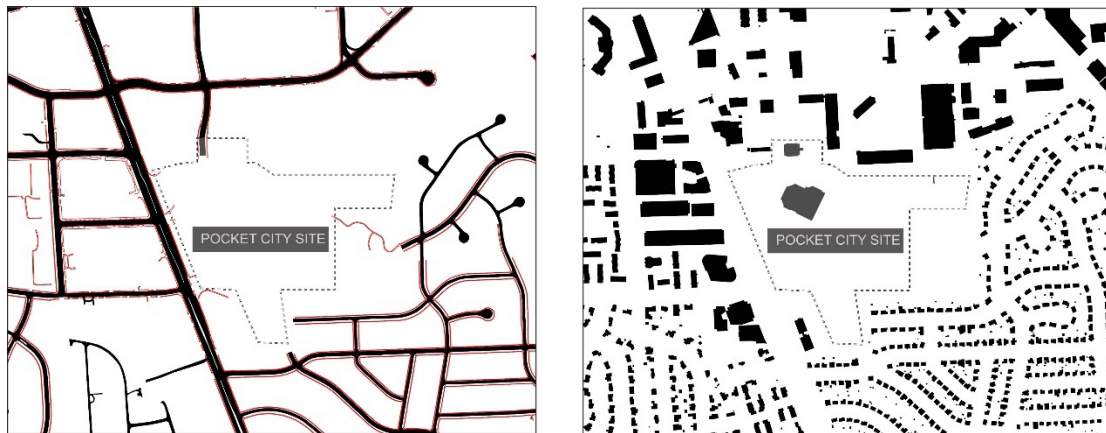


Figure 62: White Flint Dead zone (Own Work)

Within the next few sets of diagrams that are here to explore the new layout of the site one will be able to see that of Rules 4,5, 6 and 7. The first thing to explore is that of the civic networking. The civic network begins to

explore the transformation of the larger city buildings to the smaller missing middle housing (Figure 63). The Axial and connectivity diagram explores that dead zone discussed earlier. The pocket city begins to take that axis from around the site to create connectivity that we saw across the barren mall site (Figure 63). Along most of this civic networking and connectivity one can see an overlap that relates directly back to rule 7. That is that of the Central core of the pocket city. The central core diagram explores the shape and size of the central park as it directly connects to each entrance of the city (Figure 63). Because the central park takes up a major part of the site it is important that people still have an ample amount of semi privatized yards and greenspace. To pocket city pushes towards creating these public gathering spaces is important to sprinkle in private greenspace for all members of the pocket city (Figure 64). With the inclusion of all these lawns, parks, and greenways it is a great time to look back at rule number 5 and that of the ground coverage of the site. With the ground coverage diagram one can see that nearly 50 percent of the site is dedicated to useable greenspace, almost all of this directly coming from the street coverage (Figure 64). This doesn't even incorporate the green roof coverage along a majority of the site's buildings. These green roofs include a diverse plant life. The breakdown of the plant life is along edges that direct back to the two of the most important gathering spaces. One being the commercial core and the second being the tallest building on site, the parks bell tower (Figure 64).



Figure 63: White Flint Pocket City Diagrams 1 (Own Work)

