Housing a Multigenerational Environment through a Mid-Rise typology

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Abstract

Hawai‘i’s housing shortage is an unavoidable dilemma searching for reasonable solutions. While the obvious answer to the housing crisis is to build more units, the need to address the specificity of the place to reflect a more coherent solution is critical. Hawai‘i is characteristic of its unique demographic portraying a healthy life expectancy. As a result, a change in the family structure for multigenerational housing is apparent due to economic and cultural values. However, the urban sprawl of low-rise high density single-family dwelling households along with the high-rise high-density towers appear to be far from effective to Hawaii’s demand.

The multigenerational family structure emphasizes the need to live with multiple generations of the family to ease of financial and social needs. Certainly not new, the multigenerational household concept existed before the industrial area. The single dwelling household signifies the ultimate aspiration of many families but does little to add density and units without sacrificing Hawai‘i’s beautiful lands. On the opposite side of the spectrum, high-rise towers have caused human disconnections of the individual with the urban fabric. An observation Hawai‘i housing development history from the Hale to Hawai‘i’s current predicament, indicates that the mid-rise typology has been absent.

This doctoral study attempts to remedy the state’s housing shortage through a design alternative reflective of multigenerational families through a mid-rise building. Research coupled with a design framework will test the theoretical understanding through an end product of a building design situated in Hawai‘i. Offering the most opportunities, the mid-rise typology reinforces the meaning of family as the building scale mandates social interactions.

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1| Introduction

The current housing status is not reflective of Hawai'i's most crucial social dynamics of multigenerational families. Neither the does the physical built environment propose a careful appropriation towards providing density. Housing and the demographics of Hawai'i is evolving into a phenomenon which the state is not prepared for and has not acknowledged the dilemma effectively till today. The shortage for available and affordable housing is a serious call for help for the state of Hawai'i. Are we then as professionals answering the housing shortage problem reflective of Hawai'i's demographic composition and geography? The state's answer to the housing demands have been efforts to build more single-family housings off in the West side of the island of O'ahu through urban sprawl and gentrification at one end. While in the urban core, high-rise towers continue to inflate on the other end of the housing typology spectrum. The social dynamics of Hawai'i population is changing and the physical problem of the built environment to add more units must be appropriate with Hawai'i's characteristic demographic composition; dominated by multigenerational families.

Hawai'i's elderly is expected to have a greater life expectancy. A greater life expectancy is expected on average 78.6 years old within the United States in the year 2016.[1] Healthier and cleaner environments have aided in factors for people to increase their life expectancy. The difference of 10 years life expectancy from the 1960's at 69.7 years to our present time is a significant change that has influenced various systems within healthcare to shift their attention towards to.[2]

[1] Kenneth D. Kochanek et al., "Mortality in the United States, 2016," NCHS Data Brief (Centers for Disease Control and Prevention, December 2017), https://www.cdc.gov/nchs/products/databriefs/db293.htm., 1
[2] *Health, United States, 2016: With Chartbook on Long-Term Trends in Health* (Hyattsville, MD: U.S. Department of Health and Human Services, 2017), https://www.cdc.gov/nchs/data/hus/hus16.pdf#015.

Figure 1-1 Elderly Couple
Source: Hawaii Reporter

One can argue now that there is now no traditional family structure. The most statistically predominant family structure is an extended family where the grandparents are living at a higher expectancy and are not able to live independently. Instead, grandparents are residing within their children's family. This social demographic change demands an investigation into how our present architectural design and practice addresses these social issues. Are our present designs designed just for the healthy living adults, or has the profession neglected the elderly as a separate category for design? With the elderly expected to live longer, a change in the family structure has shifted and changed the structure of a regular traditional family that the social media has portrayed over the past couple of decades. Today, this multigenerational housing has become the predominant norm for family structures in Hawaii and calls for an immediate understanding of socio-cultural change to better address the state's housing crisis.

Between 2012-2016, Hawai‘i is projected to demand over 24,000 housing units.[3] With the understanding for the need of more housing, is the state’s approach the solution to density healthy and correlative to the needs of the city effective? The approach to low-rise and high-density development introduced additional problems, especially for the age groups that are not dependent on the car but need access to transportation. While West O‘ahu are popping single-family dwellings, Hawaii’s demographic has reflected a diverse need of dwellings. The gentrification of West O‘ahu is not meeting the demands of the diverse demographic situation, especially for multigenerational living. Soon after World War II, Hawai‘i like the rest of the United States nation demanded mass housing. Hawai‘i’s low-rise response to the housing demand were “walk-up” typological apartments. Soon after the high-rise housing encroached within the Hawai‘i market. One of the missing typologies Hawai‘i neglected through these years is the mid-rise typology to address housing density.

Figure 1-2 Hawai‘i Development
Source: Treat the Housing Supply Like One More Critical Infrastructure, Civil Beat

[3] “HOUSNIG OAHU: Islandwide Housing Strategy” (City and County of Honolulu, September 12, 2014), http://www.honolulu.gov/rep/site/dpptod/dpptod_docs/Housing_Oahu_Draft_9-12-14.pdf., 5

The purpose of this dissertation investigation is to develop design strategies that create an alternative solution supporting Hawai‘i’s multigenerational demographic in a mid-rise typology and demonstrate their application in a conceptual design proposal in context with Hawaiian regional architecture fostering a community environment.

The first initial part of the thesis will review the family structure along this the change over the years and how that has impacted social and cultural changes. Additionally, an assessment of the existing built environment will determine the severity of the situation as to how existing designs are/ are not being addressed towards the elderly. A review in the context of multigenerational housing will proceed right after to understand other traditional housing models to compare. Because this dissertation is addressing multigenerational housing as a component of a the housing crisis, the need to analyze and define a typology along with density becomes imperative as part of the equation to finding a solution. With a general understanding of the multigenerational housing and its need for an appropriate density, a literature review will be conducted to formulate a spatial list and design principles for multigenerational housing design based on strategies implemented in the United States, Europe, and Asia. The design principles will then be used to formulate design strategies as design guidelines and site selection criteria. The final product will be a conceptual design proposal for multigenerational mid-rise housing in the context of Hawai‘i base on these proposed designed guidelines.

2| A Changing Demographic

The importance of this chapter is to understand the development of the family structure and the value to design for particular age groups. The changing dynamics of the family development has grown into more complex structures today which provides the necessary reasons to design for each generation. The growing phenomenon is that we are living in a time where people are achieving higher levels of age expectancy. The question is therefore, are our contemporary designs addressing the new dynamics of the family structure? Is this new growing population being efficiently addressed? Hawai'i is not far from this dynamic of multigenerational family structure, in fact it is a main denominator of Hawai'i's population.

2.1 Family Structure History and Development

Family structure is important to analyze because it has changed dramatically throughout history. Grasping the components of different family structures which have evolved due to economics, cultural values, and social needs become necessary. The factors into how various family structures have changed will be explored to understand who, what, when, where, and why our family structures are different from the past in different eras, compared with the present outlook structure.

The nuclear family is a unit consisting of a father, mother, their son, and daughter; the ideal image of a traditional American family household.[4] The most typical and the most portrayed family is when the family remains small as a nuclear family. This ideal image of a traditional American family however, has evolved and changed throughout history onto our present time. Due to economic and social transformations occurring in our society today, the nuclear family is evolving and adapting into families of more than two generations. This new and emerging living family structure of three of more

[4] Roberta L. Coles, *Race and Family: A Structural Approach* (California: Sage Publications, Inc., 2006). 73

generations residing under one roof has changed the landscape of what it means to being accepted as one of the modern traditional American family as it addressed new approaches to designing within the coexistence of multiple generations.

External and internal forces have changed the structure of the traditional family. Today, the increase rates of divorce, higher years of life expectancy, economic and social distress have forced the normal typical family to change into new types of structure. Through these factors, the extended living or multigenerational households have made its way into the normal, typical family. The change in the family structure can be mainly seen within three time-phases in history.

In analyzing the development and the changing family structure, the structure will be divided into three-time periods; agricultural era, industrial era, and the present era. The agricultural era is a general time period prior to mass production and mass demand after the results from World War II. After the world war, the event changed most of the dynamics and structure of the family influencing a change in lifestyle for many people during the industrial era. The present era is then shifted by the introduction of the internet where information is easily disseminated and where the introduction of sustainability developed, shifting away from the lifestyle during the industrial era.

Relevant to the family dynamics is how each family structure has divided certain roles as financial providers, as well as domestic providers in relationship of each family member's role to the household. From there, we can understand where the multigeneration family occurred. Financial providers within the family structure provide the income. Income is what allows the family to survive everyday necessities such as providing food and shelter. Domestic providers are family members who are involved in the nurturing and care for the children and/or elderly. As the family grows and survives the typical life, it is vital that both financial and domestic family members are included in any

family structures. Due to the change of events and eras, social and financial roles have shifted the family structure. By understanding the different roles of the family members in each era, we can identify the introduction of the multigeneration family and give reasons as to why there is an importance to designing for this unique family structure in our present situation.

Agricultural Era

The agricultural era is defined by the time before the industrial era between 1500-1800.[5] Situated in a rural environment, the extended household functioned as a supportive unit that worked together to produce a self-sustaining environment based on agriculture production. In a very primeval state, the men were the source of killing and gathering meat and other types of food. Men would go out into the wild to hunt their prey for their family or clan needs. Women participated in an opposite role where most of their times were spent taking care of household duties, children, and elderly parents. Despite patriarchal traditions, everyone contributed to the survival and the daily functions of the family.[6]

[5] Coles. p 34
[6] Ibid

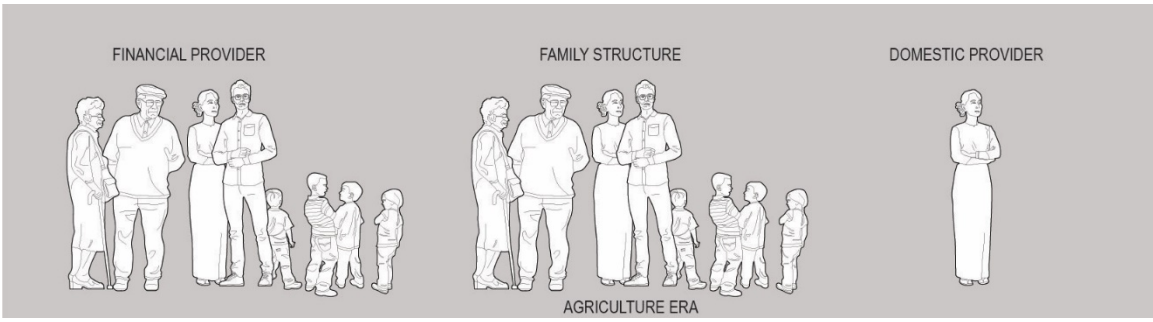

Figure 2-1 Family Structure during the Agriculture Era
Source: Coles, Race and Family: A Structural Approach
Illustration: Author

A typical family consisted of a husband, wife, biological children, and extended family members typically grandparents with the exception in the case of involving slaves. Divorce rates were low and rare because each family member had contributing roles to the success of the family. While the men had a dominant role in providing food and shelter, the role of the wife was to assist their husbands within the household, both done by keeping the house clean and raising the children.[7] Households were large because of high birthrates and the common practice of taking in non-related people into their families. Families gave birth to many children for several reasons. First, they needed child labor on the farm. Second, high infant mortality rates meant an increased probability that several children would not survive to adulthood.[8] Another reason was that there was no idea of birth control or the thought of it. All three factors generated to the high population and non-regulated family control within families, clans, and throughout cities. Therefore, it was common to have a large number of house hold members as that would equate to the overall well-being of the family as well as a reflection of the family's income to provide and domesticate more.[9]

[7] The Evolution of American Family Structure, Tricia Hussing
[8] Coles, *Race and Family: A Structural Approach*. p 34
[9] Ibid, p. 35

Figure 2-2 Bhutanese family in front of a traditional dwelling near Ura Village
Source: noipictures.photoshelter.com

Industrial Era

With the transition from the agriculture era to the industrial era, the family structure changes to a smaller family to adapt to the social and economic conditions of its present society. Families moved and transitioned from the rural countryside lifestyle to the urban lifestyle. The extended family is no longer part of the typical family structure as it was during the agricultural period. Instead, the nuclear family shifted without the need of the grandparents. Due to the shift in economic provisions, the male figure became the dominant "breadwinner" and contributor to the household. This dominant role of the men becoming managers and providers to the family created a strong family culture. The roles of the female were to mainly assist and stay at home raising the children.[10]

[10] Coles p. 37

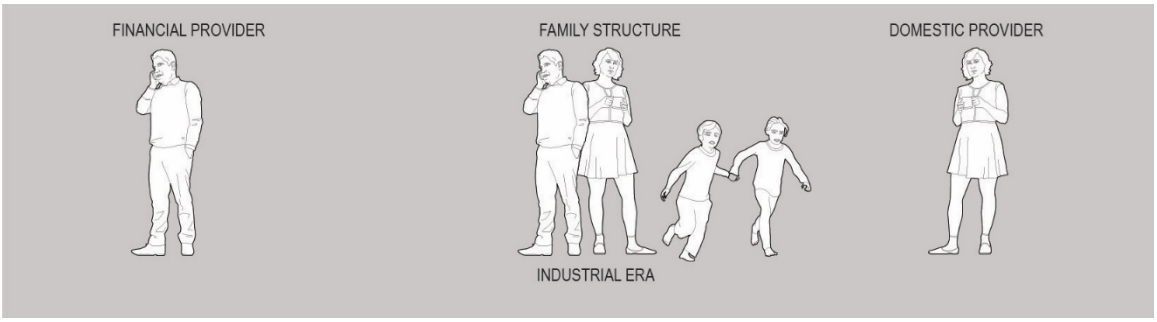

Figure 2-3 Family Structure during the Industrial Era
Source: Coles, *Race and Family: A Structural Approach*
Illustration: Author

The Industrial era also brought in a new wave of architecture that brought about to more privacy within the family household. Home and family members began to live more privately. Houses became filled with rooms and hallways, gone with the open plan as children and parents slept in separate rooms. The dynamic change of the family ultimately created segregation and privacy.[11] The separation of work and family life meant that many households became a nuclear concept to the house in a white picket fence image.

This ideal American family structure consisted of the "breadwinner male, the domestic household wife, and children.[12] The father or husband would go out to work every weekday and would be the main financial provider of the family. The wife, unlike during the agricultural era, did not contribute to the financial support of the family. Instead, the wife would stay home the whole day or at large periods of time to take care of the children and be responsible of clean and maintaining the house. This was the picture-perfect family, they ate dinner at the same time, lived in sociable neighborhoods, and parents and children had close relationships with their parents. The family

[11] Ibid
[12] Ibid

ultimately became the image everyone sought out for because this portrayed traditional "modern" family in the 1950's symbolized economic power, high education and social strength.[13]

A Changing Shift

By the 19th century, the role of men and women in the family began a shift in balance. The century brought about a number of important changes to the family structure. The legal boundaries were relaxed, with common-law marriage. The 1893 Married Women's Property Acts, married women were now allowed to have property rights and by the 20th century, women were able to own property. Levels of child well-being began to take into consideration as compulsory school attendance laws, child, labor restrictions, playground, and widow's pensions to permit poor children to remain with their mothers.[14]

While the ideals and picture of the American family portrayed happiness and satisfaction, divorce rates continued to become a statistic. The Great Depression drove unemployment and lower wages forced Americans to delay marriages and have children. Because of this economic struggle, divorce rates reached high levels because marriage and family were simply to afford. The economic downturn also adjusted the family structure as children and wives began taking up on part-time jobs to supplement and alleviate the family income.[15]

The media on television was inaccurately portraying the family life. The average age for women to marry was 20, divorce rates stabilized, and the birthrate doubled. However, the perfect images of family life did not tell the whole story. The portrayal of this "ideal family" was a product of

[13] Husser, Tricia. Tricia Husser, "The Evolution of American Family Structure," Concordia University, St. Paul Online, June 23, 2015, https://online.csp.edu/blog/family-science/the-evolution-of-american-family-structure.
[14] Ibid
[15] Ibid

the economic boom that followed World War II which led to economic growth where 13 million new homes were built in the 1950's.[16] This therefore led to the design for more single-family households with their own private lot, increasing their comfortability for privacy. The resulting factor is a social disconnect

Present Era - The Modern Family

However, the shift of the ideal family has evolved and changed in our modern time. The ideal picture-perfect family was but a mirage and never reflected the large population of the American family. This was due to the increasing gender role of the women. Women gained additional power in society within the workplace and education.[17] Today, the present typical family structure is made of different typological family structures as there is not just one traditional family structure. Evident are family structures where it consists of multigenerational families, non-families, and as well as single—parent family structures. While the nuclear family exist today, to say that the single-family structure is the most common family structure is false. Instead, America is representing a diverse spectrum of different traditional and non-traditional family structures. For this dissertation, a better look into the multigenerational family has now become a strong and growing part of the demographic of today's family, even in America.

But what we see today is not the typical family with child and parent anymore. Instead the family structure is ever more complex and changing. One of these family structures in the multigenerational families, the focus of my dissertation. In the figure below is a composite diagram representing the change of the family structure throughout the three-time periods. The family structure never remained consistent, but due to events, arguably even to the extent of our built environment, the structure has

[16] Ibid
[17] Coles, 77

evolved accordingly. Interestingly, the concept of a multigenerational family is not a new concept, rather it was more importantly the origins to the family structure which we have strayed off to due to the introduction of mass productions and the ability to increase the levels of our personal privacy.

By understanding the evolution of a multigenerational family structure will then analyzed in the following sections such as the structure and why the multigenerational family has evolved back into this present era. From there, the shortcoming as to why the current built environment fails to reflect our family structures will be addressed. The last portions of the chapter will focus its lens on Hawaii and make an argument as to why designing the built environment to reflect the multigenerational family as a necessary topic to tackle in the future.

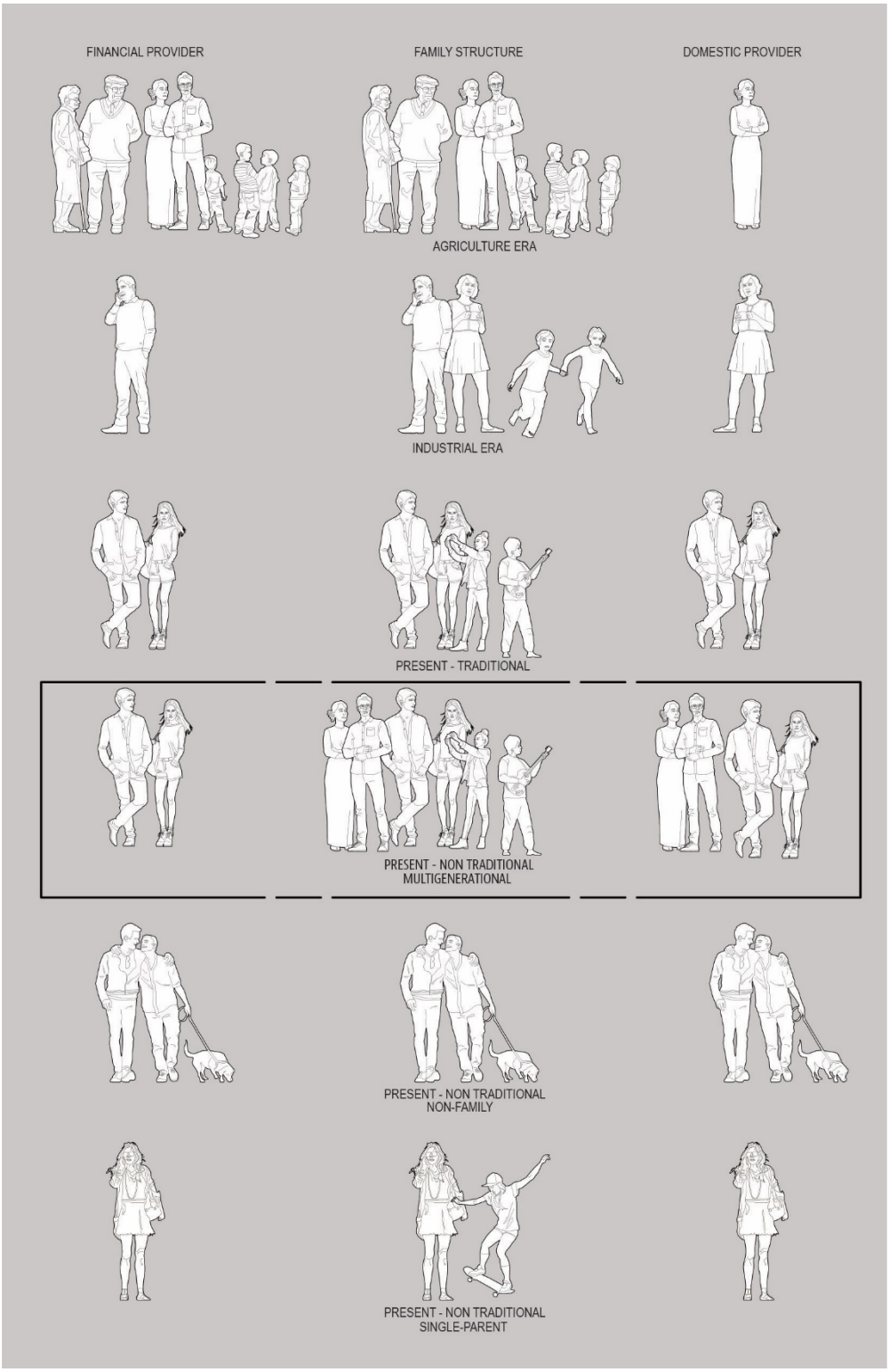

Figure 2-4 Family Structure Development
Source: Coles, *Race and Family: A Structural Approach*
Illustration: Author

2.2 Higher Life Expectancy

The modern outlook of higher life expectancy has dramatically changed the landscape in the United States. People in the United States are living longer these days than ever before since the 1960's. It is expected that by 2050, the average life expectancy of the population in the United States will reach to an average of 82 years old.[18] With the improvements of the quality of life, more and more people are able to live at a higher age expectancy. People are increasing their life expectancy because medical advancements, increased time of physical activities, and as well as healthcare have all attributed to a better quality of life.

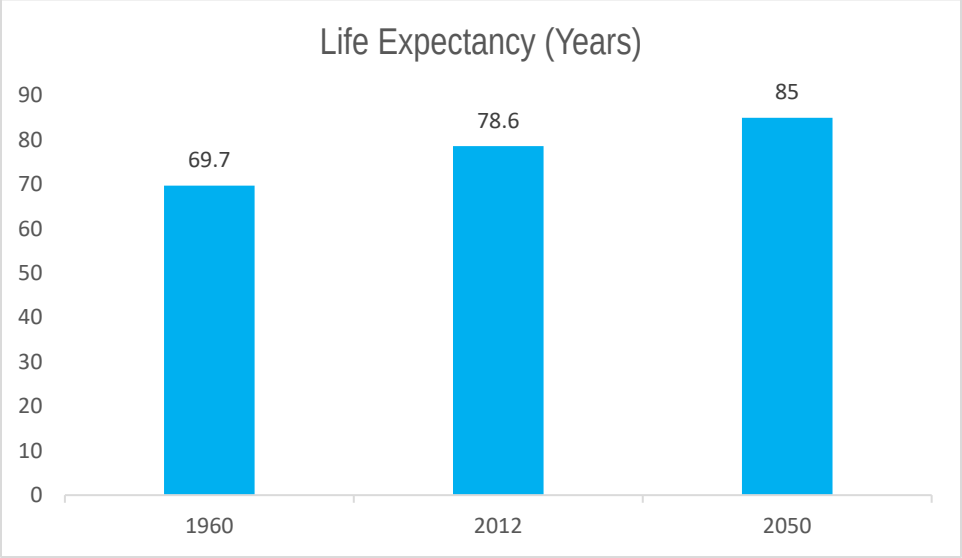

Figure 2-5 United States Life Expectancy in Years
Source: Ortman, An Aging Nation: The Older Population in the United States
Illustration: Author

The number of elderly are steadily growing, and this have been given attention to the society as the government has increase the economic burden of the elderly by providing more government

[18] Ortman, An Aging Nation: The Older Population in the United States

programs such as social security and medical coverage. With the aid of the government, and the society's contribution to a better quality of life, the population of the elderly is expected to grow by large numbers. At 2017, the United States on average is expected to have 50 million people to live up to age 65. With a better and healthier environment, by 2050, the population of people expected to life through age 65 will be nearly 80 million people.[19] A difference of 30 million people, or a 266% increase in the elderly group.

One of the main reasons for higher life expectancy is the advancements in the medical and technology field. Medial improvements have contributed to the decline of diseases and have provided preventive measurements for many ailments. The medical improvements have conspired to the decline of diseases and other provided preventive measurements for many ailments. Government supported programs allow governmental/private assistance in their medical expenses. Americans are enjoying a much better and longer life due to better healthcare services. In 2013, Americans spent more than $300 billion on long term services and support which include nursing home facilities, and home-based health care.[20]

However, with more and more people reaching beyond the average life expectancy, it has resulted in a greater demand for staff and services that need to be provided for this rising age population of seniors. The next question is then to ask whether the built environment is well equipped to providing the necessary staff and services demands for the elderly. Is the built environment appropriately satisfying the needs of the seniors that are expected to live to their 80's or is our present built environment creating obstacles for elderly?

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[19] Ibid, 6

[20] "Americans Are Living Longer | USC Online | Gerontology USC," University of Southern California Leonard Davis: School of Gerontology, accessed March 19, 2018, https://gerontology.usc.edu/resources/infographics/americans-are-living-longer/.

2.3 Existing Built Environment for the Elderly

Our existing built environment is simply not designed for our growing elderly population. Seniors are candidates for extra healthcare. The physical environment inhibits our seniors to be actively incorporated; as assisted living and other healthcare solutions have practically isolated our elderly apart from the community to actively interact within the community. While we may see long-term healthcare facilities as the cause of social isolation, our current lifestyles of living in a single dwelling household also prohibits a sufficient built environment for our elderly to age in place. And because of this social isolation, our built environment is preventing our elderly from living far better lives than they deserve. The built environment addresses the average and typical young, healthy person when being accounted for during design, neglecting the people that live over 65 years old.[21]

Assisted living, nursing homes, and other models of long-term living care for seniors have become ultimately prison cells for the elderly. Affordable assisted living care facilities for seniors are becoming more difficult to acquire since the price for assisted living have proven to become expensive and unaffordable.[22] One of the drawbacks is the segregation of the elderly from the rest of the community. Elders are held essentially captive within the assisted-living facilities with limited interaction with other generations and within the outside community. Assisted-living facilities and nursing homes are designed separate from an integrated community. Elders are also stripped from their current housing which resulted in losing their social contacts whether they be colleagues, friends, and neighbors. This social and physical separation of the elderly among the community does not

[21] Elizabeth Burton and Lynne Mitchell, *Inclusive Urban Design: Streets for Life* (Architectural Press, 2006). 19
[22] Judith Mitchell M. and Bryan J. Kemp, "Quality of Life in Assited Living Homes: A Multidimensional Analysis" 55B, no. 2 (2000): 117–127.

foster a healthy environment for the elderly population. Instead, elders are becoming prisoners of their own space as assisted living facilities offer little to no interaction with the surrounding community.

Yet, while it is easy to spot that nursing homes are social blockades, our ideal single-family houses also participate in this social disparity. The most common form of dwelling is the single-family household, which fails to accommodate changes to the family's need to extend or change the living situation to meet the needs for an growing family to aging in place. The Center for Disease Control and Prevention defines the tern, Age in place, as the ability to live in one's own home and community safely, independently, and comfortably, regardless of age, income, or ability level.[23] The disconnection between the inhabitant and their habitat has increased.[24] Single dwellings offer little adaptability or flexibility to allow grandparents to live integrated and cohesively with the nuclear/main family. The single-family dwelling ultimately symbolizes the family values and the freedom it comes with. The typical design of the house and the layout of the rooms do little to express adaptability and transparency. Instead, these white-picket family houses fostered an ego that focus on independence and individualism, opposite to the philosophy of integrating a wholistic community level.

[23] National Center for Environmental Health, "CDC - Healthy Places - Healthy Places Terminology," December 11, 2017, https://www.cdc.gov/healthyplaces/terminology.htm.
[24] Ryan Shidaki, *Multigenerational Living in the Urban High-Rise: Designing for Hawaii's Extended Family* (University of Hawaii, n.d.). 22

Figure 2-6 Single-family houses in Hawai‘i
Source: Author

In a study conducted in 2015, Brigham Young University concluded that people living in isolation were at significant risk of premature deaths.[25] This meant that people who were socially isolated lived an unsatisfactory life. Loneliness prohibits longevity. The lack of social connections presents health risks, while the steady existence of relationships with family members, friends, coworkers, adhere to a positive effect in terms of the wellbeing of an individual. Therefore, the more socially connected a person is with their family and community, decrease the chances for premature deaths.

[25] “Prescription for Living Longer: Spend Less Time Alone,” Brigham Young University, March 10, 2015, https://news.byu.edu/news/prescription-living-longer-spend-less-time-alone.

Consequently, today there is a growing demand for new models of living and care for seniors with new models to collaborate with other residences to ease the burden of a growing demand.[26] With a better quality of life, the elderly population is steadfastly growing. This means that while the numbers increase for the older generation, the younger working core generation cannot meet the demand for assisted-living situation. With the life expectancy to increase to ten more years by 2050, elders are now able to live another chapter in their life.[27]

2.4 Hawai‘i Current Demographic

While the trend of increasing multigenerational families and life expectancy in United States is prevalent, this section of the paper will look to compare the development of Hawai‘i’s family structure, its current life expectancy, and the existing built environment for the elderly. Compared to other states in the United States, Hawai‘i is among the states with the highest rate of residents living in multigenerational housing due to high life expectancy.[28] Another statistic that supports the relativity of Hawai‘i to this dissertation is the high rate of multigenerational households compared with the total households living in Hawai‘i. Nearly 12% of Hawai‘i’s total households are multigenerational families, nearly doubled the national average. Additionally, multigenerational living is connected to the cultural values of many ethnicities that make up the Hawai‘i demographic. Asians and Hawaiians that make up a majority of the population of Hawai‘i continue to stress the strong family values. However, the landscape of elderly living conditions is similar around the world where the demand for senior care

[26] Epimakhova, Designing For Multigenerational Community: Creating a Supportive Environment for Young and Old in the U.S.A., 25
[27] Health, “CDC - Healthy Places - Healthy Places Terminology.”
[28] Census DBET

has increased while as the same time, these healthcare facilities have only separated them more from the community and world.

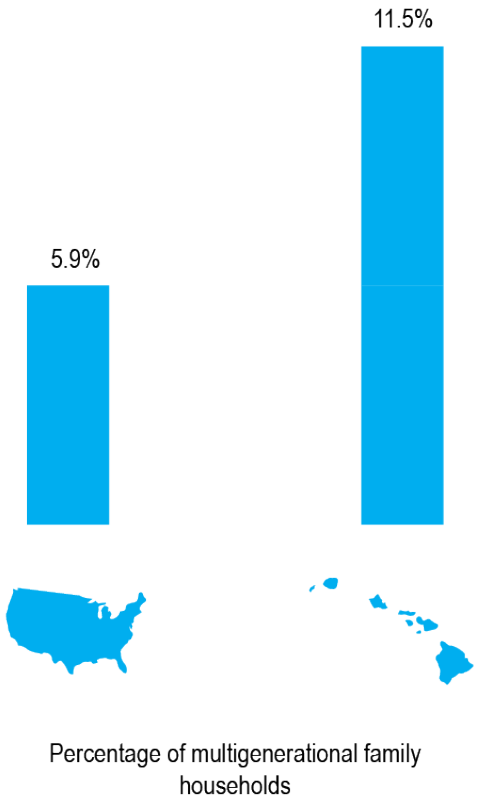


Figure 2-7 Percentage of Hawai'i's multigenerational family households
Source: Hawai'i DBET
Illustration: Author

Hawai'i Family Development and History

In traditional Hawaiian society predating before the colonization of James Cook and Americans, the family was recognized as a communal system that engaged in the production of agriculture to maintain an overall economy. Families in early Hawai'i were composed of multiple

families residing in specific districts. The families lived in ahupua‘as, based on an agricultural land governing system ruled by chiefs to maintain these ahupua‘as. This harmonious living structure that was organized in a hierarchal system the chiefs and the commoners lived together to make up the composition of the population of Hawai‘i. Adults and young kids would take care of the elderly, and the seniors would reciprocate by taking care of the children.[29] The Hawaiians lived in an integrated environment that emphasized the community of many extended living families. The living arrangements of traditional Hawai‘i is then comparable during the agricultural era. Multiple dwellings were constructed to accommodate the different generations and family members of the village. Although family members did not necessarily live under one single roof, separate units provided various uses to create an integrated living community that addressed the extended family.[30]

After the agricultural era, the workforce housing of the plantation era spurred up. The Plantation-era Hawai‘i was a society unlike any that could be found in the United States. The growing sugar and pineapple plantation industry was growing, which led to the immigration of many Asian immigrants from Japan, China, Philippines, and other countries. Because the population of the Hawaiians were declining, a large labor force needed to be imported to meet the demands of pineapple and sugar cane plantations. Plantation owners quickly began importing workers, dramatically changing Hawai‘i’s demographics. The life of the plantation worker however, was not easy. Days began before sunrise and work was demanding. Much of the ethnicities lived in segregated camps and the living conditions were arduous. By the 1880, many of the ethnic groups had planted their roots onto Hawai‘i such as the Japanese. As the corruption of the plantation owners

[29] Diane Lee Rhodes, “Cultural History of Three Traditional Hawaiian Sites (Chapter 3),” Overview of Hawaiian History, accessed March 19, 2018, https://www.nps.gov/parkhistory/online_books/kona/history3b.htm.
[30] Shidaki, *Multigenerational Living in the Urban High-Rise: Designing for Hawaii’s Extended Family*. 30

grew, many of the ethnic immigrant works united in strikes. The resulting effect in these towns was the development of the families into multiethnic societies or communities.[31]

While America transitioned towards the picturesque traditional American family, Hawai'i remained rooted in family values and traditions. Hawai'i values and beliefs supported the living of multigenerational living. Families in Hawai'i placed significant value in the word *'Ohana*, so the relevance of extended families remained dominant. Hawai'i also has showed resilience during the industrial era as the multigenerational family structure remained while the ethnic demographic completely altered the compositional makeup with the addition of immigrant workers settling as permanent residences. Referred to as a melting pot, Hawai'i represents a population of 21% of people that identify themselves as multiracial.[32] In comparison with the rest of the United States, Hawai'i's demographic composition is composed of a diverse mix of races. While the make of the United States population seems to follow a pattern dominated by a singular race, a mix and diverse number of races and ethnicities dominate Hawai'i's population.

Today, Hawai'i's is composed of a racially integrated group of various ethnic majorities and minorities. While Asians account for 55% of the state's population, the United States only account for 6% Asians in the entire nation.[33] In Hawai'i, Caucasian only account for 23% of the state's population, where Caucasian makeup nearly 74% of the entire United States. In Hawai'i, Asian Americans in Hawai'i populated 55% of the state's population.[34] The Asian race is the most dominant race in the state of Hawai'i. The Japanese are the leading ethnicity, with the Filipinos, and the

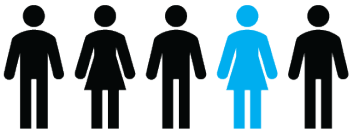
[31] "Japanese - Hawaii - Immigration...- Classroom Presentation | Teacher Resources - Library of Congress," webpage, accessed March 19, 2018, //www.loc.gov/teachers/classroommaterials/presentationsandactivities/presentations/immigration/japanese2.html.
[32]"U.S. Census Bureau QuickFacts: Hawaii," accessed March 19, 2018, https://www.census.gov/quickfacts/HI.
[33] Us census
[34] US census

Chinese for second and third, respectively. 1 in 5 residents in Hawai‘i are immigrants, while another 1 in 7 native born U.S. citizen has at least one immigrant parent.[35] This dynamic difference in racial and ethnic diversity in Hawai‘i versus the rest of the nation can be traced from the days of the plantation. The growth of the sugar plantation and other industries demanded for more workers, which lead to large waves of immigrants immigrating from many of the Asian counties. An important note worth mentioning is that Asian immigrants who arrived in the United States continued to maintain strong family groups and ties and did little to live as individuals. The value of family not only facilitated adjustment to a new environment, but also reinforced the connection to family values.[36] Asians who immigrated from foreign countries still carried family values, Asian American elders held authority in the family, while the children respected these family values and were taught to be obedient to all elders. This obligation to their parents created more interaction with parents and children and has resulted into having many Asian American households transforming into multigenerational households.

“Like a lot of Asian families, Filipino families value the group”

-Patricio Abinales, professor of Asian Studies at the University of Hawaii Manoa[37]

[35] Olivia Peterkin, “Why Hawaii Trends Toward Large And Extended Families,” Honolulu Civil Beat, November 21, 2017, http://www.civilbeat.org/2017/11/why-hawaii-trends-toward-large-and-extended-families/.
[36] Shidaki, *Multigenerational Living in the Urban High-Rise: Designing for Hawaii’s Extended Family*., 33
[37] Peterkin, “Why Hawaii Trends Toward Large And Extended Families.”



Nearly one in five Hawaii residents
is an immigrant

one in seven is a
native-born U.S. citizen with at
least one immigrant parent

Figure 2-8 Overview of immigrants in Hawaii
Source: Why Hawaii Trends Toward Large And Extended Families: Civil Beat
Illustration: Author

With the Asian demographic remaining a prominent component of Hawai'i's demographic, the comparison of the family structure of the Asian household seems relevant to this dissertation. By traditional measures of family success, Asians have a high percentages of large family households that consists of more children than the national average.[38] With the means of defining a general perspective of who categorizes as an Asian, in Hawai'i there are three distinct sub ethnic groups. The three are 1) Pacific Islanders, 2) Southeast Asians, and 3) East Asians. Due to strong family values, much of the family structures in Asian households comprise of multigenerational structures.[39] Asian families have also shown low divorce rates which could be deceptive as we would assume that most of these marriages were living in happiness. Nevertheless, even if we characterize all these

[38] Coles, 225
[39] Ibid

Asian ethnicities, Asians tend to have strong family values which have led to multigenerational family structures.

> *"But for many Native Hawaiians, Pacific Islanders and Asians, cultural tradition plays a huge role in a family's decision to live together."*[40]

Hawai'i's Higher Life Expectancy

Hawai'i is no exception to the growing elderly population phenomena. Respecting and caring for elders is a traditional value that resonates with families in Hawai'i, especially with Asian ethnic and racial backgrounds. Hawai'i's statistics forecast to have the states with the longer life expectancy than any other state across the United States. While the is a slight difference between the sexes, Hawai'i's life expectancy is expected to grow to 80 years old, a 3-year difference with United States average life expectancy.[41] Higher levels of life expectancy will create a growing population where needs of the elderly cannot be neglected and will need to be addressed whether or not Hawai'i is ready for it.

Existing Built Environment for the Elderly

The similar problems reemerge for the elderly in the built environment for Hawai'i which includes high cost of living while facing a housing shortage. The high cost of living in Hawai'i should also not be excluded as to why the rate of multigenerational housing is so high in Hawai'i. In Kalihi, much of the house that would be deemed as a single dwelling household, have turned to be overcrowded structures. As families have tend to now move away from the urban core of Honolulu to seek more affordable dwellings, the cost to commute into town for work have created another

[40] Peterkin, "Why Hawaii Trends Toward Large And Extended Families."
[41] Kristen Lewis and Sarah Burd-Sharps, "The Measure of America 2013-2014," *Social Science Research Council*, n.d., 60. 16

problem. Overcapacity of family members in a multigenerational home is a prevalent challenge where inadequate living space and accommodating the various needs of family members and adapting to a new lifestyle. Hawai‘i is ranked 1st among the 50 states with the highest monthly gross rent for a 2-bedroom apartment at $1,893. That’s $500 dollars more than the U.S. average.[42]

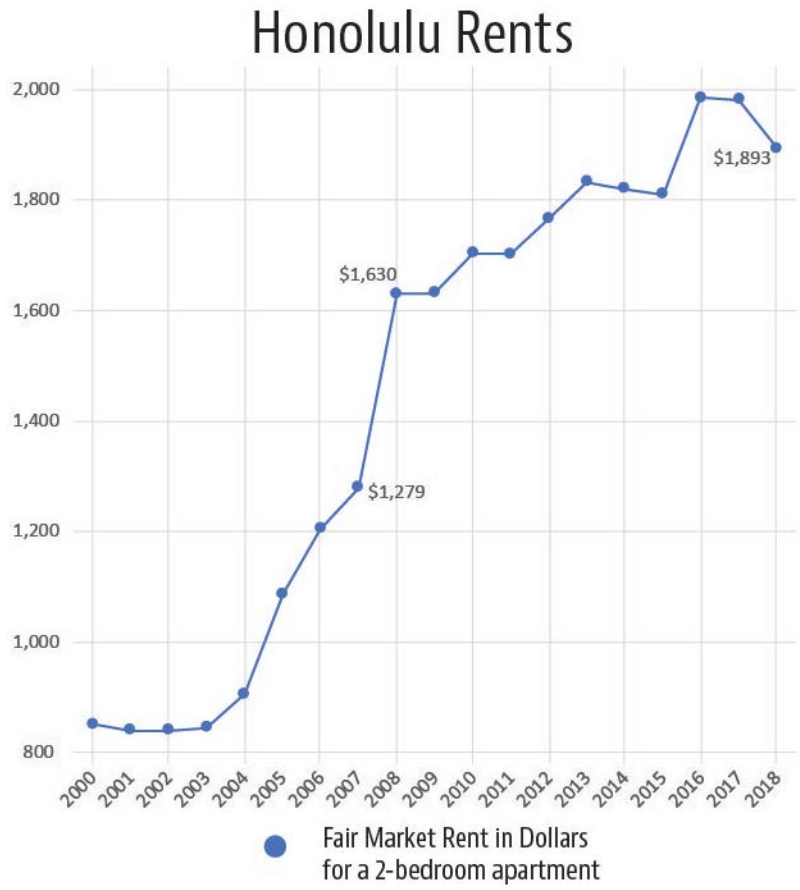


Figure 2-9 Honolulu rental outlook
Source: U.S. Department of Housing and Urban Development
Illustration: Author

[42] Peterkin, “Why Hawaii Trends Toward Large And Extended Families.”