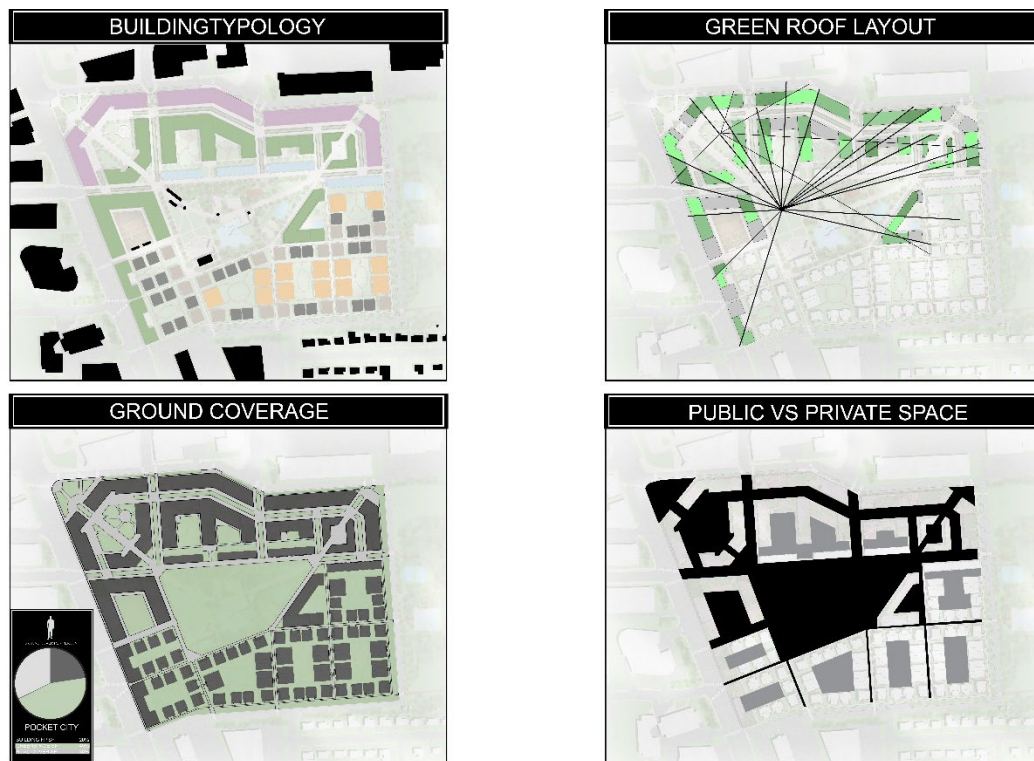
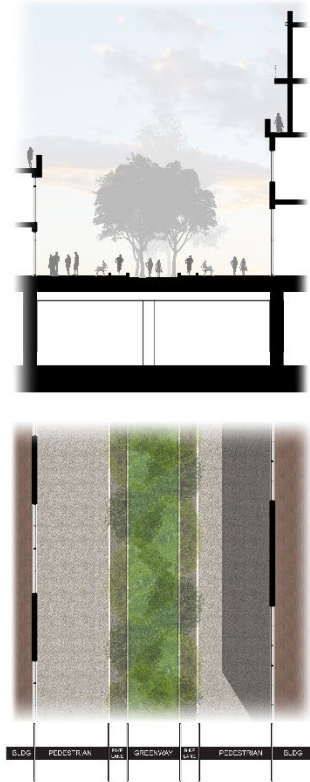


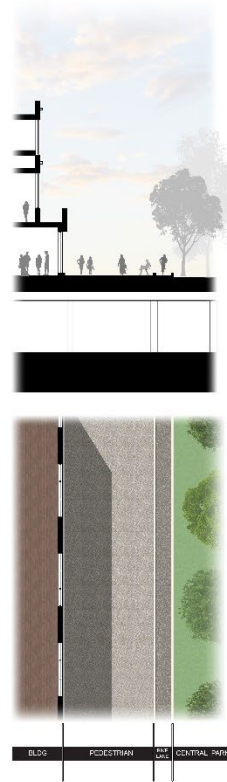
Figure 64: White Flint Pocket City Diagrams 2 (Own Work)

As one dive deeper into the representation of the rules through the pocket city at white flint it's important to discuss the streets as they are taking on a completely new form. Rules number 4 discusses that of the street layout. The pocket city has 4 different street types that range in size and use yet will be navigable by all emergency and ADA vehicles. The first is the commercial street which incorporates bike lanes in the center surrounding a public greenway (Figure 65). Underneath that commercial street one can see a larger service route used to supply services to all commercial buildings. The second street is the community street which appears on all sides of the central park (Figure 65). The community street is a large street with space for stands during events as well as a bike lane lining the park. The third street is actually the north side stairways (Figure 65). These stairs combat the norther edge topographic wall, which is the only topographic issue on the site. Thus, the building seen behind the stairs in section has a commercial street edge on both the second and the first floor of the building. The building also includes elevators along each of the stairways for ADA use. The final street is the residential street (Figure 65). These are the smallest and least traveled streets. They act mainly for residents that live along the streets themselves.

COMMERCIAL STREET



COMMUNITY STREET



HIGH STREET STAIRS



RESIDENTIAL STREET



Figure 65: Pocket City at White Flint Street Sections (Own Work)

Rule number 4 continues on to discuss the subterranean parking provided throughout the site. Thus, for White Flint the parking will also be underground. The parking itself sits underground with four access points one on each side of the site and a service route that connects to basements of all of the commercial buildings (Figure 66). Once underground 5 different stairways reach up from the parking garage (Figure 67). Four at each side of the park and one central gathering space that is actually a dropped down area of the park. Of the four, one is also connected to the parks amphitheater that we will see later and can be seen in the vertical circulation axon on both my board at the PowerPoint. As for the parking itself this is a grossly overcompensation for the amount of required parking based on Montgomery County code, despite this it is important to provide feedback on how much parking could be provided.

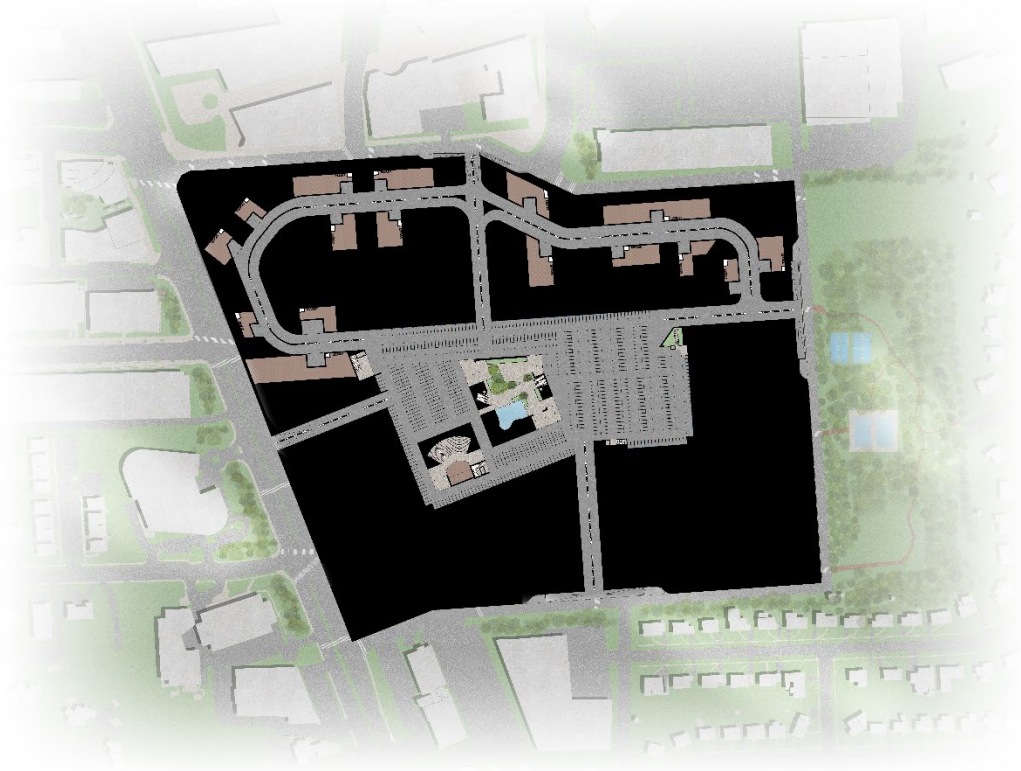


Figure 66: Pocket City at White Flint Underground Parking (Own Work)

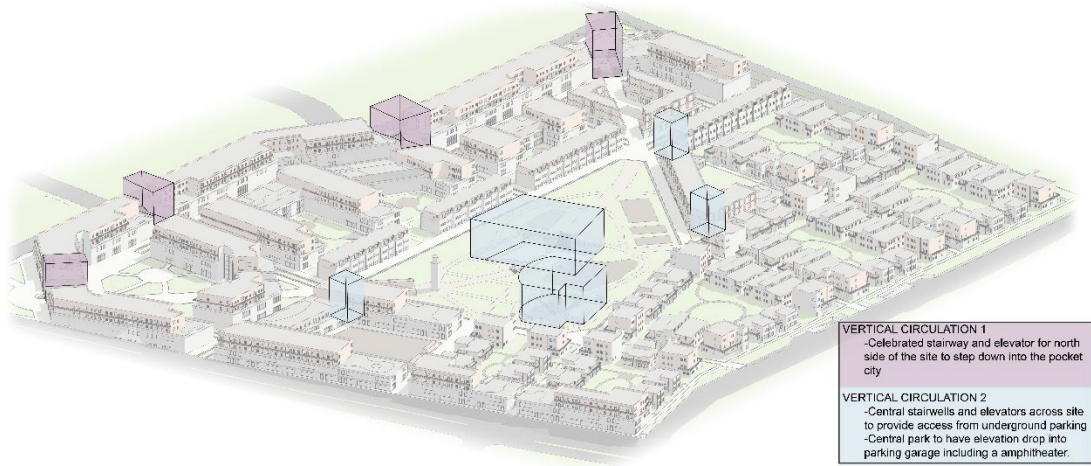


Figure 67: PCWF Underground Parking (Own Work)

Looking next at that of the building use, rule 6, one would find that the site, while mostly residential, also includes a lot of commercial and office, community buildings (Figure 68). The entire site is provided with a variety of housing opportunities. For commercial the entire north and west side include commercial as they connect to a majority of the existing commercial development. Lastly the community buildings sit close to the park as per Rule 8 (Figure 68).