Single dwellings prevent the elderly to age in place. The need to retrofit these single dwelling family units to help elderly live is costly and many of these design does not address accessibility of the elderly. Most seniors living in single dwelling houses live in suburban areas. However, for most suburban areas, the design of these houses is intended for young families, more importantly, people with cars.[43] So when a senior is deprived for his car due to the inability of his/her wellbeing, it restricts access and social interaction, which leads to isolation within the house. When an senior is trapped in a house, one of the problems a typical single dwelling houses has are when these houses are equipped with two stories, which make it difficult for elderly to walk up the stairs on a daily basis due to their health ability. As mentioned before, Hawai'i is leading the nation in multigenerational housing, yet why are residential designs nor solutions to this housing predicament have not been addressed.[44]

2.5 Conclusion

The traditional typical American family idealization is of the past. Increasingly families have contributed to a more diverse demographic family structure. Today, the make-up of today's family structures now includes multigenerational, single parents, and non-family structures. In Hawai'i, multigenerational families have dominantly created the makeup of the state's family structure. The continued family values for Asian continues to become prominent and has led to many reasons as to why they are prevalent in the multigenerational family structure. As the generations to follow are expected to have higher expectancy based on higher quality of life, there is a greater need to pay attention to this growing demographic as the world and especially the state of Hawai'i tries to solve

[43] Allison Arieff, "Opinion | A Housing Crisis for Seniors," *The New York Times*, January 28, 2017, sec. Opinion, https://www.nytimes.com/2017/01/28/opinion/sunday/a-housing-crisis-for-seniors.html.
[44] Shidaki, *Multigenerational Living in the Urban High-Rise: Designing for Hawaii's Extended Family*.27

its housing crisis. The city and county of Honolulu estimates a housing demand of 26, 075 units between 2015 – 2025.[45]

However, it's important to not deny the elderly from collaborating and designing with the elderly people, and not as separate entities from ordinary people. For a healthier and integrated community, the elderly growing population must be taken into account and be part of the equation rather than isolating them into assisted living facilities both physically and socially. The current single house and room layout is not sufficient in responding to this dynamic shift in our social demographic if we want our elders to age in place. Therefore, the design is to increase the opportunity to participate in a diverse range of activities and events within the physical context seniors to live independently. In Hawai'i, is the word 'ohana becomes a word that continue to become meaningful, it is important that the values of family exist within our families. The word 'ohana is also an economic unit as many family members are affected. When the rise of living becomes a financial burden, people and family members relocate outside of Hawai'i, and that in turn affects the rest of the 'ohana. Collaboration and communication within the multigenerational family structure in the community with the elderly will create a healthy community.

"If enough people in the 'ohana leave — then the remaining family members can no longer afford to live here themselves and end up also relocating to the mainland."[46]

[45] Peterkin, "Why Hawaii Trends Toward Large And Extended Families."
[46] Peterkin.

3| Multi-Generational Housing

While the phenomenon of multigeneration living is not new, this chapter creates a backdrop of contextual understanding of multigenerational living in the built environment. Discussion in this chapter will address the benefits, strategies, and the dynamics of various generations coexisting within the built environment. Additionally, precedents of multigenerational housing will look at different scales with different strategies to briefly provide contextual understanding of multigenerational living applications. The objective of this chapter is to understand the social dynamics that prevent social isolation from not just the older generations, but all generations. A final overview of Hawai'i's solution to multigenerational living will give an additional perspective that specifically addresses the regional site to better address missing pieces to the urban fabric.

3.1 Multi-Generational Housing Context

A multigenerational housing is simply a single dwelling where the multiple generations coexist together. Extended families are composed of grandparents, parents, and children living under one roof.[47] This social dynamic of different generations living in an integrated environment demands that the built environment must support multiple generations coexisting in a healthy atmosphere. A strong sense of a healthy environment is one that is socially cohesive and integrated, providing support for everyone. When collaboration and integration of all generations within the dwelling is attained, a viable and livable growth in the community is accomplished.

[47] D'Vera Cohn and Jeffrey S. Passel, "A Record 60.6 Million Americans Live in Multigenerational Households," *Pew Research Center* (blog), August 11, 2016, http://www.pewresearch.org/fact-tank/2016/08/11/a-record-60-6-million-americans-live-in-multigenerational-households/.

Cities are addressing design mainly for healthy adults, where far too often we see the elderly and children overlooked or isolated within the design.[48] Our designs towards the children and elderly have resulted into an afterthought without integrating these two age groups into a healthy adult community. Today's designs seem to have isolated the elderly into a separated living environment. Our nursing homes and facilities isolate our elders from the physical environment, conditionally the connectivity to the community diminishes. This decline in isolation on the built environment ultimately deters the health of the elders. "Integrated Living" a term derived by Peter Ebner creates an innovative model in which the aging population and multigenerational living has been developed. Each age group has different needs and specific needs which include the elderly, single parent, immigrants, teenagers, and people with disabilities.[49] By integrating diverse inhabitants with their specific needs, support from all the residents and people will create an environment healthy for all generations.[50]

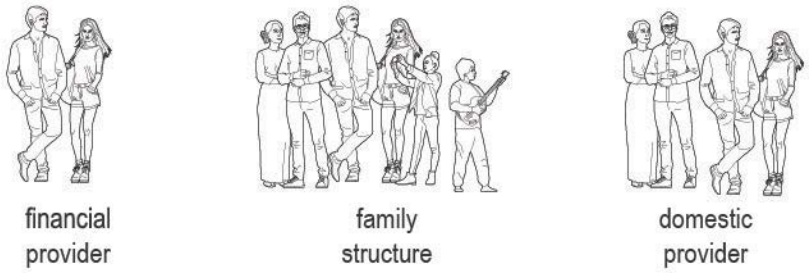


Figure 3-1 Family Structure
Illustration: Author

[48] Burton and Mitchell, *Inclusive Urban Design: Streets for Life*.
[49] Christian Schittich, *In Detail: Housing for People of All Ages: Flexible, Unrestricted, Senior-Friendly*, 2007.
[50] Tatiana Epimakhova, *Designing for Multigenerational Community: Creating a Supportive Environment for Young and Old in the U.S.A.* (Clemson University: Tiger Prints, 2016)., 18

As each age group socially benefits from the multigenerational house, the benefits of physical activity also arise. The dynamic of each household member delivers specific functions within a multigenerational household. Each generation receives and supports other generations. Grandparents become mentoring figures to their grandchildren. Grandchildren can also provide nurture to grandparents; as they learn patience and are given a different perceptive with their grandchildren.[51] Grandparents receive emotional satisfaction from more frequent interaction with grandchildren which reduces the needs for senior or child daycare. The emotional and physical proximity creates a greater bond between the generations. The time spent with the seniors and children have decreased the percentage of depression, but also increased the numbers of seniors with better physical care, and a reported sense of purpose.[52]

Multigenerational living is a social complexity that can also provide economic benefits to everyone. Multigenerational households provide affordable benefits by accommodating more people in the house saves money on child and senior care, as well as saving time commuting back and forth between parents and grandparent's homes. Parents are the main providers of the house as they are the most able to go into the workforce, but also provide social needs for both the children and grandparents when needed. Grandparents who are financially stable can pay for groceries and their grandchildren's meal are periodic times. All household members aid with the daily household activities, as well as social and financial support. "The psychological drive to be able to see and interact with other generations is an intrinsic need for everyone" says Tatiana Epimakhova.[53] The

[51] Shidaki, *Multigenerational Living in the Urban High-Rise: Designing for Hawaii's Extended Family*. 57
[52] Sharon Graham Niederhaus and John L. Graham, *All in the Family: A Practical Guide to Successful Multigenerational Living* (Taylor Trade Publishing, 2013)., 39
[53] Epimakhova, *Designing for Multigenerational Community: Creating a Supportive Environment for Young and Old in the U.S.A.*, 18

need to address all age groups and generations are essential to the research because each age group play an important role in the healthy environment.

The single-dwelling house that represent the traditional American house is unadaptable and inflexible to adjust to the dynamic change of our growing population of multigenerational families. The standard home can be visually interpreted as an enclosure of permanent walls with definition of interior spaces. Rooms are clearly divided among walls and even decrease the interactions within household members. The single-family dwelling does not address anticipation of present or further family needs. Our present situation needs our dwellings to address flexibility. Flexible housing can adjust the family's changing needs and patterns for. Flexibility allows the family to adapt and adjust to different situations. A typical single-dwelling differentiates private and public spaces and shows little integration to become flexible and transparent.[54] Physical segregation of generations from each other has the tendency then to aggravate the tension between generations due to limited social interaction.[55] Having a flexible house allows for unexpected adaptations that may not be accounted for. These factors affect the inhabitable space internally and externally. Majority of single-family dwelling is simply not going to solve our housing crisis of adding density and more housing units.

3.2 Precedents

Multigenerational living is not entirely brand-new concept. Multigenerational housing has existed during the times where villages would support the living of elderly people living under the same roof as the nuclear family. The origins of this model are found in traditional housing for three-

[54] Shidaki, *Multigenerational Living in the Urban High-Rise: Designing for Hawaii's Extended Family*.60
[55] Epimakhova, *Designing for Multigenerational Community: Creating a Supportive Environment for Young and Old in the U.S.A.* 36

generational families where the mature adult members of a family were responsible for their elderly parents who helped raise the children. The entire extended family lived under one single roof. In a traditional village services and settings supported needs of diverse age groups and were located within walkable distances to a store, local goods, religious and social events. Moreover, a village that emphasized a community with different levels of interactions within the family, friends, and neighbors showed strong bonds as a community. The following precedents show context of the multigenerational housing in the existing built environment to grasp a greater contextual understanding as to how strategies have been implemented to prevent social isolation.

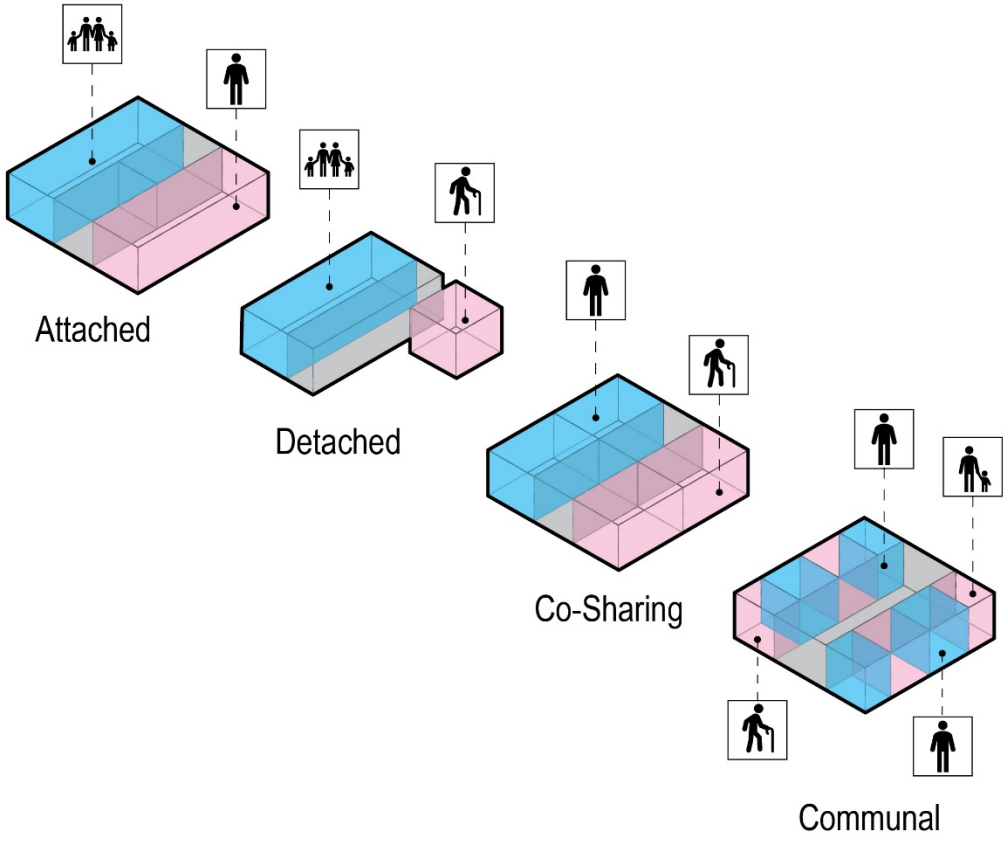


Figure 3-2 Multigenerational Housing Strategies
Illustration: Author

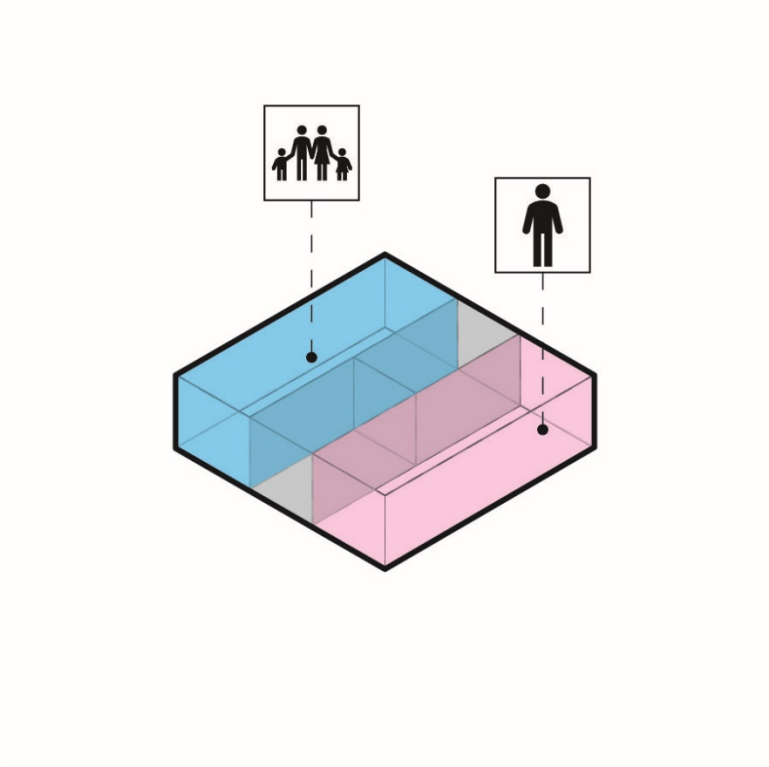


Figure 3-3 Attached Scheme: Living and common spaces in one dwelling
Illustration: Author

Attached

An attached scheme has both the living units and common units all under one dwelling. The common spaces are shared with both the main and extended family The Courtyard House in Singapore is an example of a multigenerational house that integrates separate living spaces for each generation in one single dwelling. Inspired by the traditional siheyuan courtyard building of northern Chinese residential houses, the house integrates a central courtyard flanked by adjacent wall or rooms on all sides of the central courtyard. Each generation is designed to have their own private room which is located on the second floor while the first floors provides all the common spaces that is shared among all generations. The parents and the children occupy the north facing block of the

building while the south facing massing is delineates for the grandparents or other guests and other common areas. Living and common spaces are all under one dwelling.

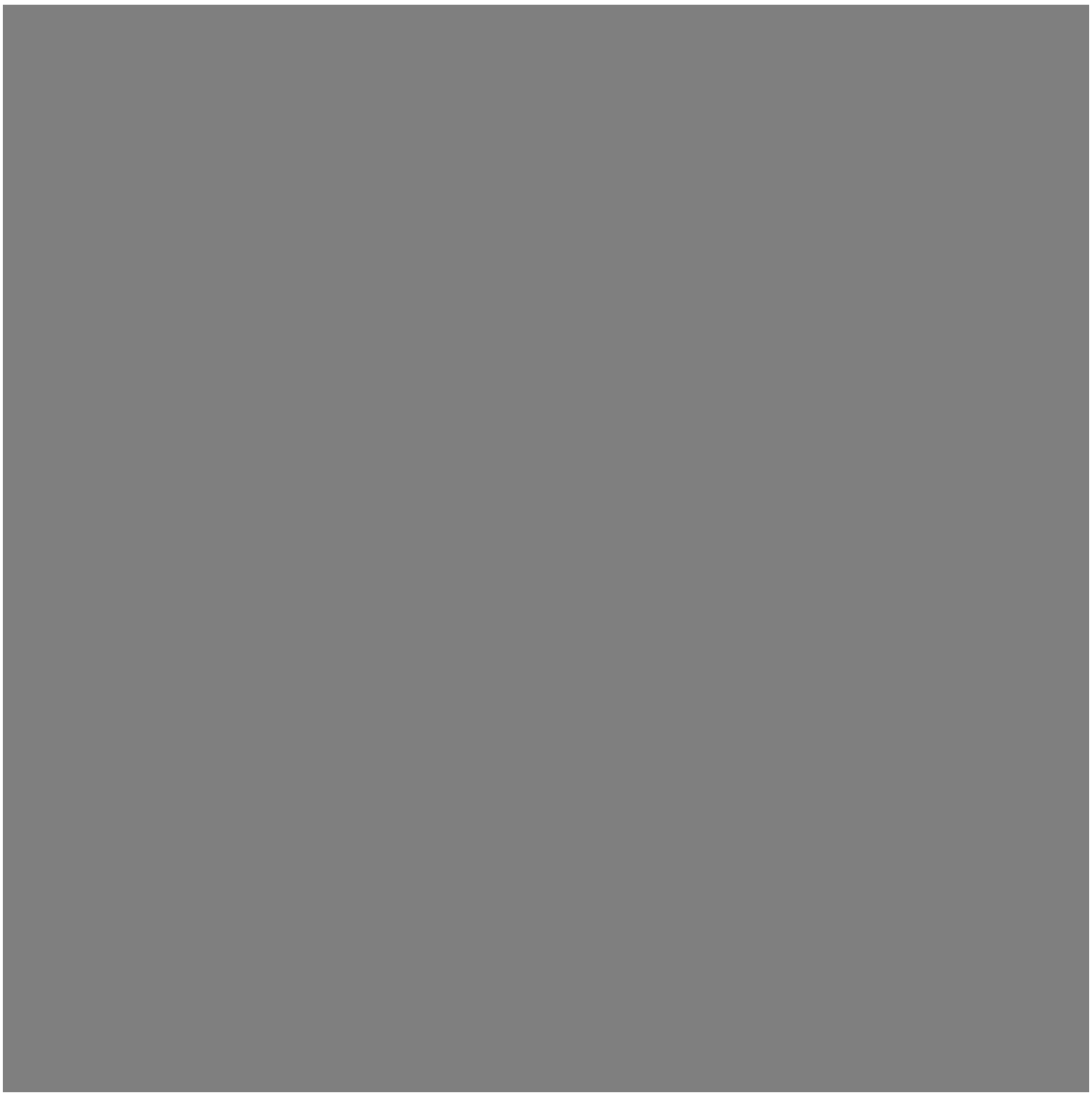


Figure 3-4 Courtyard House in Singapore
Source: Archdaily
Illustration: Author

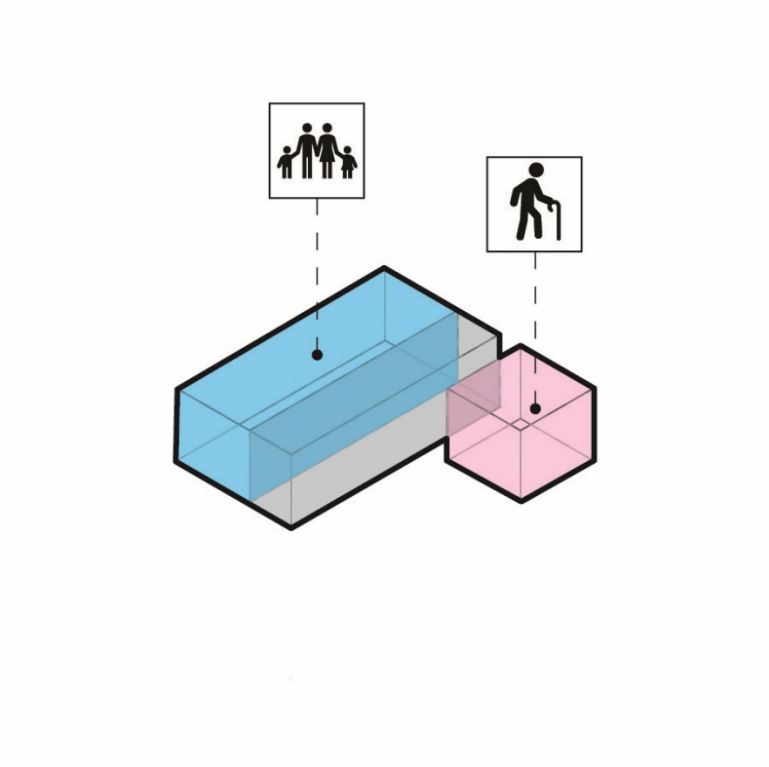


Figure 3-5 Detached Scheme: extended family separated from main dwelling
Illustration: Author

Detached

Another strategy for multigenerational housing is to physically separate the generations in to distinct dwellings yet maintain a close proximity between each dwelling. House Eichgraben is a house project in Austria that separates the grandparents from the main unit of the house as an accessory unit. While both units are physically separated, the close adjacency still promotes sociable gatherings and interactions within each generation possible. Grandparents are close enough to provide child care support when the parents go out and work. Both separated units have different living units and have a level of independence on the same property. Additionally, the owner of the main room has the option to rent out the accessory unit to someone else or be converted into another

usable function. The attached unit has a separate building entrance to promote more levels of independence.