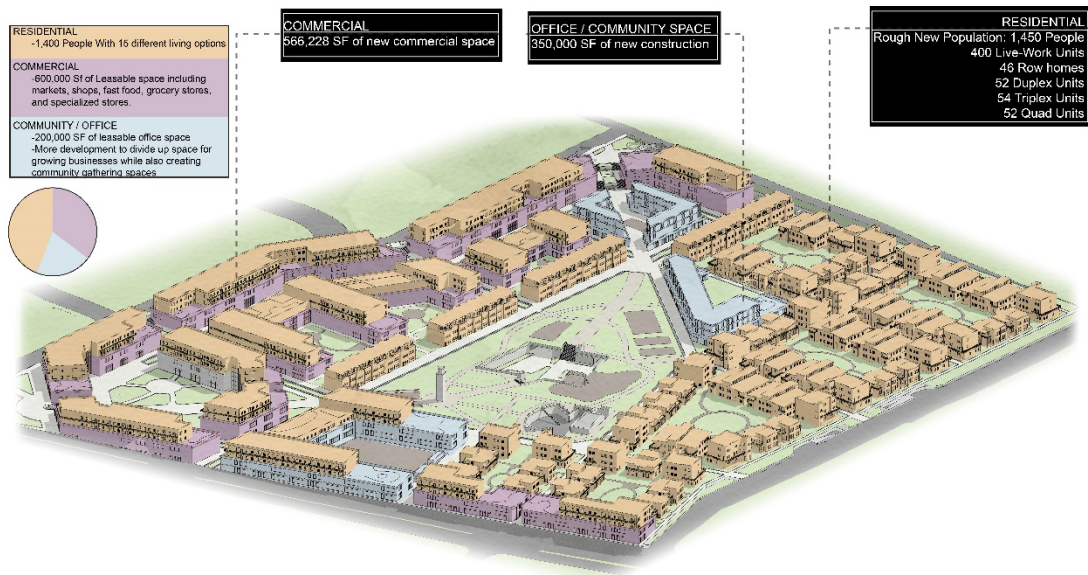


Figure 68: PCWF Programming (Own Work)

With a strong overview of the site development, it's important to take the Pocket City one scale down and begin to look now at the building and public space scale. It is important to look at the park itself the commercial core, the two main community buildings and a typical residential pocket (Figure 69).



Figure 69: PCWF Plan Callouts (Own Work)

The park (Figure 70) itself includes an amphitheater (connects to garage) and bell tower on axis to help create a ceremonial space (Figure 71) within the park. As one moves to the east the park becomes more natural with a pond, winding paths, a park, some sports fields. The section (Figure 73) shows the relationship (Figure 72) between the park and the garage and how the center of the park acts like a beacon and lightwell for the garage itself. The park in its entirety acts as the central core of the city and thus must be grand in scale

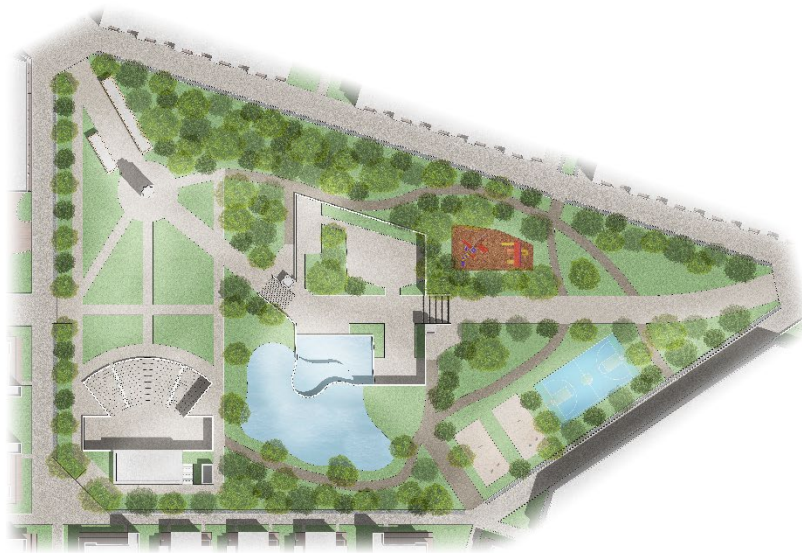


Figure 70: PCWF Park Plan (Own Work)



Figure 71: PCWF Park Ceremonial Space (Own Work)



Figure 72: PCWF Underground Park Perspective (Own Work)



Figure 73: PCWF Park Section Perspective (Own Work)

The next public space to investigate is that of the White Flint Plaza (Figure 74). This commercial core sits on the northwest side of the site directly connected with the plaza of the Nobe gateway to the north as well as the metro stop. The plaza (Figure 75) is the second largest public space on the

95

site and will be able to provide a space for markets and other various events.

Within the section (Figure 76) you can see the dual street façade to the right as well as the underground service routes below ground.