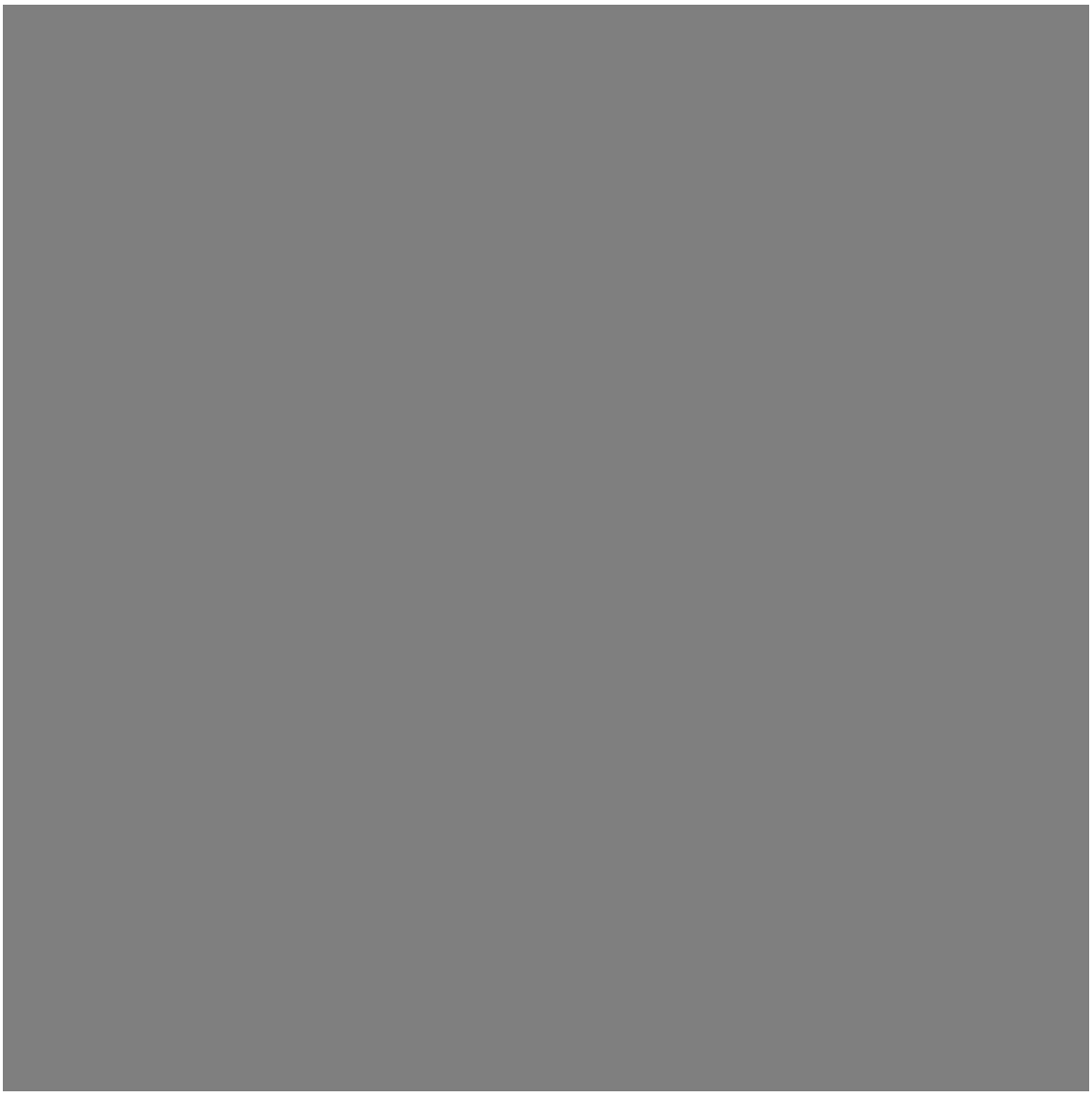


Figure 3-6 House Eichgraben in Austria
Source: Archdaily
Illustration: Author

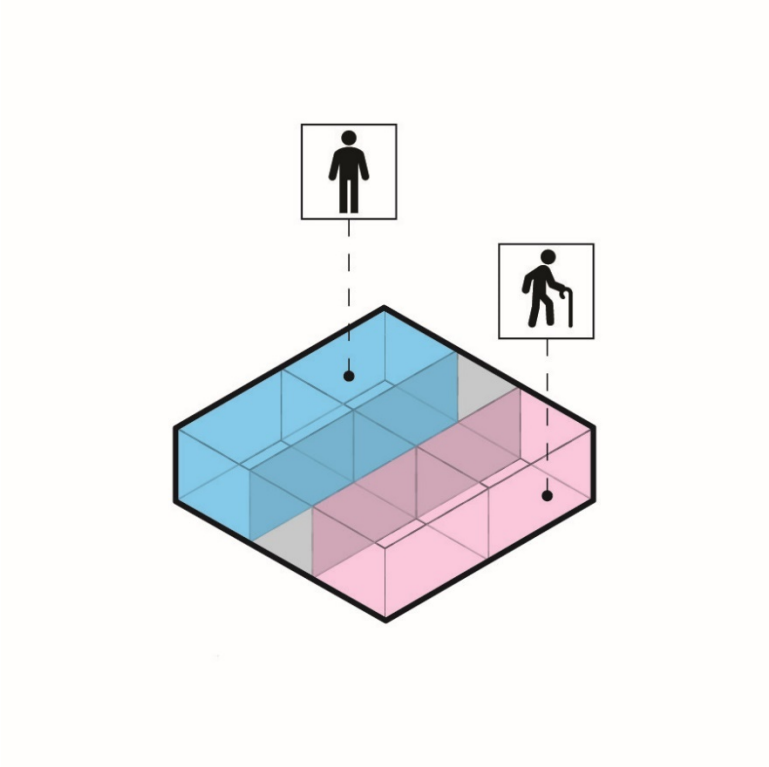


Figure 3-7 Co-Sharing Scheme: student and elderly living spaces under the same dwelling
Illustration: Author

Co-Sharing

Netherlands has implemented a model that integrates students and senior living together. Humanitas, is a social service organization that help students pay their dorm expenses in exchange providing social interactions with the elderly. Ultimately, the students are given a dorm for free with all expenses paid for, and in return, the students will devote about 30 hours of their time per month with the residing elderly with activities such as prepping them meals, shopping for groceries, teaching and accompanying them for recreational activities. With the interactions between the students and the elderly, no one feels like they are isolated from the community. These social interactions create humanistic bonds that have results in declining in mental health and loneliness, increased mortality,

and an overall improved health in older adults.[56] The social connections that the students and the seniors developed have now more meaningful connections versus the occasional staff that maintain the elderly home facility. Physical integration of housing for the elderly into the existing urban context is a significant contributor in an establishment of the social contacts for the seniors.[57]

[56] Tiffany R. Jansen, "This Nursing Home Is Also a College Dorm," CityLab, accessed March 20, 2018, http://www.citylab.com/housing/2015/10/the-nursing-home-thats-also-a-dorm/408424/.
[57] Epimakhova, *Designing for Multigenerational Community: Creating a Supportive Environment for Young and Old in the U.S.A.* 36

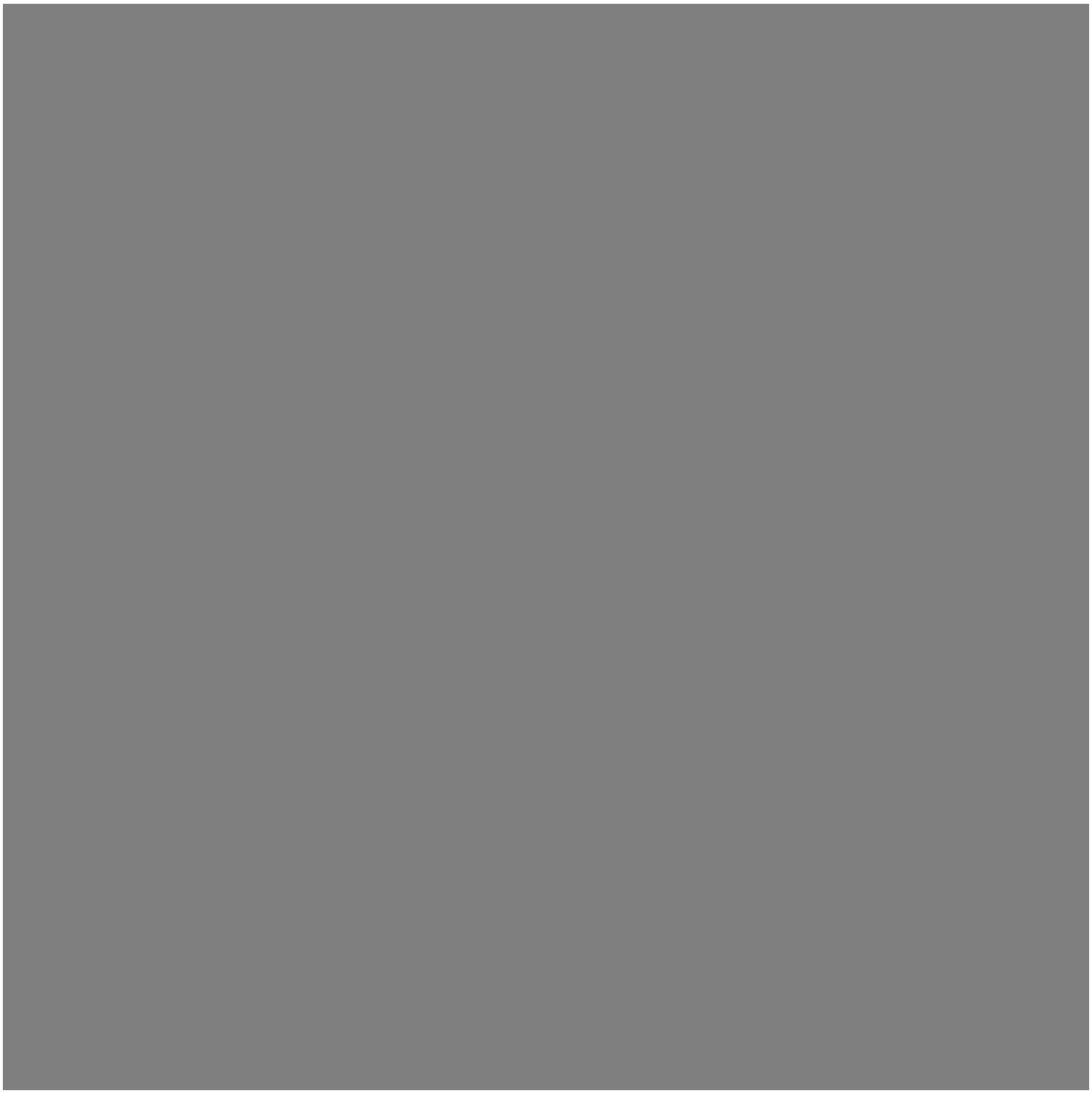


Figure 3-8 Residential and Care Center Humanitas in Netherlands
Source: Tiffany Jansen. CityLab
Illustration: Author

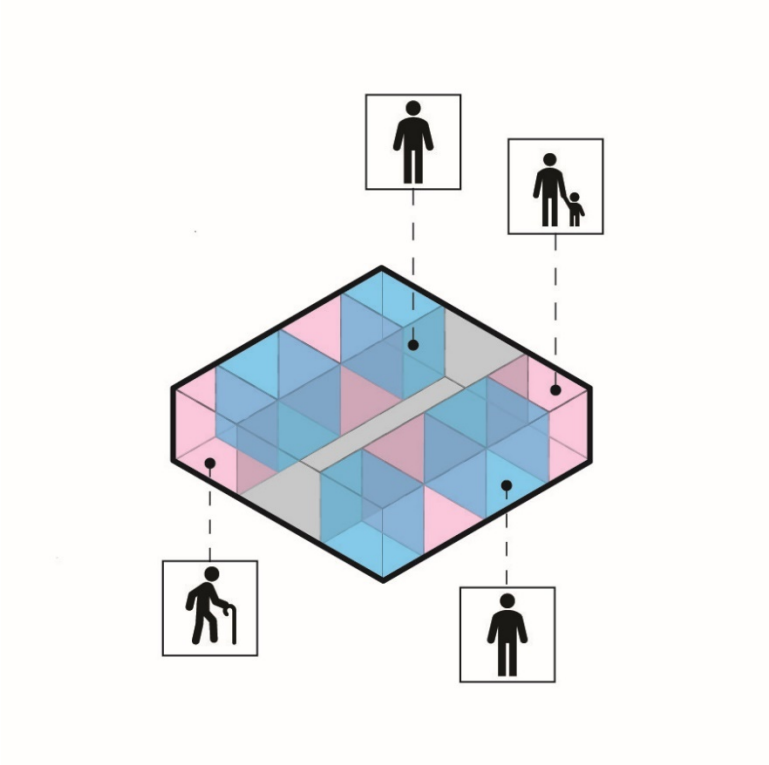


Figure 3-9 Communal Scheme: Micro apartments to emphasize common spaces
Illustration: Author

Communal

Communal is another concept that has implement generational living which creates a greater sense of community. The Collective Old Oak in London is one of the largest co-living building that is dominated in the urban setting of London. You are provided a bedroom, kitchenette, and a bathroom depending on your choice of room. The communal spaces such as the kitchens, dining, and entertainment spaces are largely focused and articulated in design. Within these cohousing communities, facilities such as a gym, retail outlets, restaurants and bar can also be included within the cohousing communities. The importance of these cohousing communities is to build up the collaboration and socialization within the residents to a healthy community. People that are interested in cohousing are people who want to remove the hassle of paying one bill that covers everything and

who feel a certain level of isolation and loneliness. The Collective in London is focused on creating spaces to generate possible experiences by redefining how people live, work, and play. With over 550 bedrooms, and so many services that hand, residents of the building will feel like they never have a reason to leave the building. Co-living offers people flexibility and convenience all within the same level while at the same time providing levels of privacy.[58] Each floor features one larger kitchen with a dining table, which is shared between 30-70 residences. While the Collective seems to gather more of an interest with younger professionals, the co-living environment is meant to be a non-commitment attitude. Today's generation is not inclined to commit in buying a mortgage, so co-housing is essentially a great alternative.[59]

[58] "World's Largest Co-Living Complex Promises Residents 'Everything at Their Fingertips,'" Dezeen, April 28, 2016, https://www.dezeen.com/2016/04/28/collective-old-oak-common-co-living-plp-architecture-willesden-junction-london-housing/.
[59] "What Is Co-Living? - The Collective," accessed April 5, 2018, https://www.thecollective.co.uk/coliving.

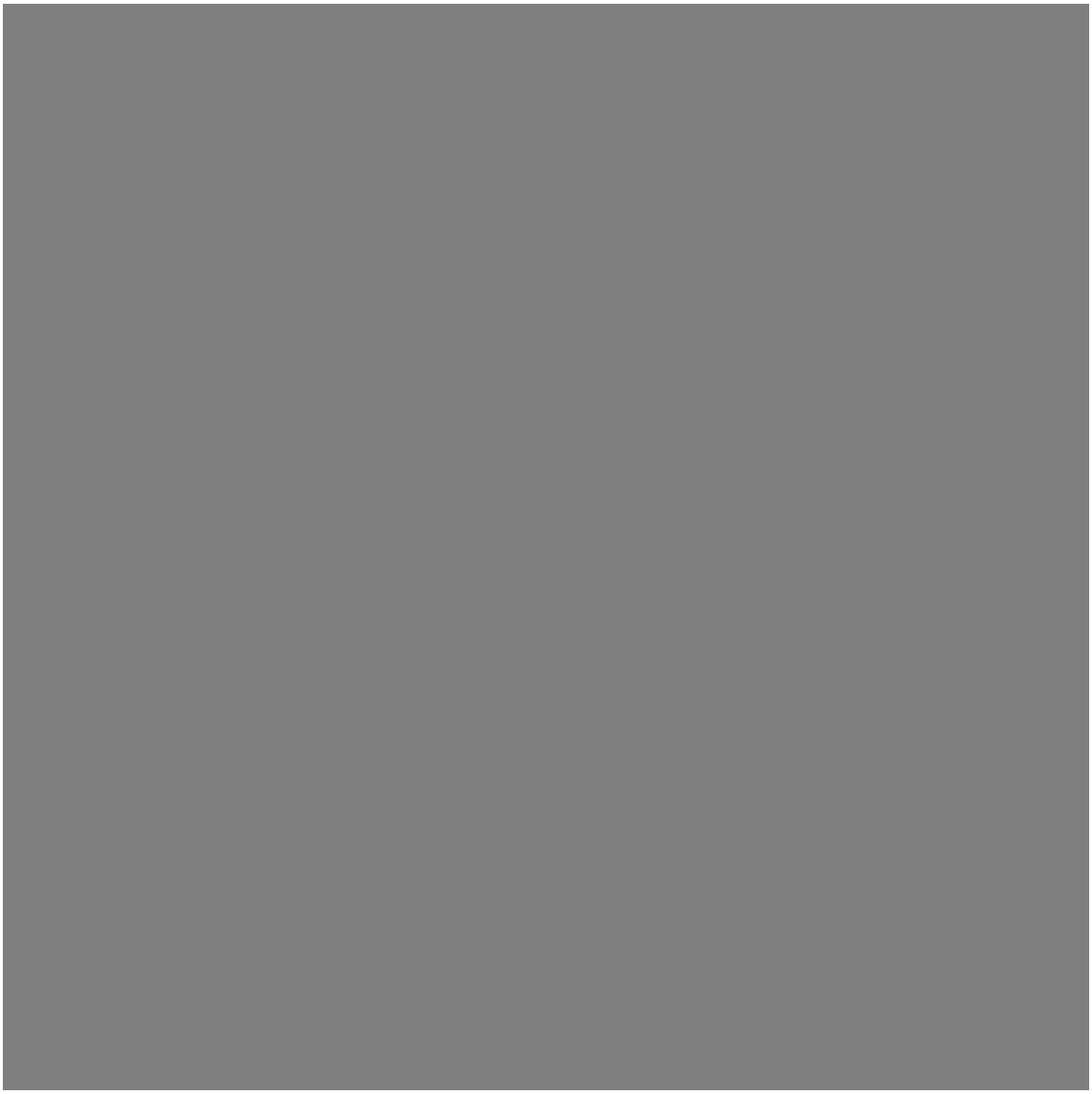


Figure 3-10 Old Oak Collective in London
Source: Jessica Mair. Dezeen
Illustration: Author

All schemes provide different alternative living solutions to live with not only different generations, but also establish social connectivity. Solutions explored attached and detached living with close proximities. The third and fourth scheme experimented with the idea of living with not necessarily strangers, but more like neighbors that share one building instead adjoining lots. Today the beneficial coexisting of different generations is becoming a popular focus for the planning of

urban quarters designed for all generations and is based on the idea that care facilities are not economically and socially sustainable solutions because of a lack of social resources, the rising old-age dependency ratio, and an insufficient network of infrastructure.[60]

3.3 Multigenerational Housing in Hawai‘i

As there have been multigenerational living solutions across the world, there have also been similar attempts in Hawai‘i. Whether these living alternatives have failed or succeeded remains to be a case for another argument. We also see Hawai‘i introducing similar aspects of multigenerational coexistence such as living under a single roof, as well as detached living situations in the form of Accessory Dwelling Units. Within the past we have seen settlement houses and its effects of generational housing, but we have also seen the recent years of the rise of monster houses surfacing on the Hawai‘i landscape. Settlement housing provide an important starting point as these facilities were the first forms of living that attempted to incorporate a sense of community to prevent social isolation especially as a time where large immigrant populations dominated the demographic landscape.

[60] Epimakhova, *Designing for Multigenerational Community: Creating a Supportive Environment for Young and Old in the U.S.A.*32

Settlement Housing

Figure 3-11 Palama Settlement
Source: Hawaii Community Foundation

Probably the first form of this situational living can be traced back to the tenement and settlement housing that first began in the 1800's. The main objective of these settlement houses such as the Palama Settlement in Kalihi were meant for people in poor urban areas, in which volunteer middle-class "settlement workers" would live, hoping to share knowledge and culture with, and alleviate the poverty of, their low-income neighbors. The "settlement houses" provided services such as daycare, education, and healthcare to improve the lives of the poor in these areas. Many immigrants lived in crowded and disease-ridden tenements, worked long hours, and lived in poverty. Children often worked to help support the family. Often perceived in small towns and neighborhoods as symptoms as well as causes of urban decay, dwellings designed for nontraditional households incite controversy among community members faced with the problem of balancing the desire to maintain neighborhood uniformity and the need to provide housing.[61] The conditions helped give birth to a social consciousness among liberal reform-minded groups and individuals. This

[61]Warren S. Nishimoto, "The Progressive Era and Hawaii: The Early History of Palama Settlement, 1896-1929," The Hawaiian Journal of History, 34 (2000).169

consciousness was a belief that industrialization had destroyed the fabric of community, causing alienation and hopelessness among individuals and families residing in slums.[62]The settlement housing had three objectives. First, was to implant the settlement in the geographic community. Second, the community life would prosper in the identification of the settlement house. And thirdly, the settlement was meant to be experimental, flexible, adapting to the changing needs of the programs in the community.

[62] Nishimoto "The Progressive Era and Hawaii: The Early History of Palama Settlement, 1896-1929,"., 170

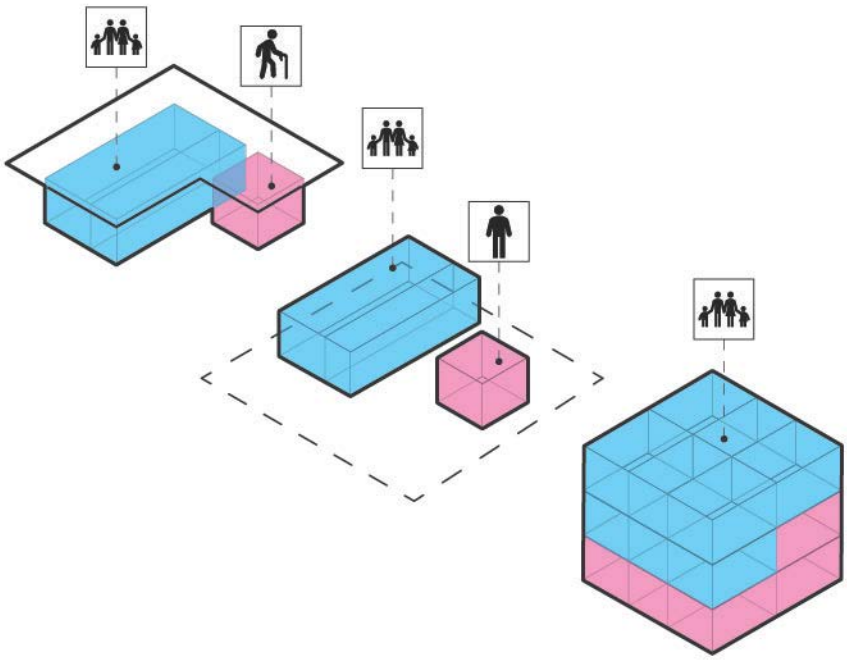


Figure 3-12 Multigenerational Housing Strategies
Illustration: Author

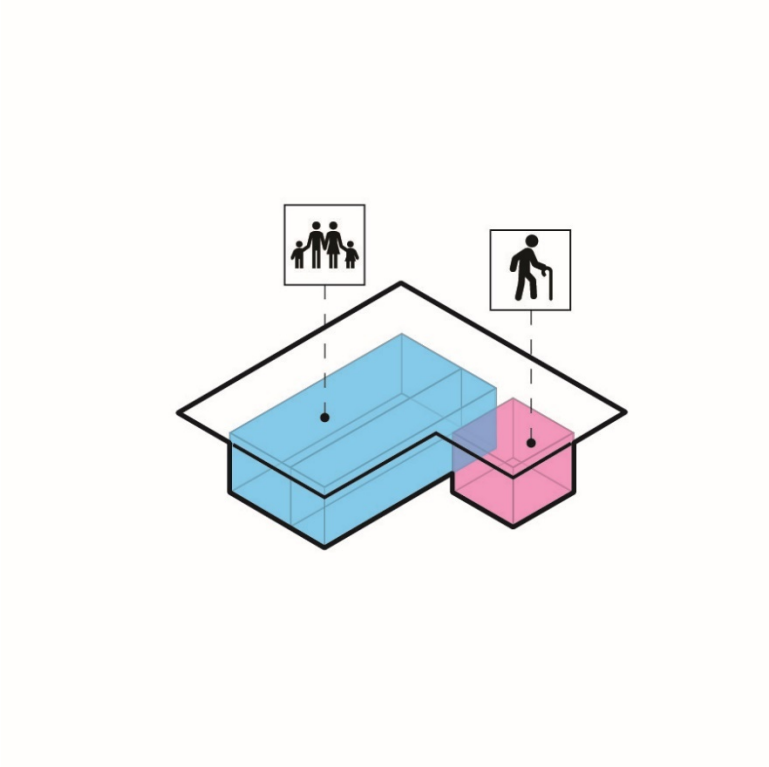


Figure 3-13 Ohana Zoning: Extended units attached under one roof
Illustration: Author

Ohana Zoning

The Ohana zoning ordinance was first introduced by Eileen Anderson in 1980 to address the housing crisis by assisting families in build individual living quarters while at the same time preserving the concept of extending family living.[63] Similar to the House Eichgraben project in Austria, there is a physical separation of the additional living quarters yet still maintain a close proximity within the site. The second dwelling can take the form of an attached or detached single-family home on an existing residential lot, provided that all building codes are met. The Ohana Zoning performed two

[63] "Accessory Dwelling Unit Homeowner's Handbook: A Guide for Homeowners on Oahu Interested in Building an Accessory Dwelling Unit" (Hawaii Applessed), accessed March 20, 2018, hawaiiadu.org.3

objectives; assist families in purchasing housing, and to encourage the preservation of the extended family.

One of the restrictions that the Ohana Zoning was that the extended portion of the residential dwelling was qualified for only related members to the owner of the main house to maintain the extended family structure. This however, was not the case anymore as unrelated residents can live in the attached dwelling via Accessory Dwelling Unit, which will be explain later. The restriction of the attached dwelling to only related family members increased the concept of generational living.[64] Provisions were then suggested that the extended family requirement be reinforced by only allowing related family members to live in the attached dwellings for at least several years, 5 years was the suggested example. If this requirement was satisfied, the owner would be allowed to have any resident, related or unrelated to dwell in the attached dwelling.[65] This prerequisite preserved the intentions of the Ohana Zoning of being meant to multigenerational living.

[64] Shidaki, *Multigenerational Living in the Urban High-Rise: Designing for Hawaii's Extended Family*.40
[65] "Accessory Dwelling Unit Homeowner's Handbook: A Guide for Homeowners on Oahu Interested in Building an Accessory Dwelling Unit."3

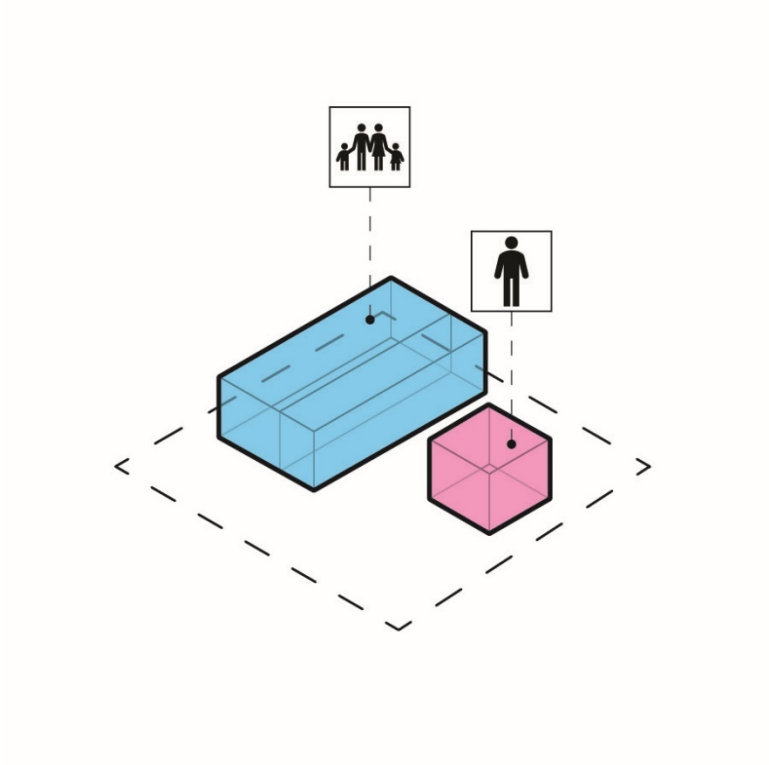


Figure 3-14 ADU: detached from the main dwelling
Illustration: Author

Accessory Dwelling Units

Accessory Dwelling Units are also another recent alternative to multigenerational living. Ohana units which were adopted in 2015 by the City and County of Honolulu by Mayor Kirk Caldwell.[66] Ohana units need to be attached to the existing roof where an Accessory Dwelling Unit can stand as a separate unit on the site. Additionally, homeowners that want to pursue the construction of an Ohana Unit must sign a covenant agreement to only rent the Ohana unit to a related family member whether by blood, adoption, or marriage by the Building Department. While the Ohana unit has a living space with an attached wet bar, an Accessory Dwelling Unit (ADU) is

[66] "The Ohana Unit versus the ADU," *Architect Honolulu, Hawaii Home Planning, Architectural Services Oahu* (blog), June 17, 2016, http://www.architecthonolulu.com/ohana-unit-versus-adu/.

equipped with a living space, a full kitchen, and a bath. ADU units must include a sink, stovetop range and refrigerator, with separate attached water and sewer lines. ADU must also have a separate access from the street apart from the main dwelling unit and have its own parking space.[67] Strong preferences for Ohana Units and ADU have been shown for many multigenerational households in Hawaii as they have given many families an economical and viable option for affordable living.

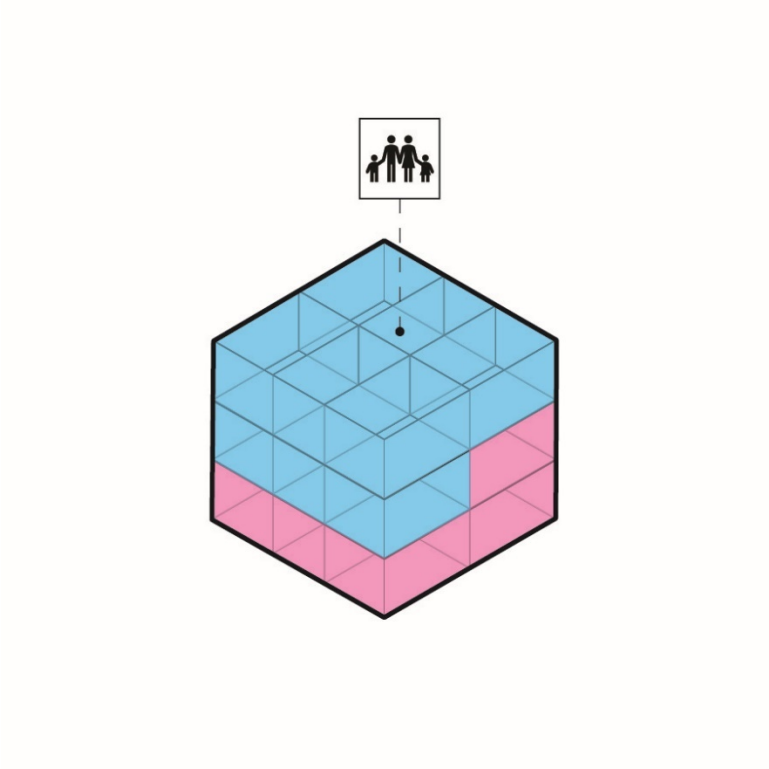


Figure 3-15 Monster Houses: High density single-family dwellings
Illustration: Author

Monster Houses

In more recent news, the sprawling of what the state of Hawai‘i calls “Monster Houses” have raised concerns of neighbors. Neighbors of these “monster home” properties are dealing with houses

[67] “Accessory Dwelling Unit Homeowner’s Handbook: A Guide for Homeowners on Oahu Interested in Building an Accessory Dwelling Unit.” 18

that are nearly three stories tall which could account for 16 bedrooms, 11 bathrooms, and numerous wet bars. Technically, these buildings are large residential structures which is defined by having more than 8 bedrooms. The problems of these houses are that it obstructs the pristine views of the mountains and the oceans, need for additional parking in these large houses, and the massive and enormous size of these houses. Nevertheless, these properties are all legal if all the residents in the house are all family members and not rented to anyone that is not related to the property owner.[68]

Figure 3-16 Monster House in Kalihi
Source: hawaiinewsnow.com

Hawai‘i is saturated with families that value family and the attempts of Ohana Zoning, and Accessory are evident. However, Hawai‘i has also taken unfortunate directions to multigenerational housing when houses become inappropriate to the surrounding context via these monster houses. These three strategies do give a starting point to analyze as to how multigenerational living in Hawai‘i can be approached.

[68] “Monster Homes Are Gobbling up Communities — and It’s All Legal - Hawaii News Now - KGMB and KHNL,” accessed March 20, 2018, http://www.hawaiinewsnow.com/story/36640245/monster-homes-are-gobbling-up-oahu-neighborhoods-and-its-all-legal.

3.4 Conclusion

Multigenerational living existed as early as primitive villages, as the early days emphasized community integrated living environments. Multigenerational living is not something new. Multigenerational living serves it purpose as it financial and socially benefits each generation. Elderly are not socially isolated and are given responsibilities are secondary domestic providers to their grandchildren, while the grandchildren benefit by receiving additional care and being taught important values. Parents are left with less burden financially and socially to their children as they can focus their career and provide the bulk of the financial need of the family.

Researched are several schemes as to how different generations can coexist to prevent social isolation with various levels of social interactions. Previous precedents have shown that there have been attempts for multigenerational living through attached and detached residential living scales, as well as larger urban situations as mentioned in projects like the elderly housing in Netherlands and cohousing in London. In Hawai‘i’s case, settlement housings were a partial solution to overcrowding while trying to attain a sense of community. Today’s Hawai‘i regulations seem to address multigenerational living through Ohana Units and Accessory Dwelling Units as they have tried to address Hawai‘i’s own housing shortage. However, more recently, intrusive monster homes are killing views and have upset the neighbors. Despite that multigenerational living has shared a long history, it is imperative to understand the design outcomes that best situate each generation to create a built environment so desperately needed for Hawai‘i’s housing shortage.

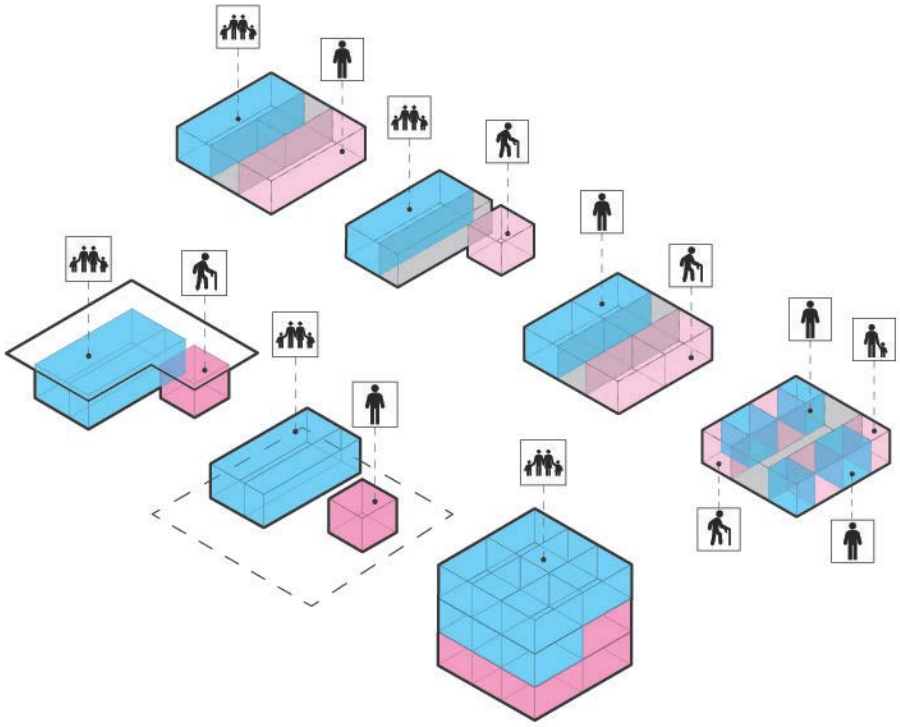
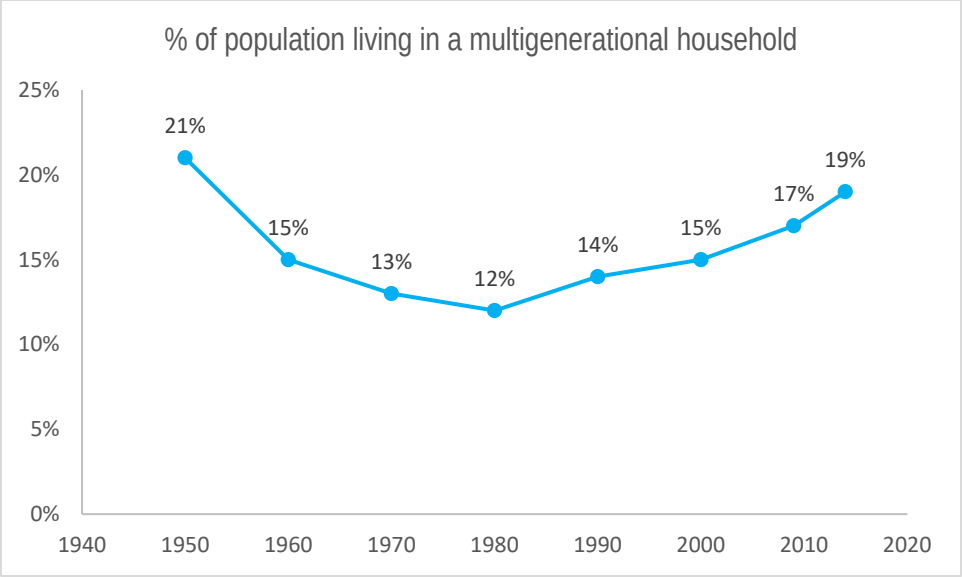


Figure 3-17 Composite of different schemes to generational living
Illustration: Author

4| Housing the Mid-Rise Building

Hawai‘i is a growing population with a housing demand crisis that has labeled Hawai‘i as one of the most expensive states to live in. In 2014, nearly 19% of families in the United States are multigenerational families or with families with two or more adult generations. [69] While multigenerational families continue to rise, there must be an effective solution to add density while reflecting a demographic appropriate to the present social dynamics. An argument in this chapter will evaluated the three levels of development from low -mid -high rise and conclude with a decision appropriate for Hawai‘i. To make a strong argument of the chosen development, an analysis into following precedents in the suggested development housing in multigenerational living situations will be evaluated, along with an evaluation of a current outlook of Hawai‘i’s development. The concluded development typology to address multigenerational living will then proceed to create design outcomes and guidelines as the basis for the conceptual design as the end product of this dissertation paper.

[69] Cohn and Passel, “A Record 60.6 Million Americans Live in Multigenerational Households.”



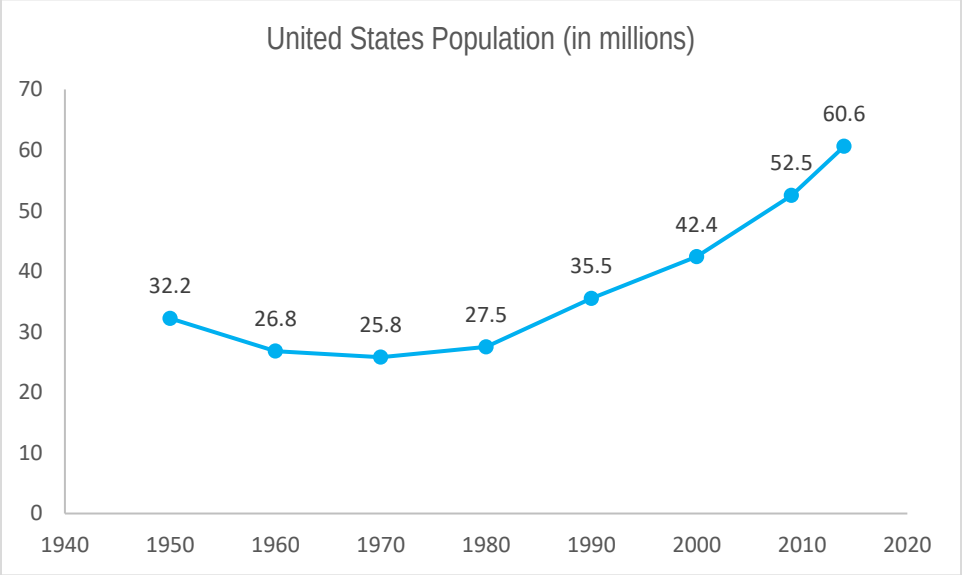


Figure 4-1 Growing trend in multigeneration families
Source: pewresearch
Illustration: Author

4.1 Low – Mid – High Rise

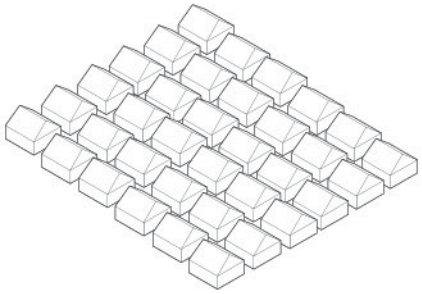


Figure 4-2 Low-Rise Housing
Illustration: Author

Low Rise Development

Upholding the lifestyle of an American in the mid-twentieth century meant you were able to own a car.[70] Our dependency of our cars in every aspect of our daily lives has drastically changed the way we have lived as Americans. The lifestyles that has been upon us Americans can be traced during the Industrial Era where media played an important role to the imagery of the ideal American traditional family. The prerequisites of being labeled an American family was to own a car with our own white-picket fenced house surrounded by a private backyard. Cars brought about freedom in paralleled with the freedom culture that every American wished to achieve.