Figure 74: PCWF White Flint Plaza Plan (Own Work)



Figure 75: PCWF Plaza Perspective (Own Work)

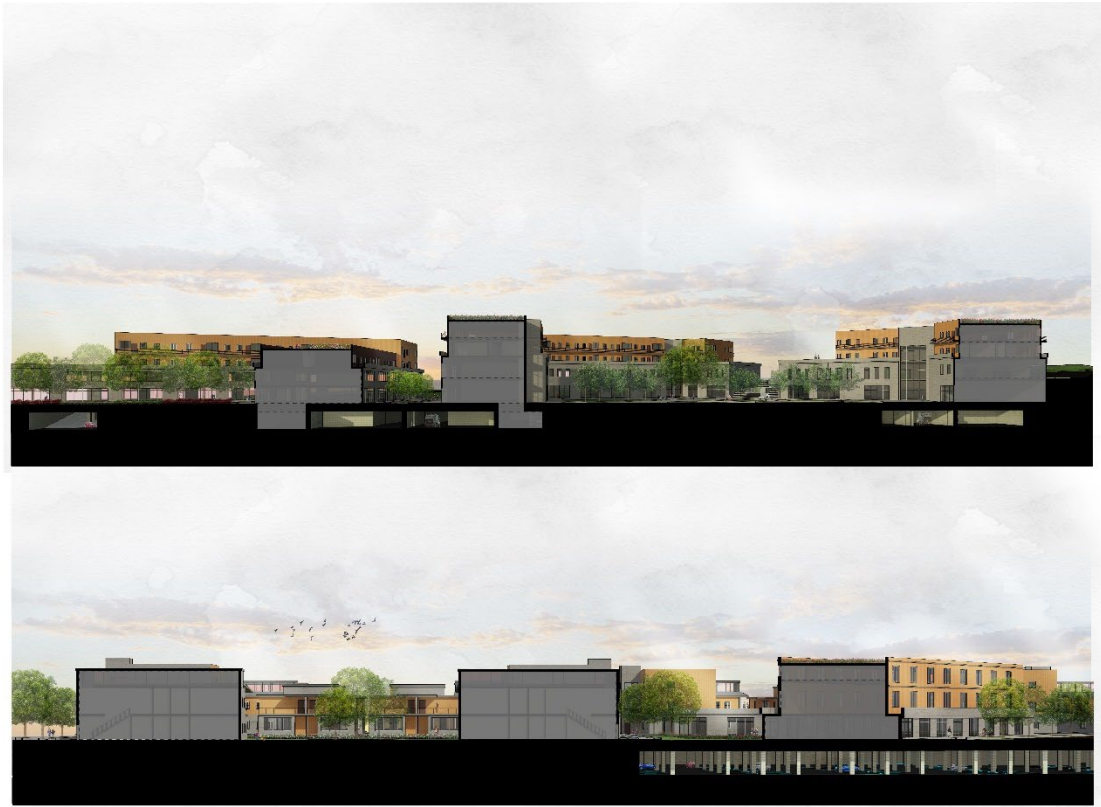


Figure 76: PCWF Site Section Perspectives (Own Work)

The next two spaces directly relate with rule number 8 and thus are the community buildings that surround the park. The first one, on the west side of the park is the community garden building (Figure 77). The garden is for all residents to plant whatever they please (Figure 79). The garden itself sits around the largest of the community buildings. The community building includes a community wide mailroom (that is distributed after checking), as well as community official offices. The garden is also maintained by the community as well as people who work within this community building. On the opposite side of the park, the east, sits the community rec center (Figure 78). The community rec center includes a gym, an indoor and outdoor pool,

rec rooms, ball rooms, and other community amenities (Figure 80). This community rec center is also the only building on the whole site to sit above the parking, as seen in the section (Figure 76).

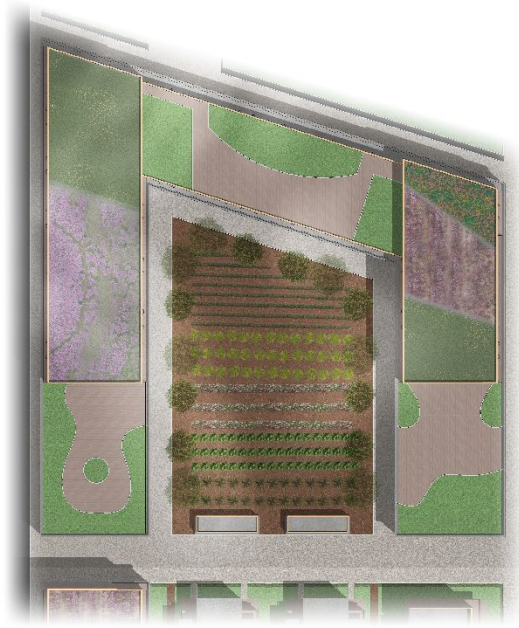


Figure 77: PCWF Community Garden (Own Work)

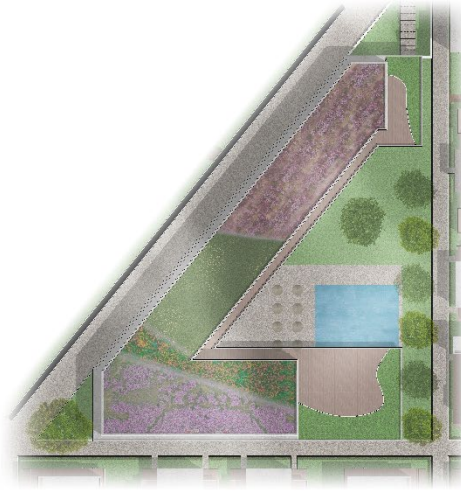


Figure 78: PCWF Community Rec Center (Own Work)



Figure 79: PCWF Community Garden (Own Work)



Figure 80: PCWF Rec Center (Own Work)

The final area to discuss goes closer to the privatized part of the site (Figure 81). This is that of the residential pocket (Figure 82). Each privatized pocket includes four of the 6 different residential building typologies (Figure 84). Along with this one would see that each pocket closely resembles that of the pocket community. Thus, each home has a semiprivate yard that connects to a central public greenspace where residents can gather with their neighbors. This allows for increased residential diversity. There are overall 8 different housing options, Duplexes, Triplexes, Quads, Various Rowhomes, and one-to-three-bedroom apartments (Figure 84). As you go through the site the density and typology of housing changes from more apartments to the north to a variety to the south (Figure 83).



Figure 81: PCWF Residential Pocket (Own Work)



Figure 82: Residential Street (Own Work)



Figure 83: PCWF Building typology Breakdown (Own Work)

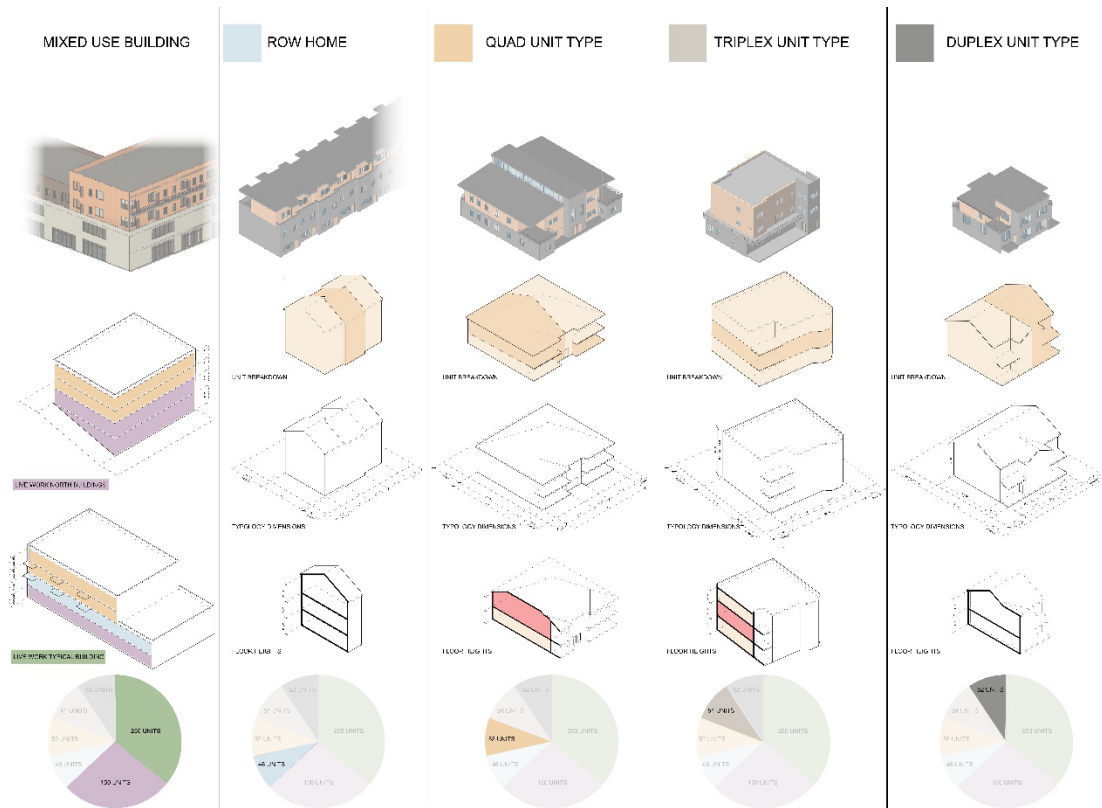


Figure 84: PCWF Unit Typologies (Own Work)

Final Thoughts

All around the Pocket City at White Flint (Figure 85) was successful venture into an extreme of what the urban growth pattern of the future might look like. Of course, due to the high demand of car traffic in our current living today there are difficulties with fully transforming to a car free community. However, giving the current development with the younger generations seeking out public transportation options, Ubers, electric bikes and scooters, and even mopeds a future without cars taking president in our cities isn't something to farfetched. While our societies future may not look exactly like

that of the Pocket City it is important to investigate these extremes so that we can move toward a more community oriented urban growth pattern.