The origin of the urban sprawl was to mitigate the population density by gradually softening development outside the city center. As the center of the city would urbanize and population increase,

[70] James Howard Kunsler, *Home from Nowhere* (Touchstone, 1996)., 58

the urban fabric could not simply handle the demands of urban density. However, due the growing economics of these urbanized cities, the radial growth of the infrastructure network allowed for growth outside of the city center bounds. As public transportation and the development of the car became of high demand, it was easy for people to commute to and from the house to the middle of the city to work. London was a city that experience urban growth during the 19th century and felt the first effects of urban sprawl as the city center was overcrowded and unsanitary. With the development of the railway, urban growth around the city began to catalyze.[71]

As a result, the urban sprawl shifted and expanded the human population away from central urban areas via low-density communities. Like mass production of the automobile, mass production of houses opened the way towards urban sprawl and the creations of subdivisions. The strategy to create single-dwellings led to the dependency of cars as automobiles, emphasizing the values of freedom and privacy. As the continued reliance of the car increases, so does the laziness of being healthy reflect a similar situation. In a sprawl environment, facilities require the use of a car which leads to little incentive to practice any physical activities. The visual result has led to carbon emissions but also poor physical health.[72]

Nevertheless, urban sprawl showed little support as negative connotations persists. Urban sprawl results in land loss and reduction of diversity. Because of its low-rise high-density growth, precious land is taken away. Sprawling suburban areas demand for larger areas to be consumed when compared to other levels of development. With its mass development, and fast production, single-family dwelling lack diversity. This monotonous type of building results in poor living qualities and does not invigorate any sense of community or healthy living. Like nature, nature is a well-built

[71] Ken Snyder and Lori Bird, "Paying the Costs of Sprawl," Impact Fees, December 1998, 10
[72] Kunsler, *Home from Nowhere*. 58

cohesive system that thrives due to its biodiversity, something completely absents from an urban sprawl.

Infrastructure has also been affected in urban sprawl as the need for sewer, highways, parking, water, electricity all add up. Providing services such those mentioned earlier are also more expensive per household in less dense areas as infrastructure continues to be spread out thin. And because people in urban sprawled areas are so dependent of the cars, this allows for casual driving to any basic services which then results into more infrastructures. Residents of low-density areas spend a higher proportion of their income on transportation than residents of high density areas.[73] This eventually all adds up to costs and payments.

Single family dwellings are not the only form of low density development. Low-rise apartments may not offer as much luxury as high-rise apartments, but they are usually cheaper to rent, and the price is often negotiable. Residents in low-rise apartments tend to be older, which means you will enjoy less noise, fewer parties and a cleaner environment. Low-rise apartment complexes are usually located in quieter, residential areas, thus offering more privacy. In addition, low-rise apartments are closer to the public street, which means that you will spend less time going from your home to your car or public transportation.

Low-rise apartments can be further from downtown areas, which could mean a longer commute. Because there are fewer units available, you won't have as much variety, and most units come without extra appliances or furniture. In some cases, you may also find that you must set up your own phone, internet, cable, and utility services, as landlords are unlikely to do this for you. Furthermore, low-rise complexes aren't as luxurious, and very few will include extra amenities like

[73] Ken Snyder and Lori Bird, “Paying the Costs of Sprawl,” Impact Fees, December 1998, 4

gardens, pools, fitness centers or laundry facilities. Finally, supervisors and property managers rarely live in the building, and you may not have your own parking space.[74]

Figure 4-3 High Rise tower
Illustration: Author

High Rise Development

High Rise housing can be loosely defined for having floors beyond 12 stories. These grand structures tend to be the direct answer towards creating housing density. However, high-rise buildings are creating a social discourse in the inability for livability. The ability of interaction with the human individual and the street has faded away. High rises are so tall that they make no visual sense to a pedestrian at eye-level. Living in high rises creates a very finite and encapsulated world in of itself with the individual. This liveliness has depleted any chance of propinquity.[75] Tall buildings never can address a diversity of needs and people. As tall buildings begin to inflate prices of construction,

[74] Snyder and Bird. 13
[75] "7 Reasons Why High-Rises Kill Livability | Smart Cities Dive," accessed April 5, 2018, https://www.smartcitiesdive.com/ex/sustainablecitiescollective/7-reasons-why-high-rises-kill-livability/561536/.

the resulting effect leads to luxury units, allowing the rich to only benefit. Therefore, we must be careful that these buildings be the only answer to density and housing.

It wasn't until the 1930s when a lack of sufficient and adequate housing became apparent, but the situation had not become more apparent until the aftermath of the second World War which destroyed homes and damaged the infrastructure. By the 1950s, the demand for more housing stock further increased due to the "baby boom" as population further increased. The high-rise blocks soon became the solution to the housing crisis demand. Much of the early years of high-rise housing were characterized by early forms of mass production. The high-rise housing building became the epitome building of this decade.[76]

Regardless, high rise buildings are here to stay due to the symbolism of status and success. Every country cannot ignore the results of the post-war and the need of mass housing.[77] The origin of the high-rise dates to the second half of the 19th century after World War II. The introduction of mass industrialization resulted in mass urbanization. Most of Europe's high rising came during the 1960's. It was in Ebenezer Howard 's influential 1898 plan for a "Garden City" which established the principles of combining the best of "town' and 'country' in a small and low-density developments away from the over-crowded city. The 1920s and 1930 became the first response to the European housing due to excessive amounts of unregulated urbanization. And it was not until the 1930 when Le Corbusier introduced Villa Radieuse (The Radiant City) which attempted to solve the universal problem of housing.[78] By the 1960's the need for high-rise housing was highly influenced by a series of motives.

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[76] Han Meyer and Daan Zandbelt, eds., *High-Rise and the Sustainable City* (Amsterdam: Techne Press, 2012). 32
[77] Richard Turkington, ed., *High-Rise Housing in Europe: Current Trends and Future Prospects*, Housing and Urban Policy Studies 28 (Delft: DUP Sience, 2004).
[78] Ibid

1. The need to solve long standing housing shortages
2. The development of innovative technologies
3. A confidence in "modern architecture" to reach a more just and fair society
4. A desire to protect the countryside from mass development
5. The demand for improved standard of living
6. Competition between municipal authorities in the provision of modern housing
7. The support of governments for radical solutions to meeting housing problems

While the first motive is evident, the other motive seems to require additional explanation. Because of the exponential growth of population, there was a need to develop construction techniques with concrete, which at that time was the preferred material.[79] Concrete could use large prefabricated components, use housing factories on site and the rationalization of the building process all made high-rise technically possible. The possibility of creating homes through prefabrication reinforced the view that every social problem had a technical solution.

The third motive for modernism architecture was to be applied in housing projects which could deliver a more equal and fair society. High-rise housing would lead to a powerful expression of the belief that social development could be controlled more effectively than ever before. The forth motive for building high-rise was to keep and preserve the natural beauty of the lands and to consolidate the high-density housing in the city to prevent the urban sprawl. The argument is that high-rise density would be able to meet the same demands of low-rise density while being able to provide small gardens and providing everyone with privacy and more open spaces. The high-rise development also prevented people from living a secluded and petite bourgeois lifestyle. The fifth

[79] Ibid

motive was to improve the overall standard of health by providing centralized amenities and services easily accessible to people. The 1960's provided high-rise flats for the luxurious. At that time, the modern amenities were hot and cold-water supply, central heating, and a rubbish disposal system. Collective amenities also provided childcare, laundry, shopping provisions and recreation facilities as these amenities were all intended to increase the standard of living so that people felt content and comfortable. [80]

High-rise buildings were also symbolic of the progressiveness and status of a city. High-rise blocks could be used as landmarks to reflect a town's progressive urbanism and modernity. The seventh and final motive of high-rise housing was the stimulus and support provided by national governments. In Britain, high-rise construction was associated with slum clearance, the government provided therefore additional subsidies to support the cost of construction.[81]

The high-rise housing development provides a type of construction, an increase of efficiency of time it takes to construct, as well as the use of prefabricated construction to produce uniform standards. Another outcome of the high-rise housing were the communal areas. Development of the high-rise housing created halls, corridors, lifts, refuse disposal areas, etc. The use and sharing of such communal spaces was based on high expectations of people's mutual and collective behavior. There communal spaces and systems were designed to alleviate most of the people's needs in an efficient manner. However, the high-rise housing final outcome or feature was its solution to the social sector to house working-class families. As the concept of social housing did not exist in Central and Eastern Europe, all high-rise housings were created and planned for all class of people. High-

[80] Ibid
[81] High rise in europe

rise housing represented the ideal housing of its era or modern dwelling which developed spacious, comfortable, well-designed, and suitably located buildings.[82]

High rise buildings are not going away and will remain a part of any growing progressive country. Not one country can deny the results of the post-war and its need for mass housing. High rise housing has come to the development pattern of being the most visible and uniform slab building product since the post war in the 1960s. High rise living has now become the norm. 6 million people live in high-rise housing in a majority of Europe, a further 34 million people live in large prefabricated estates of at least 2,500 dwellings, in which high-rise blocks are typical.[83]

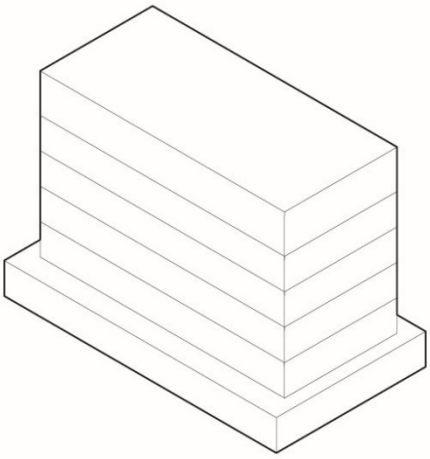


Figure 4-4 Mid-Rise Typology
Illustration: Author

[82] Ibid
[83] Meyer and Zandbelt, *High-Rise and the Sustainable City*. 33

The Mid-Rise Development

For purpose of this dissertation, the proposal is a little bit of moderation from the low-rise typology and the high-rise typology. The mid-rise development is something in between, where the typology hasn't been fully explored much in the United States. A developing city can at points be overwhelmed with the urban context while at the same time design with the comfort of the human pedestrian in mind. The mid-rise typology incorporates density and neighborhood environment as a viable solution to housing demands. The neighborhood feeling that walk-up apartments and mid-rise buildings provide is at a comfortable human scale. Proximity and needs of services for the walking human add to the human scale as parks, schools, food, and grocery stores are just walking distances apart. Mid-rise buildings let the limits of human movement dictate the size and proportions of design; the scale in which begins to feel human.

"*.. where entire blocks of walk-up apartments have been preserved, the human scale provides an amazing and welcome contrast to the soaring, elevator-towers that cover much of the rest of the island. You immediately sense how the heights of the buildings are in harmony with the width of the street. The materials are warm and natural, and, on the Avenues and major streets, the sidewalks are lined with small shops and restaurants. While walking, you have the sense that you "fit." It's not unlike retrieving your jacket after having mistakenly slipped into someone else's that was several sizes too large. It just feels right..."*[84]

[84] Robert Freedman, "Mid-Rise: Density at a Human Scale," Planetizen - Urban Planning News, Jobs, and Education, March 12, 2014, https://www.planetizen.com/node/67761.

The first approach to this argument is to define the characteristics and components of a mid-rise building. A Mid-rise building is the in between of a residential house and a skyscraper tower. Mid-rise building maximizes the height and density of the urban context while at the same time, provide sunlight into the apartments and continue to provide views into the street so that the feel of a neighborhood is achieved. Merriam Webster defines a mid-rise building of 4-11 stories in height.[85] A low-rise typological building ranges from a one story single dwelling house up to low-rise apartment with a maximum of 4 stories; synonymous to walk-up apartments. On the other side of the spectrum is the high-rise building which consists of 12 of more stories. Usually the height of these mid-rise buildings equates to the adjacent width of the streets including the sidewalks. Five hours of minimum sunlight per day are integrates into the design of these buildings. The benefits to these mid-rise building is their ability to preserve a neighborhood feeling due to providing a similar urban scale without being too out of context and scale when compares to high-rise buildings.[86] Like many mix-used buildings, mid-rise housing offers a ground level function of office and retail. The podium is essentially designed to occupy pharmacy stores, retail, grocery stores, and restaurants. The upper tiers of the building are then allocated mainly as apartments and residential units, but also at times, office space.

According to *why Density?* by a+t Research Group, the author makes the argument for mid-rise buildings. Density is typically measured in a ratio of the number of dwellings per the floor area. Instead, Floor Area Ratio is a better indicator of density as the uses of volumes periodically change.[87] For the case of the research, nine generic typological urban form solutions were evaluated based on their density and two other factors. Coverage; the relationship between the Covered Area on the plot

[85] "Definition of MID-RISE," accessed April 5, 2018, https://www.merriam-webster.com/dictionary/mid-rise.
[86] Freedman, "Mid-Rise."
[87] A+T Research Group, ed., *Why Density? Debunking the Myth of the Cubic Watermelon* (Vitoria-Gasteiz: A+T Architecture Publisher, 2015)., 58

and the Total Area of the plot. Second in the Height Index; a ration of the Floor Area Ratio and Coverage factor. Like the average height of a building, the Height Index is the dividend of dividing the Gross Floor Area buy the covered area on the plot. These three measurable factors determine the balance of densifying the urban form with the integration of the public social interactions.[88]

Floor Area Ratio (FAR) should then be utilized as an indicator for density. A well balanced urban form of solids and voids enriches the context with the built form.[89] High density does not always mean high rise. All types of the urban form were dominated by the same floor area of 100 square meters. Of the urban forms that were analyzed, the single-family houses represented the least dense development based on is FAR while underperforming the balance of coverage by providing one of the least amount of public and open spaces within the plot. To achieve a balance of building and the urban fabric, the author recommends that the coverage index fall short and below 0.50. The intensity and the density of the urban fabric is suggested to include an FAR of around 3.00. The author concluded that the best approach to creating an environment where the benefits of a compact city are utilized by focusing of the med-rise typology buildings as it produces the most integrated and well-balanced environment.

If the answer lies within the mid-rise development, we must then understand the objectives the mid-rise should solve towards the shortcomings of the low-rise sprawl and the high-rise towers.

[88] Ibid
[89] Ibid

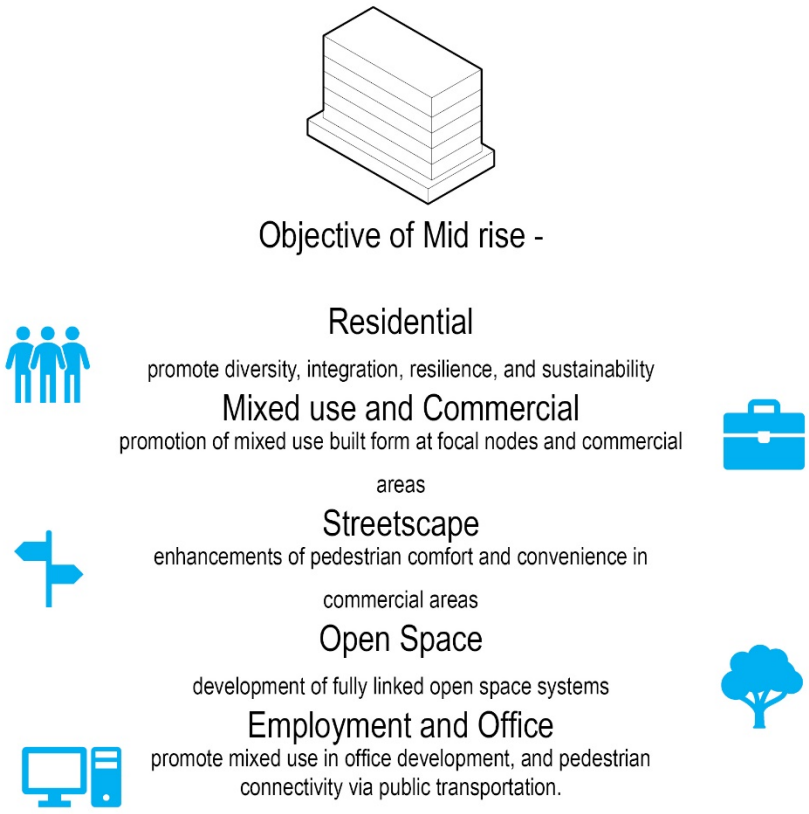


Figure 4-5 Objectives of the Mid-Rise Building
Source: Urban Design Objectives
Illustration: Author

On a residential scale, the mid-rise building promotes diversity through a range of housing types and densities. The integration of higher density and mixed-use spaces is possible through a mid-rise building. The built form of the mid-rise also allows for better reflection of regional and local context as the scale of the architecture components become relatively accessible by humans

physically and visually as people don't feel a sense of disconnect with the built environment.[90] Connectivity with the street and reinforcement of the pedestrian streetscape is made possible because the human activity is scaled appropriately with the built form.

Incorporation of the mixed-use spaces and commercial spaces within the mid-rise delivers livability and support for residents. Promotion of mixed use occupancies continues the built form at focal nodes and commercial areas. The streets are mixed with retail. Pedestrians become enhanced and commercial areas feel more convenient for people.[91] Mid rises are also able to minimize the impact of parking as you are not forces to traverse through a flat lot of parking spaces or through a confusing maze of a gigantic parking structure.

Connected streets within a mid-rise building also provide solutions to vitality and density. For mid-rise buildings, connected street systems mean visual connection and attractiveness of the individual with the buildings. Again, the enhancement of pedestrian and convenience are within the scale and scope of the mid-rise. A connected street is then a reflection of variety in the local context and regional character of the place. At the street level, enhancements of community identity and the sense of community is further reinforced.

With open spaces, mid-rise buildings are the best solution. Mid-rise buildings still allow for fully linked open space systems. A full range of open spaces include natural lands, parks, parkettes, pedestrian links, and trail systems. Because mid-rise buildings do not prohibit much of these open spaces, enhancement of views to and from the open spaces are possible. Sustainable vegetation and design of the open space are also possible due to emphasis of a community scale that drives

[90] Joseph Bogdon, "Urban Design Objectives," n.d., http://www.eastgwillimbury.ca/Assets/3+2015+Services/1.1+Planning/Bogdan+May+5+Pres.pdf.
[91] Ibid

the individual to participate.[92] Mid-rise buildings eliminate the amount of time for an individual to take the lift of a high rise as well as the need to use a car to drive to a park. Open spaces in a mid-rise building become the most accessible.

The last objective of employment and office also eases the burden of the individual with the need to commute to work. Mid-rise buildings establish a distinct, attractive, prestigious business image, It promotes high quality streetscapes, mixed-use office development at nodes, and pedestrian connectivity and access to amenities. In terms of transportation, the individual has little reliance on the car and has the opportunity to promote public transportation such as the bus or bicycling.[93]

However, there have become some certain shortcomings that have given the mid-rise building difficulty for developers. One of the struggles for mid-rises is the financial perspective that developers are always looking for the best profit while the same amenities are required for a high-rise. In this perspective, bigger is better. Parking also becomes an issue as people expect a parking space for their unit or business as the needs and regulations for parking differs between Europe and United States. A society far too dependent on the personal car to take the individual to places. Mid-rises also have a difficulty with regulations of their neighbors. Usual requirements instruct for buildings to taper off a 45-degree vertically as the building reaches certain heights which cut back on adding more units.[94] So, while these shortcomings have hindered the growth of mid-rises, smart planning and changing perceptions of the policies and regulations could make a viable option for building mid-rises.

[92] Ibid
[93] Ibid
[94] Ibid

The mid-rise building bolsters many benefits that range from cost efficiency, human connectivity, and the drive of technology. Due to the scale of these mid-rise projects, the cost does not restrict itself to high construction and therefore monopolizing towards the rich. The mid-rise building as mentioned numerous times, creates the best scale from humans to interact with one another, while at the same time, within the community, and the built environment. Additionally, with the introduction of newer technology with low-rise and high-rise typologies, engineered wood has become a popular choice in the mid-rise housing typology. Wood construction has multiple green benefits and as well as health benefits. Wood has less embodied energy and has a high life-cycle energy use. The construction methods of engineered wood also demonstrate practical innovations which has led towards cost efficiency.[95] The table below shows the comparison within the three developments based on certain categories to illustrate the pros and cons of each development. The argument for a mid-rise multigenerational housing has shown that it is beneficial while at the same time meeting the demands for needed density.

[95] Lisa Podesto, "Maximizing Value with Mid-Rise Construction," 2015, 12.