Figure 85: Pocket City at White Flint (Own Work)

Bibliography

"15 Minute City Putting People at the Center of Urban Transformation." :15 Minute City. 2021. <https://www.15minutecity.com/>.

"A Simple, Beautiful Life." Seaside. <https://seasidefl.com/>.

Andres Duany, Robert Steuteville. "Defining the 15-minute City." CNU. August 04, 2021. <https://www.cnu.org/publicsquare/2021/02/08/defining-15-minute-city>.

Barrington-Leigh, Christopher, and Adam Millard-Ball. "A Century of Sprawl in the United States." PNAS. July 07, 2015. <https://www.pnas.org/content/112/27/8244>.

"Black Apple Pocket Community." GREENSPUR. <https://www.greenspur.net/black-apple>.

Burke, Stephen. "Placemaking and the Human Scale City." Projects For Public Space. January 11, 2016. <https://www.pps.org/article/placemaking-and-the-human-scale-city>.

"Canal Corporation." Reimagine the Canals. <https://www.canals.ny.gov/reimagine/neighbourhood.html>.

"Celebration." Congress For New Urbanism. May 07, 2019. <https://www.cnu.org/what-we-do/build-great-places/celebration>.

"Celebration, Florida Population 2021." Celebration, Florida Population 2021 (Demographics, Maps, Graphs). 2021. <https://worldpopulationreview.com/us-cities/celebration-fl-population>.

Chapin, Ross. *Pocket Neighborhoods: Creating Small-scale Community in a Large-scale World*. Newtown, CT: Taunton Press, 2011.

Chaplin, Ross. "Cohousing and Pocket Neighborhoods – What's the Difference?" Pocket Neighborhoods. <http://www.pocket-neighborhoods.net/blog/cohousing-vs-pocket-neighborhoods-whats-the-difference/>.

"Pocket Neighborhoods." Interview by Ross Chaplin. Youtube. August 11, 2015. <https://www.youtube.com/watch?v=k749w3cHSPk>.

"Charming Seaside, Florida Defines New Urbanism." Florida Back Roads Travel. November 23, 2021. <https://www.florida-backroads-travel.com/seaside-florida.html>.

"Cities For People Not Cars." Culdesac. <https://culdesac.com/>.

- Missing Middle Housing. *City of Rockville: Open House Poster*. Rockville, MD: Rockville 2040.
<https://www.rockvillemd.gov/DocumentCenter/View/21728/Rockville-2040-Open-House-Poster---Housing?bidId=>.
- "Creating Connections With Pocket Neighborhoods at Community Gardens: HUD USER." *EDGE an Online Magazine | HUD USER*. June 1, 2020.
<https://www.huduser.gov/portal/pdredge/pdr-edge-inpractice-060120.html>.
- Crook | 26 October 2021 Leave a Comment, Lizzie. "15-Minute City Concept by Carlos Moreno Wins Obel Award 2021." *Dezeen*. October 26, 2021.
<https://www.dezeen.com/2021/10/26/15-minute-city-carlos-moreno-obel-award/>.
- "Culdesac Tempe: A Car-Free Neighborhood." *Opticos Design*. December 09, 2021.
<https://opticosdesign.com/work/culdesac-tempe/>.
- "Diverse Choices for Walkable Neighborhood Living." *Missing Middle Housing*. May 06, 2021.
<https://missingmiddlehousing.com/>.
- Duany, Andres, Jeff Speck, and Mike Lydon. *The Smart Growth Manual*. New York: McGraw-Hill, 2010.
- Duany, Andres, Elizabeth Plater-Zyberk, and Jeff Speck. *Suburban Nation the Rise of Sprawl and the Decline of the American Dream*. New York, NY: North Point, 2010.
- "Research on Health Effects, Exposure, & Risk from Mobile Source Pollution." EPA. Accessed December 16, 2021. <https://www.epa.gov/mobile-source-pollution/research-health-effects-exposure-risk-mobile-source-pollution>.
- "Event Parking - Shadowlake Village." *Shadowlake Village - A Cohousing Community in Blacksburg, VA*. February 12, 2021. <https://www.shadowlakevillage.org/event-parking/>.
- Flint, Anthony. *This Land: The Battle over Sprawl and the Future of America*. Baltimore: Johns Hopkins University Press, 2012.
- Frumkin, Howard, Lawrence Frank, and Richard J. Jackson. *Urban Sprawl and Public Health Designing, Planning, and Building for Healthy Communities*. Washington: Island Press, 2013.
- "Global Road Safety." *Centers for Disease Control and Prevention*. December 14, 2020.
<https://www.cdc.gov/injury/features/global-road-safety/index.html>.
- Goldberg, Dakota. "What Is Urban Sprawl?" *California Environmental Voters*.
<https://www.envirovoters.org/2021/03/02/what-urban-sprawl/>.