Table 0-1 Low-Mid-High Typology Development Comparison
Illustration: Author

	Origin	Development and Characteristics	Problem/ Shortcomings	Technology	Objective
Low-Rise	• car dependency • density relief of the urban city • 1920's	• single-dwelling houses • subdivisions • gentrification • 2-3 story low-rise apartments • tenement/ settlement housing	• more need of infrastructure • lack of neighborhood interaction • commute time • lack of family interaction • lack of diversity	• prefabrication • standardization	• less noise • peaceful • privacy • cheaperoptions • housing shortage • technology development
Mid-Rise	• 1960's	• 4-12 stories • optional podium ground level	• financial • parking • surrounding context regulations	• concrete and steel • mass engineered timber	• human scale • neighborhood interactivity • mixed use development • diversity
High-Rise	• density relief of the urban city • 1950's in Europe	• +12 stories • steel and concrete structures • podium ground level	• poor street connection • separation from the society • lack of human scale • lack of diversity	• steel and glass fabrication • HVAC	• housing shortage • technology development • desire to protect countryside • improved standard of living

4.2 Mid-Rise Housing Precedents

Now that the case for a mid-rise is established, the objective in the following section is to learn from following precedents get a better understanding of the mid-rise building context. The lessons learned from this section, along with a literature review hopes to create principles and guidelines that incorporate a community sense of place, that is connected to the street with the human individual, but as well integrate all age groups to cohesively live to together that ultimately creates a resilient multigenerational community. The following precedents will investigate specific

projects in Europe with respects to FAR, Coverage Factor, and the previously mentioned Mid-Rise Objectives as the works and projects have already explored this changing typology.

Figure 4-6 The Whale in Netherlands
Source: Archdaily

High density yet mid-rise dwellings have shown to effective in Europe. The Whale by the firm de Architeckten Cie is one of the three "meteorites" that mark the area as the mid-rise dwelling; flanked on both sides with low-rise row house blocks. With a footprint of 100m x 50m, the Whale is houses over 200 dwelling units, 180 parking stalls, and other retail and office spaces. Prominent features of the are its direct access of lifts and stairs from the street level, its open corridors along the interior of the building form, and the profile roof lines that are in correspondence of the position of the sun to allow the lofted portions of the building on the street level to receive more ample sunlight. The Coverage measures at 0.42 while the FAR indicates a density of 3.86.[96] The coverage indicates

[96] "Case Study #4 | The Whale," *MAS CONTEXT* (blog), December 22, 2009, http://www.mascontext.com/issues/4-living-winter-09/case-study-4-the-whale/.

strong connection between the building block. Its strongest feature of the building is the ability to maintain a human scale and interaction with the urban context by allowing a more porous connection with the ground floor level.

Figure 4-7 The Silodam in Amsterdam
Source: dezeen.com

The Silodam by MVRD achieves a diverse community by housing a big variety of different spatial qualities and different housing types due to a fast-changing housing market. The diverse housing types is reflected on the façade of the building as the façade takes on the similar diverse qualities. As a counterbalance to the increasing individuality, the housing types were put together in a small neighborhood. The groups of 4-8 houses are equal and can be recognized on the façade. The mixed program provides 160 different units ranging from apartments, offices, work spaces, commercial and public spaces in a 11-story building within a 20m wide building envelope. The

various apartments included units with opposing views on each side of the waterfront, double-height apartment, apartments with panoramic views and apartments with patios. It became a container of houses, literally interpreting the surrounding harbor. Adding a 21st-century silo of houses to the adjacent 19th- and 20th-century silos.[97]

Figure 4-8 Mountain Dwellings in Copenhagen
Source: archdaily

What if the parking area became the base upon which the place terraced housing? Rather than doing two separate buildings next to each other – a parking and a housing block, the architect decided to merge the two functions into a symbiotic relationship. The program is 2/3 car park and 1/3 living. The number of dwellings is 83 units as the parking consists of 480 parking spaces. Rather than doing two separate buildings of a car park and a housing block, both functions become one transforms into a concrete hillside covered by a thin layer of housing of 11 stories. The parking area needs to be connected to the street, and the homes require sunlight, fresh air and views, thus all

[97] "MVRDV's Silodam Combined Housing Typologies Says de Vries," Dezeen, July 28, 2015, https://www.dezeen.com/2015/07/28/silodam-mvrdv-housing-amsterdam-harbour-movie-nathalie-de-vries/.

apartments have roof gardens facing the sun, amazing views and parking on the 10th floor. The Mountain Dwellings appear as a suburban neighborhood of garden homes flowing over a 10-storey building - suburban living with urban density. The building is still appropriated with a human scale even with the blending presence of car and housing.[98]

[98] "Mountain Dwellings / PLOT = BIG + JDS | ArchDaily," accessed April 5, 2018, https://www.archdaily.com/15022/mountain-dwellings-big.

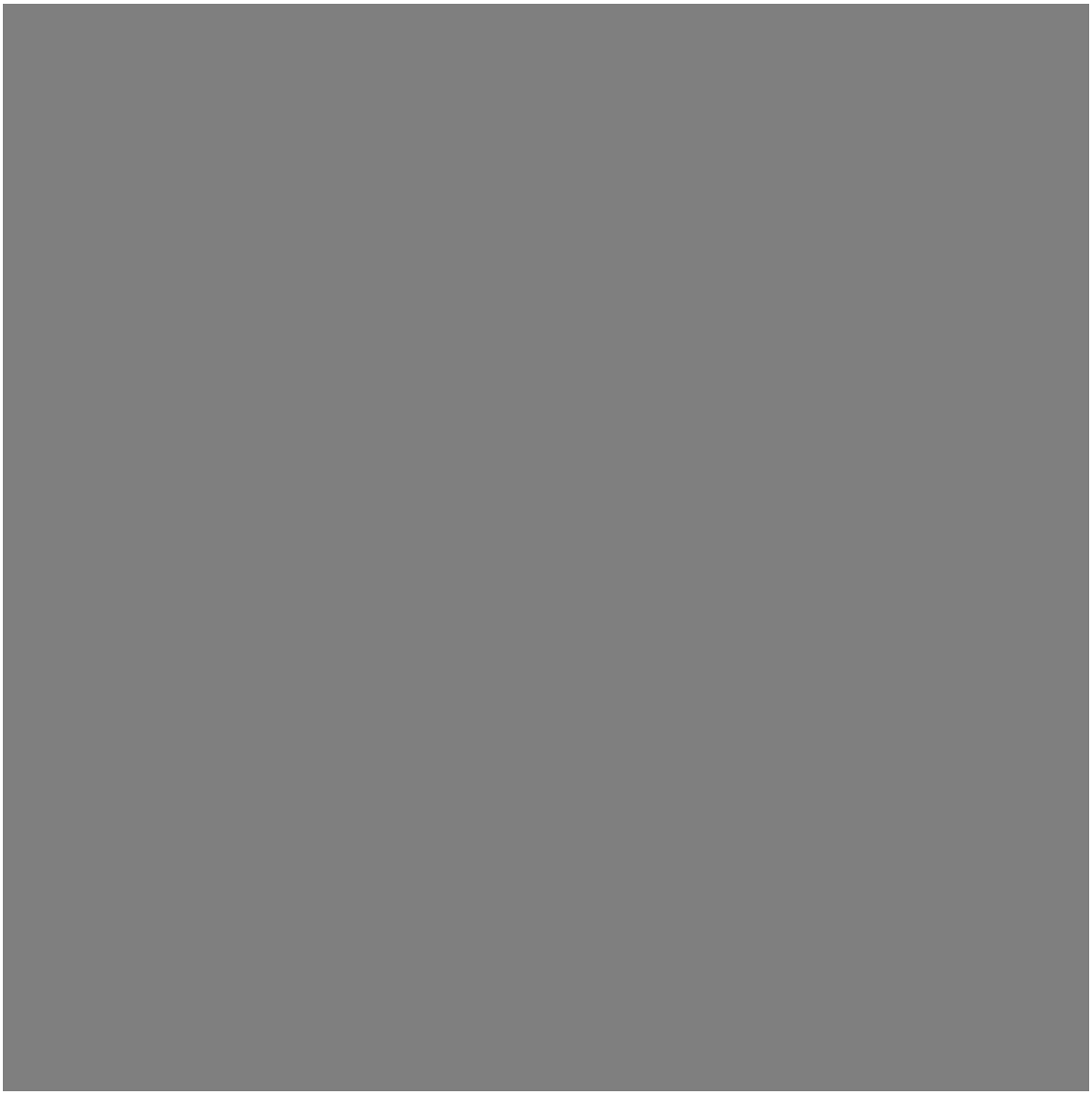


Figure 4-9 Precedent Comparison
Illustration: Author

These precedents have shown that scale within the street level, diversity in function, and the natural and vehicular forces are still applicable to the mid-rise typology, but at a scale appropriate for a neighborhood. The street level is still imperative when designing for the mid-rise as this becomes the threshold of public and private. The ability to control the spaces for privacy and public

are important at the ground level especially where the funnels or street and site are intertwined. The diversity of spaces, functions, elements, and age generations contributes to a healthy environment. Absent is the monotony and singularity that only bring oversimplification unreflective of natural and complex systems that exist in the world.

4.3 Hawai‘i’s Current Housing Predicament

Many people live in overcrowded homes. Kalihi seems to be the perfect metaphor. Cars fill up the driveways and line the streets. Houses are retrofitted from single-stories and transformed by lifting into two-story houses to add more units to offer rental rooms to offset the burden of income. A can of sardines overly packed to get the most of its value for real estate. Yet the prominent aspect of these homes is its missing or lack of back or front yards. The tradeoff to add more living space over natural spaces has defined the housing desperation. While Hawaii attempts to keep our ‘āina and the prestige of the Hawaiian lands reminiscent of its flora and fauna beauty, the housing situation has become inevitable. The lack of housing, not to mention affordable housing is at dire need of solutions and assistance. We see the source of our housing crises a byproduct from our current housing policies, programs, and investments as disjointed and inefficient.

Urban sprawl is clinching the throats of our precious lands in Hawaii with urban development continuing to grow horizontally outside the urban core. The development on the West portions of the island of Oahu, specifically ‘Ewa, Kapolei, and Makakilo developments have witnessed exponential dominance of single family residential dwellings. As Kapolei seeks to be established itself as the second city of the island, consequences have surely risen towards finding a solution to the bitter traffic commute from the West side of the island to the central urban core of Honolulu, and vice versa.

Our terrible pattern of suburban sprawl recently led to the inglorious distinction of Honolulu being 10th most congested city in the United States. Hours and hours on end, people sit as time sets over the horizon during rush hour and spend nearly 59 hours in a year, stuck in traffic.[99] Time is simply wasted as longer commutes create burdens to get things done for the individual. This traffic phenomenon on Hawai'i is extensively growing, and as the problem will not fix itself, solutions and key measurements must be taken now.

Figure 4-10 Ewa by Gentry Urban Sprawl
Source: hawaiiliving.com

The planning of our new developments is costing the residents of Hawai'i money and it is coming out of their taxes to make way for these new developments. As prime agricultural lands are being converted to subdivisions and residential dwellings, a need for new infrastructure will be eminent in the future. New sewer, water, electricity, and other utilities that make up the infrastructure will be paid at the expense of the tax payer of Hawai'i. These monster project developments are creating more traffic and pollution as Hawai'i becomes more accustomed to expensive imported food and fuel. Hawai'i is not excused from the shortcoming urban sprawl has affected as other places

[99] Melanie Yamaguchi, "Report: Honolulu Takes No. 10 Spot for Worst Traffic in US," accessed April 2, 2018, http://www.hawaiinewsnow.com/story/31474499/report-honolulu-takes-no-10-spot-for-worst-traffic-in-us.

such in America or other places around the world have felt the negative effects. While costs begin to rise, and precious lands deplete; additional infrastructure, loss of family interaction, and neighborhood feeling also begin to desperately fade. Sprawling is forcing the increasing need for infrastructure of water, waste, electricity, and all other utilities to connect house to the urban grid. The scale and proximity of these houses also don't allow for family interaction as easily without the use of a car. Neither does the it then proceeds to promote as sense of place nor a sense of community.

If then the answer to Hawai'i's housing crisis is not building out at the expense of our pristine and precious lands, is the solution then to build up? If the urban environment and urban redevelopment can be taken into consideration, how tall do we keep Hawai'i's building? While urban sprawl presents the left-hand side of the spectrum, the opposing component to the spectrum on the far right is high-rise development. The predicament with building 60 story buildings is that it competes with our natural landscapes.

Figure 4-11 Are Hawaii High-Rises eliminating the precious views?
Source: hawaiipublicradio.org

There is an inherent connection that many locals would point out with the natural views of Punchbowl towards the beach shores as they are vital for the regionalism of Hawai‘i. Unlike other mainstream cities that have produces a rich history through the urban fabric, Hawai‘i still feels adolescent in comparison to this much bigger and denser cities. Therefore, the urban artifacts that Charles Jenks mentions, which bring a level of identity and history to the city, are not of Hawai‘i’s artificial built environment. One can argue that the urban artifacts of O‘ahu and Hawai‘i, are instead our natural distinguishing landmarks such as Punchbowl and Diamond Head. Lewis Mumford writes in his personal experience and insights in Hawaii in a report titled *Whither Honolulu?* focuses on the potentials that should take into consideration when planning and designing specifically for Hawaii unique regionalism. The first consideration is the preservation of views. Hawaii, unlike most other developed cities, offer little backdrop of a visual comparison and proximity of the mountains to the sea.[100] Today’s development in Ward and with Howard Hughes are playing antagonist to the advice of Lewis Mumford. Instead, a “white-picket” fence of high-rises obscures the mauka-makai views that were so important to Hawai‘i’s identity in this big world.

Preserving our agricultural lands does not have to come at the cost of Honolulu’s mauka-makai vistas that so strongly define our relationships with Hawaii’s natural environment. This depends on how well we implement urban densities that are truly sustainable. Sustainable urban density is more than increasing the height and population density of high-rises. It’s about balancing the inputs and outputs of a system within the capacity of that given system to achieve as close to neutrality as possible. If the answer does not lean towards low-rise nor high-rise development, then the next more logical choice is to develop a strong presence of mid-rise development in the core of Honolulu’s urban fabric which have not really established a presence or typology on the island. Based

[100] Lewis Mumford, *Whither Honolulu?* (Honolulu: City and County of Honolulu Park Board, 1938).14

on our precedent studies on mid-rise dwellings, they are best suited in creating an integrated, living, socially interactive environment. As low-rise and high-rise buildings obscures the human scale with the built scale, the mid-rise does well to preserve the concepts of a neighborhood as the human scale is in proportion to the mid-rise housing typologies.

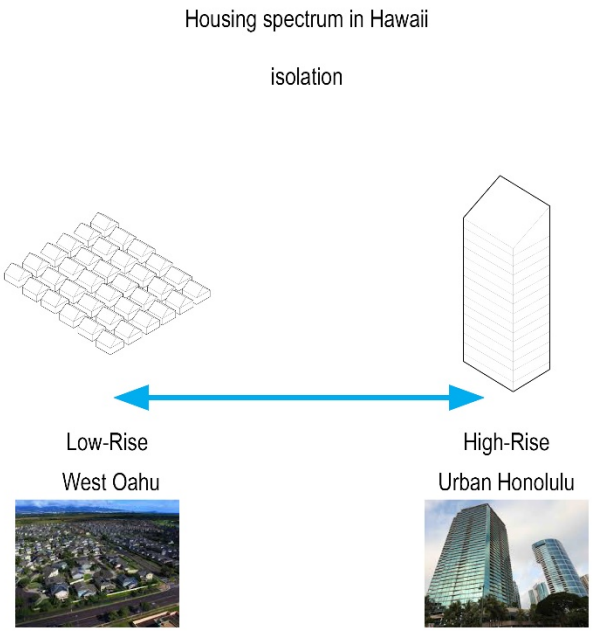


Figure 4-12 Hawaii housing spectrum
Illustration: Author

The needed density development has seen both sides of the spectrum where West O‘ahu has seen the majority of urban sprawl in single family dwelling households. While the urban Honolulu area are seeing its fair share of high rise units. But its important to note the social isolation on both sides of this spectrum. The American Dream. You finish work in town and want to go home. You hope on to your car, drive about an hour to get to your home. You drive into your drive way, to the

garage, through the connecting door and now you're in your home with your family. To get even anywhere in these places, you need your car because there is little public transportation. Which means you never walk past your neighbors, which means little interactions. On the other side of this development is the high rise. So, when you live in these high-rise towers, you enter the basement, park your car, and take the lift to the 30th floor and enter the lobby with no natural lighting. Walk a couple more feet in a tight corridor and you're in your apartment. But you never get to chat with any other people that live around you. So, what I am proposing is a little of moderation, something in between. It's something that hasn't been a fully explored within the history of Hawaii's development is the mid-rise. The alternative solution to the mid-rise allows for more density while at the same time provide a scale in which a sense of neighborhood is achieved to increase the social interaction.

4.4 Development of the Hawaiian Housing

As the evidences and factors present a predestined utilization of a mid-rise typology in Honolulu's urban context, a quick glimpse of the history of Hawai'i's housing will provide a general overview of the vernacular architecture but also the social and critical issues addressing the built structure along the urban context that have paralleled universal issue historically. The analysis will put in retrospect the need for the mid-rise building as the next antidote for Hawai'i's future housing development.

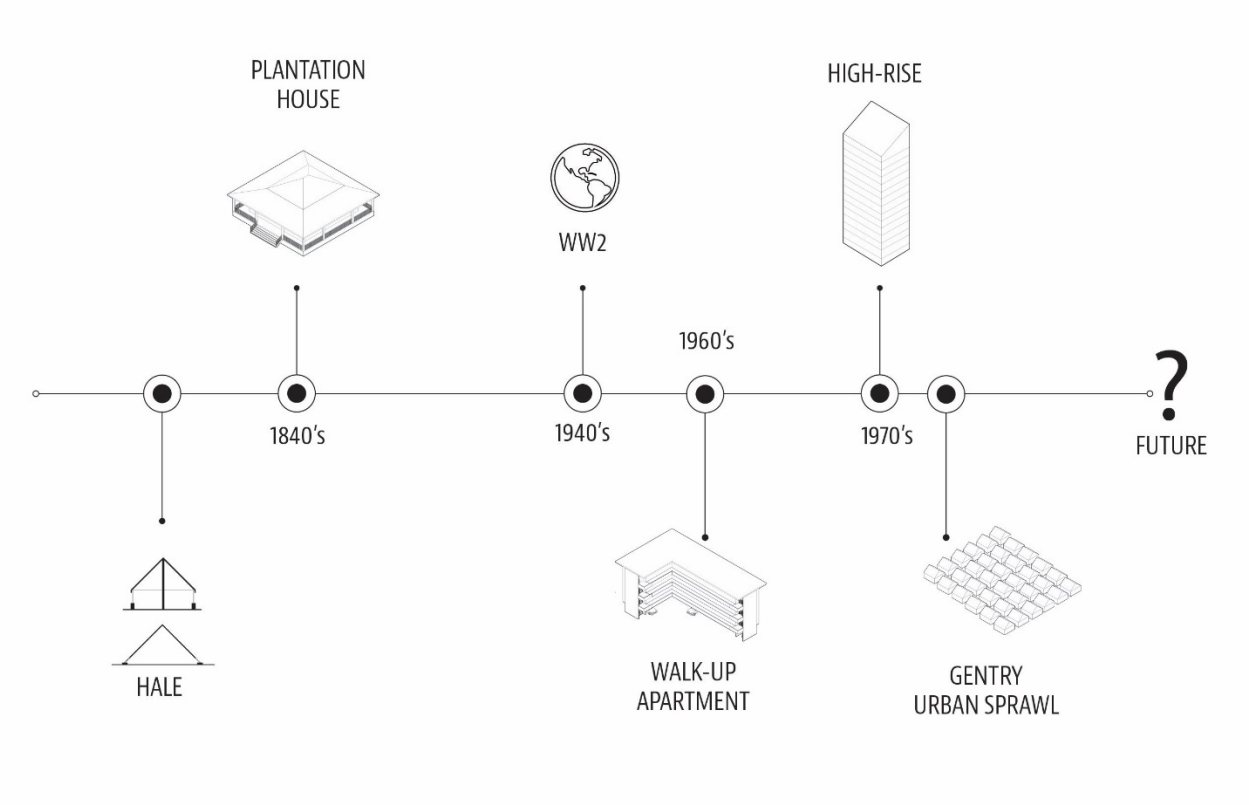


Figure 4-13 Brief Housing Timeline in Hawai'i
Illustration: Author

Hawai'i's agricultural era reflects similar concepts of integrated village communities. The hale, the Hawaiian word for house functioned beyond its meaning. While the typical association of a house connotates towards a residential dwelling, whether it be a single-family dwelling or an apartment, the hale goes beyond the meaning of a family home. The two basic house designs used in old Hawai'i were a steep roof "A" frame or an "A" frame that was raised on short walls. Hales didn't typically have much interior delineated spaces and so various Hales served different purposes from a canoe house, a weaving house, drum house, fishing house, or a house of instruction. These hales were built with the same frame structure with an open floor even though the function of the hales

were different. The hale though still invoked multigenerational living through a highly built integrated village that prospered into a healthy environment.