- "KEEL Concepts, Inc. - Greenville, SC Architect." Keel concepts.
<https://www.keelconcepts.com/>.
- Kramer, Robert. "New Urbanism and Haile Village Center Gainesville, Florida." RSS.
February 11, 2001. <http://www.webenet.com/newurbanism.htm>.
- "LEED Certification for Neighborhood Development." | U.S. Green Building Council.
<https://www.usgbc.org/leed/rating-systems/neighborhood-development>.
- "LEED for Neighborhood Development." CNU. August 06, 2015.
<https://www.cnu.org/our-projects/leed-neighborhood-development>.
- "LEED for Neighborhood Development." Infrastructure Tool Navigator. July 29, 2021.
<https://sustainable-infrastructure-tools.org/tools/leed-for-neighborhood-development/>.
- Life, Hawaii. "Ward Village Is The Country's Largest Platinum LEED Certified Neighborhood Development - Hawaii Real Estate Market & Trends: Hawaii Life." Hawaii Real Estate Market & Trends | Hawaii Life. November 14, 2017.
<https://www.hawaiilife.com/blog/ward-village-countrys-largest-platinum-leed-certified-neighborhood-development/>.
- Margolies, Atara. "Missing Middle Housing in Silver Spring." Montgomery Planning. November 22, 2021.
<https://montgomeryplanning.org/planning/communities/downcounty/silver-spring/silver-spring-downtown-plan/missing-middle-housing-in-silver-spring/>.
- Fact Sheet on the "Missing Middle". *Maryland Building Industry Association*. MD, 2020.
https://mgaleg.maryland.gov/cmte_testimony/2020/ent/3690_03042020_115646-666.pdf.
- "Missing Middle Housing." Congress For New Urbanism. July 29, 2015.
<https://www.cnu.org/our-projects/missing-middle-housing>.
- Parolek, Daniel G., and Arthur C. Nelson. *Missing Middle Housing: Thinking Big and Building Small to Respond to Today's Housing Crisis*. Washington, DC: Island Press, 2020.
- Ross Chapin Post Author. Ross Chapin Architects. <https://rosschapin.com/cohousing-vs-pocket-neighborhoods-whats-the-difference/>.
- "Seaside Demographics." Point2. 2021.
<https://www.point2homes.com/US/Neighborhood/FL/Monroe-County/Key-Largo/Seaside-Demographics.html>.

- Sullivan, Jenny. "Pocket Neighborhoods Tackle Sprawl One Acre at a Time." Multifamily Executive. March 08, 2011. https://www.multifamilyexecutive.com/design-development/pocket-neighborhoods-tackle-sprawl-one-acre-at-a-time_o.
- Tachieva, Galina. *Sprawl Repair Manual*. Island Press, 2010.
- "The Charter of the New Urbanism: Who are we?" Congress for New Urbanism. March 03, 2021. <https://www.cnu.org/who-we-are/charter-new-urbanism>.
- The Human Scale*. Directed by Andreas Dalsgaard. 2012.
- The Pedestrian Pocket Book: New Suburban Design Strategy*. New York, NY: Princeton Architectural Press in Association with the University of Washington, 1989.
- United States Environmental Protection Agency. Diesel Exhaust in the United States. 2003.
- USGBC. *LEED Reference Guide for Neighborhood Development*. 4th version, vol. 4, U.S. Green Building Council, 2014, USGBC, <https://www.usgbc.org/resources/leed-reference-guide-neighborhood-development>.
- VannPashak, Justin. "Human Centered Cities Must Be Built at a Human Scale." Medium. September 28, 2018. [https://medium.com/@jvannpashak/human-centered-cities-must-be-built-at-a-human-scale-a6c1336a0428#:~:text=Designing to "human scale" means,best response from human users](https://medium.com/@jvannpashak/human-centered-cities-must-be-built-at-a-human-scale-a6c1336a0428#:~:text=Designing to 'human scale' means,best response from human users).
- "What Is New Urbanism?" Congress For New Urbanism. December 19, 2019. <https://www.cnu.org/resources/what-new-urbanism>.
- Yeung, Peter. "How '15-minute Cities' Will Change the Way We Socialize." BBC Worklife. January 14, 2021. <https://www.bbc.com/worklife/article/20201214-how-15-minute-cities-will-change-the-way-we-socialise>.