The primitive life and architecture soon transitioned into a notable time which Hawai‘i began to take shape as a state of the United States with the 1840s-1870s. Residential houses were being built in the outskirts of the city and elsewhere in the state. The plantation house was characterized by its large lanai or porticos, vertical plank siding, and a low-profile wood frame. Hawaiian plantation house roofs were wide-hipped to provide shade and comfort against the beating sun. The name, plantation house, originates from the sugarcane and pineapple plantations which houses the laborer homesteads. The popularity and decline of the plantation houses began with the movement of larger mass housing production.[101]

With Hawai‘i and the nation facing a housing crisis post World War II, the demand for housing triggered solutions in the form of mass housing. While development of the single-dwelling residential houses grew out, the urban core of Honolulu soon began to grow in vertical successions with the introduction of walk-up apartments through zoning changes. Honolulu's walk-up apartments were low-rise units that typically consisted of 2-4 stories, constructed mainly of concrete, and their units were single-stacked.[102] The walk-up apartment continues to display vernacular elements which superficially refer to the plantation style house and at times responds to natural and social forces.

The walk-up apartment typology has many characteristic elements that give it a defined place in Hawai‘i architecture as this typology reflects site-design responses as well responding to the universal need of more housing. The footprint of these walk-up apartment that had floor plans in the shape of an "L" shape. The "L" shape building are accompanied by a flat roof that extruded as eaves.

[101] Edward D. Beechert, *Working in Hawaii: A Labor History* (University of Hawaii Press, 1985). 71
[102] Fung Associates, Inc., *Hawaii Modernism Context Study* (Honolulu: Fung Associates, Inc., 2011). 70

Vertical cores flank the ends of the building to provide circulation through the levels of the building as the ends of the building faced the street façade. At each end of the building, there are also implementations of a brise-soleil of various patterns that act as a sun shade as well as allow wind to funnel through to continue the ventilation through the apartments. The walkway/lanai where the public corridors function as circulation are on one side of the building. The outside of the building provides a more private balcony or lanai space to the residents. Lastly, the ground floor of these apartments allocated parking space and a driveway.[103] Walk up apartments continued the levels of lanai spaces with private and public considerations while addressing natural conditions of the site.

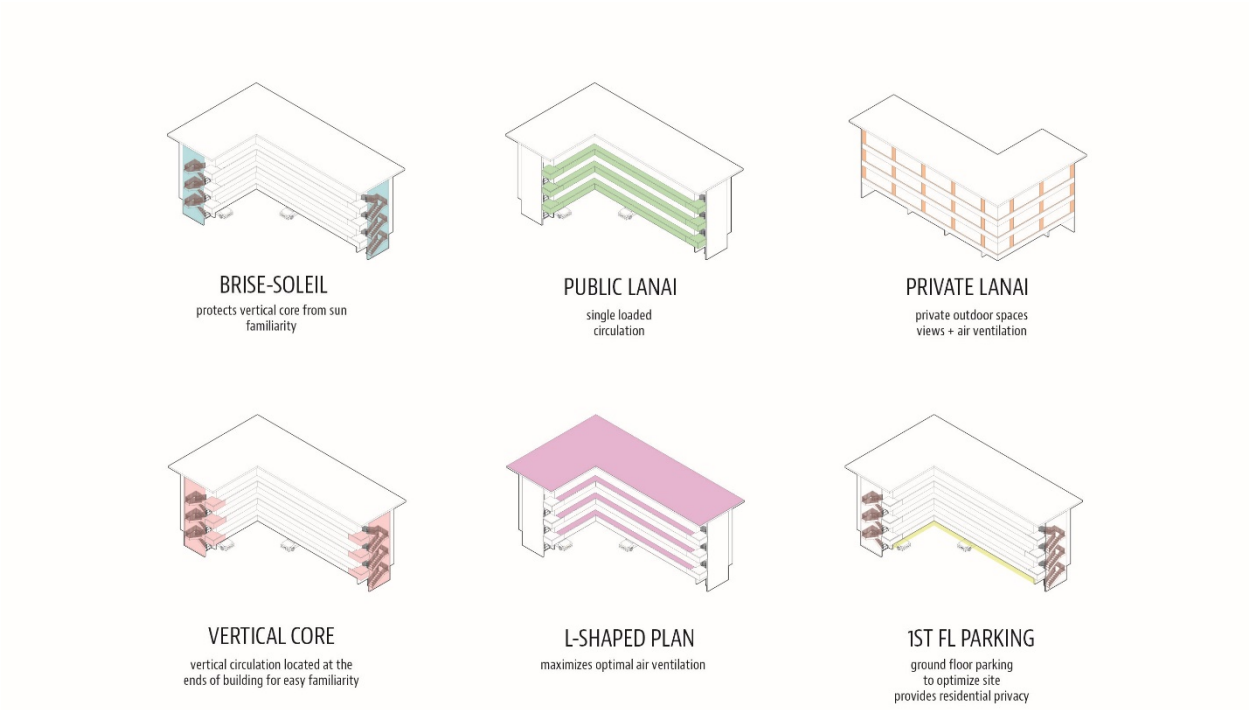


Figure 4-14 Key elements to the Walk-Up Apartment
Source: Fung Associates. Hawai'i Modernism Context Study
Illustration: Author

[103] Fung Associates, Inc. 83

As the movement of Modern architecture progressed, the vocabulary and structural possibilities pushed the limits of vertical growth. High-rise buildings in Hawai‘i took popularity during the 1955-1979. Apartments were characterized by their lanais, while commercial office buildings relied on their materials and fenestration for definition with a number employing pre-cast, recessed windows and in some instances sun screens.[104] High rises in Hawai‘i followed a rectangular footprint and characterized as mere concrete boxes. This phenomenon grew great popularity in downtown Honolulu and especially in Waikīkī receiving positive criticism as being a needed addition to further the tourism economy.

The first high-rise apartments were simply extrusions of the walk-up apartments. With its lanai-corridors and additions of more floors, high-rise apartments were accounted for if the requirement of a minimum of 12 stories was achieved. However, while the public and private lanai remained part of the design, residents began to shift into a more controllable environment. Many residents would convert their private outdoor lanai space and enclose the lanai to add to the interior space. The housing dynamic change not only shifted human comfort zones, but also changed the building’s identity. This shift in change could be acquitted to a more generalized necessity of the air-conditioner unit.[105] Like the dependence of the car, man became dependent on the realization of freedom and choice. The change and identity of our present high-rise buildings addresses the universal human need without the consideration of placement and place that have strong natural conditions the built environment once coexisted with.

[104] Fung Associates, Inc. 97
[105] Fung Associates, Inc. 99

4.5 Conclusion

Hawai‘i is experiencing the extreme ends of a development spectrum of low-rise dwellings in the outskirts of Honolulu; at the same time the urban core of Honolulu continues to add high-rise units that have little consideration of Hawai‘i’s own context. This focus of introducing the mid-rise housing in a relevant multigenerational context of Hawai‘i is its ability to add density at the same time instill a humanistic scale of neighborhood that both the low-rise and high-rise development fails to execute. With the introduction of newer technology of all these development, the mid-rise too have benefited with the introduction of engineered wood timber. Mid-rise buildings address the need for more density without losing scale and the urban street connection that high-rise buildings tend inefficiently executes. The neighborhood environment is further emphasized by creating a healthy productive atmosphere as diversity is introduced into the equation. Mid-rise buildings are still able to provide diversity of housing, retail, offices, and recreational spaces within a proximity that humans are comfortable with. Hawai‘i is at a precarious position to indulge in the social dynamics of multigenerational living in a typology that logically fits the housing needs and context in a built environment that has throughout history have once coexisted with similar social issues but have a greater attention to building according to the regionalism of Hawai‘i of our present time.

5| Design Principles

Figure 5-1 Design Framework
Source: Epimakhova. Designing for Multigenerational Community
Illustration: Author

Diversity of different generations living in a multigenerational household demands an outline of programmatic needs for each generation. The utilized design framework follows a similar format to Tatiana Epimakhova's *Designing for Multigenerational Community*. These programmatic needs then become a list of spaces and function determining the design objectives of a multigenerational design and dictate the location for a reasonable site. The formulated design objectives will create design for the built environment that is geared towards each specific generation. The objectives will address multigenerational integration, a healthy environment for all residents, an accessible and safe atmosphere that also is adaptable to all generations. These design objectives will then create necessary design guidelines to be implemented into the conceptual design of the chosen site to create a multigenerational neighborhood integrated into a healthy environment.

5.1 Spatial Programming

To create a healthy environment for all age groups, all spaces in all scales should be understood into the design and accounted for. Each age group has certain social and physical needs

that may only pertain to either a child, adult, or a senior. Within all those age groups, it is also necessary to integrate each age group in various scales in the built environment; whether small or large.[106] Within the typology of the mid-rise, it is important to think of three scales of the built environment. The smallest of the scaled interventions for all age groups is the living unit which included the private living space of the residents. The medium scaled built environment is the building and the site itself which include the floors of the building, horizontal and vertical circulation, and the security and access to the site or the building. The third scale element is the community and the city. Much of this integrated healthy environment is also predicated to the connectivity the building has with the surrounding community as well as the city. The building is only partial to the equation for the social dynamic interaction of its residents. Therefore, the proximity of amenities and services around the building should be taken into consideration. Multigenerational living is understanding the programmatic needs of the child, adult, and elderly at the same time incorporating all age group in the living unit scale, the building scale, and the community scale.

[106] Epimakhova, *Designing for Multigenerational Community: Creating a Supportive Environment for Young and Old in the U.S.A.* 37

Figure 5-2 Age Groups
Source: Epimakhova. Designing for Multigenerational Community
Illustration: Author

The child is at an important age where the level of care and attention should be prioritized. Access to the pediatrician, daycare, school, daily essential (grocery, pharmacy, stores), and easy modes of transportation should be within reasonable distances. Also included are other physical

needs such as spaces for walking as well as playgrounds for the children. But the mothers (parents) are given the opportunity to socially interact with other parents on the playgrounds. As the child begins to grow, other social interactions within the community and other children are necessary which must provide activities and recreation outside of school, sports facilities, and various forms of educational institutions to promote a healthy learning environment.[107]

Adults prioritize their needs with the convenience of access to various programmatic needs. While daily essential, public transportation, work, home, leisure, and sports facilities are all important to the growing adult, access to the cultural and episodic services that adds to the vibrancy of life for the adult and towards a better social gathering interaction. These needs then develop to physical programmatic needs such as walking space, retail, yards/garden, sports grounds, and fitness rooms. Additionally, various other adults require the needs of a babysitter, rooms for family or other guests, storage, and daycare.[108]

As the adult ages and transitions to seniority, healthcare services, caregiving, and housekeeping become the high distinctions of necessities of living. As well as daily essential services (grocery, banks, restaurants), public transportation, and social events still are a part of the needs of a senior. Socially the senior needs places to walk, leisure time, social gathering, but also family gathering. The programmatic needs then shift towards healthcare services, public park, recreational, and senior care facilities.[109]

The needs and programs of each age group is then organized to the three levels of the residential, building/site, and the community/city scales. The smallest of the scale is the residential

[107] Ibid. 38
[108] Ibid.Epimakhova, *Designing for Multigenerational Community: Creating a Supportive Environment for Young and Old in the U.S.A.* 38
[109] Ibid. 39

unit. Within this scale includes the bedroom, kitchen, living, lanai, and other spaces to supply storage, act as a hobby, study or work as according to the specific needs of the resident. The medium scale level is the building or the site. This scale addresses the public walking around the building and the site which comprise of the corridors, stairs, elevators, shared spaces, sidewalks, access, and security to and out of the site, community rooms, outdoor spaces, and all other amenities and services that are shared within the residents of the building unit. The large scaled level is then the surrounding community and the city. The importance of this scale will determine a criterion for choosing an optimal site for multigenerational buildings as they stress the importance of these mid-rise typologies to promotes a neighborhood environment that integrates into the building. Access for public transportation, schools, sports facilities, parks, and daily service facilities within reasonable walking distance will becomes important factors.[110]

By defining all important key figures into the multigenerational living, programmatic needs surface and are arranged into different levels of environment. The figure below shows a spatial program that has addressed the three age groups and lists each social and physical needs alongside the different cataloged levels. By developing these programmatic goals at all scales from the residential, building, and city scale, the design principles and objectives can then be generated to create an intense yet viable multigenerational living environment that addresses all important social and physical contents.[111]

[110] Epimakhova, *Designing for Multigenerational Community: Creating a Supportive Environment for Young and Old in the U.S.A.* 42
[111] Ibid. 42

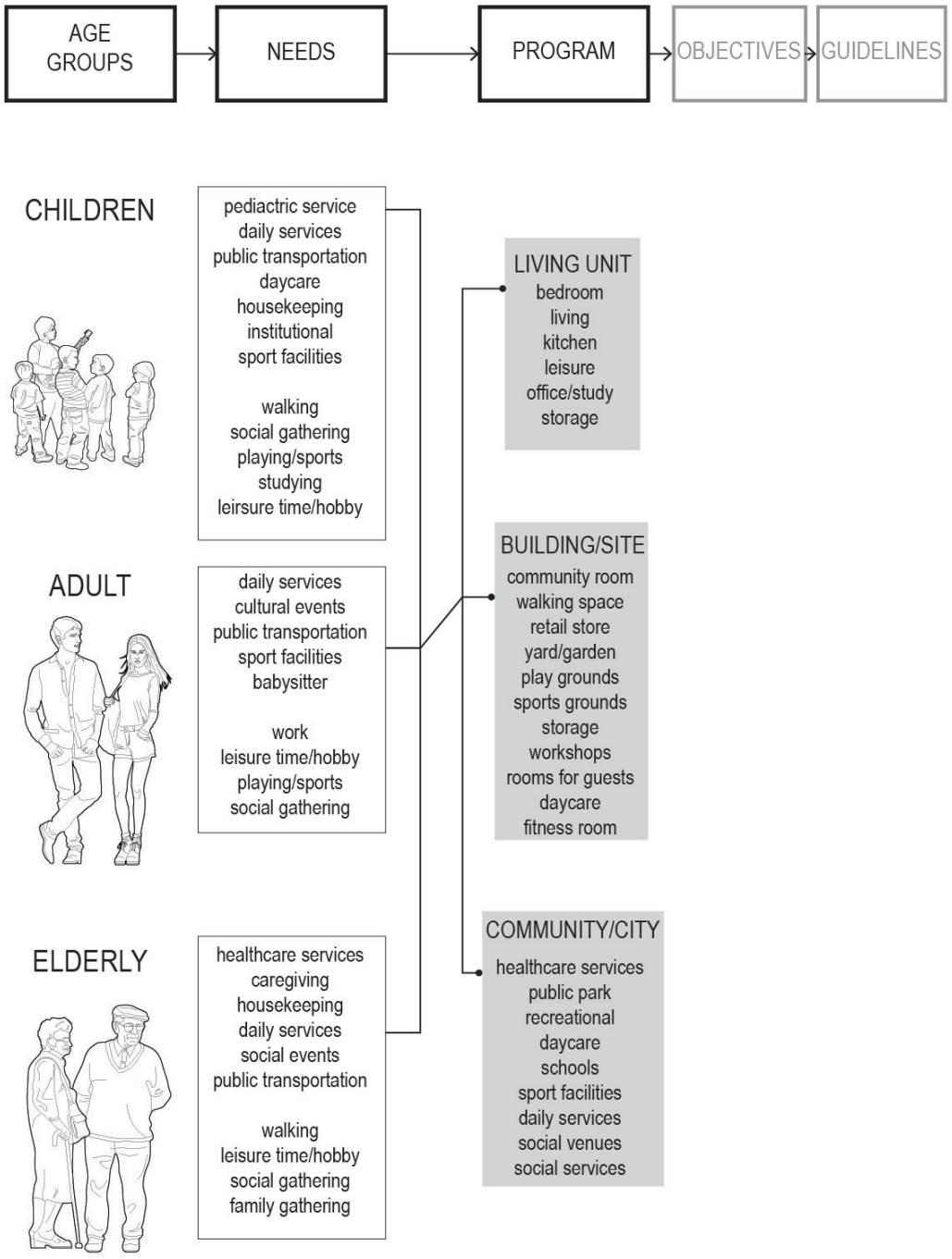


Figure 5-3 Spatial Programming Diagram
Source: Epimakhova. Designing for Multigenerational Community
Illustration: Author

5.2 Design Principles

The development of the design principles is then a culmination of literature to create a supportive backbone that will drive the design and research to this paper as they complement already the discussed information in the previous chapters. The principles are a complementary network to one another that all address a multigenerational environment meant to integrate a diversity of demographic that breeds a healthy living community within a mid-rise building. Principles then will produce physical and spatial guidelines to further direct the conceptual and schematic design of the project setting in Hawai‘i. These principles address a social, healthy, accessible, safe, and adaptable environment.

A social environment stresses the interaction of all generations to live cohesively in a built environment. To build character and community of the multigenerational housing, it is important to address the social needs of all age groups. The environment should prevent social disconnection and isolation not only within the age groups, but also along the other residents of the buildings. The more social interaction a person can experience in a daily encounter, the easier residents feel encourage to belong to a community, eliminating social isolation.

A healthy environment strives to cater to all age groups in both social and physical needs. The striving healthy environment will promote the well-being of each age group but in a heavy density that addresses the housing shortage in Hawai‘i. When people can collectively interpret and experience a sense of community, the healthy environment will breed cognitive and physical sensory. This sense of community eliminates social intimidation as familiarity encourages people to conversate breeding a healthy environment.

The third principle gives attention to physical access to the site and the proximity of services within the community. The design of the building should not prohibit function and uses from certain age groups, but to all groups. Accessibility further stresses the factors of convenient walkability to certain services as mentioned in the spatial program. This dimension should also give importance to a proper design for all age groups. This universal design should be of concern for the child, adult, and elderly in mind to prohibit social discourse among family members and as well as residents.

A then safe environment strives to make the environment safe and secure. The interaction with the street level and the access to the site is an important principle that separates the public and private realms. The design towards a safe environment is meant to prevent any accidents and crime within the buildings. It is then essential that the design does not prohibit any age group from using

or experiencing the environment so differently from other age groups. The ability for residents to place a territory and protection of the environment will create a strong sense of community. If residents can claim territory, social isolation is discouraged because residents are able to gain spaces outside the realm of their private apartment, enriching a sharing environment.

The complexity of addressing so many factors fosters a need to have an environment that has resilience and adaptability. The environment should be able to adapt and change within the scope of every residential and individual need. Accommodating and being adaptable for all age groups is necessary to this environment. If adaptability is achieved, greater sense of community grows because it will give individuals the choice and option for change accordance to certain situations. The ease to be adaptable allows for resiliency, eliminating any possibilities of social insecurity and isolation.

5.3 Conclusion

Understanding first the needs all age group to produce the program lays the foundation for developing five core principles that instill a multigenerational environment. The realization that each age group has certain needs promotes a stronger identification with each level of interaction of the built environment from the resident, to the building, to the community level. The achievement of this envisioned programmatic environment is recognized by five key principles that promote social interaction, healthy cognitive realization, humanistic accessibility, universal security, and territorial adaptability.

Design Guideline Definitions

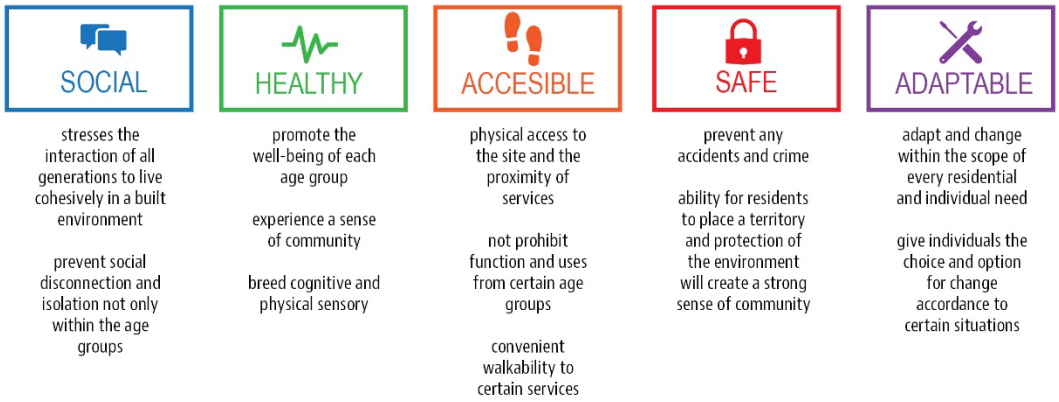


Figure 5-5 Design Guideline Definitions
Illustration: Author

6| Design Guidelines

Design guidelines provide the framework of the design for the site. Production of these guidelines stems for the understanding the hierarchy of the principles as architectural strategies. The guidelines are important to address all generations, but also takes into consideration all levels of scale from the living unit, the building, and the community, as well as the city. Additionally, a site selection criterion will be used analyze a site in parallel to the design principles and design guidelines. The defined set of guidelines, working at different planning levels, together with the formulated site selection criteria, serves as recommendations to define a successful location of any multi-generational project, and will enable the creation of an environment beneficial for all ages that will become an antidote to eliminate social isolation.

Each guideline will then be further explained and analyzed. The structure of the following sections will first define the guideline and mention its purpose. The accompanying paragraph will describe in detail the characteristics of the guideline. Next, the guideline will show how it relates back to the principles. Lastly, a precedent(s) will provide the last backbone to the guideline. The end result of each guideline will then help ensure what the purpose of each guideline, how it draws back to the principles, all with precedents to show greater evidence of each guideline.

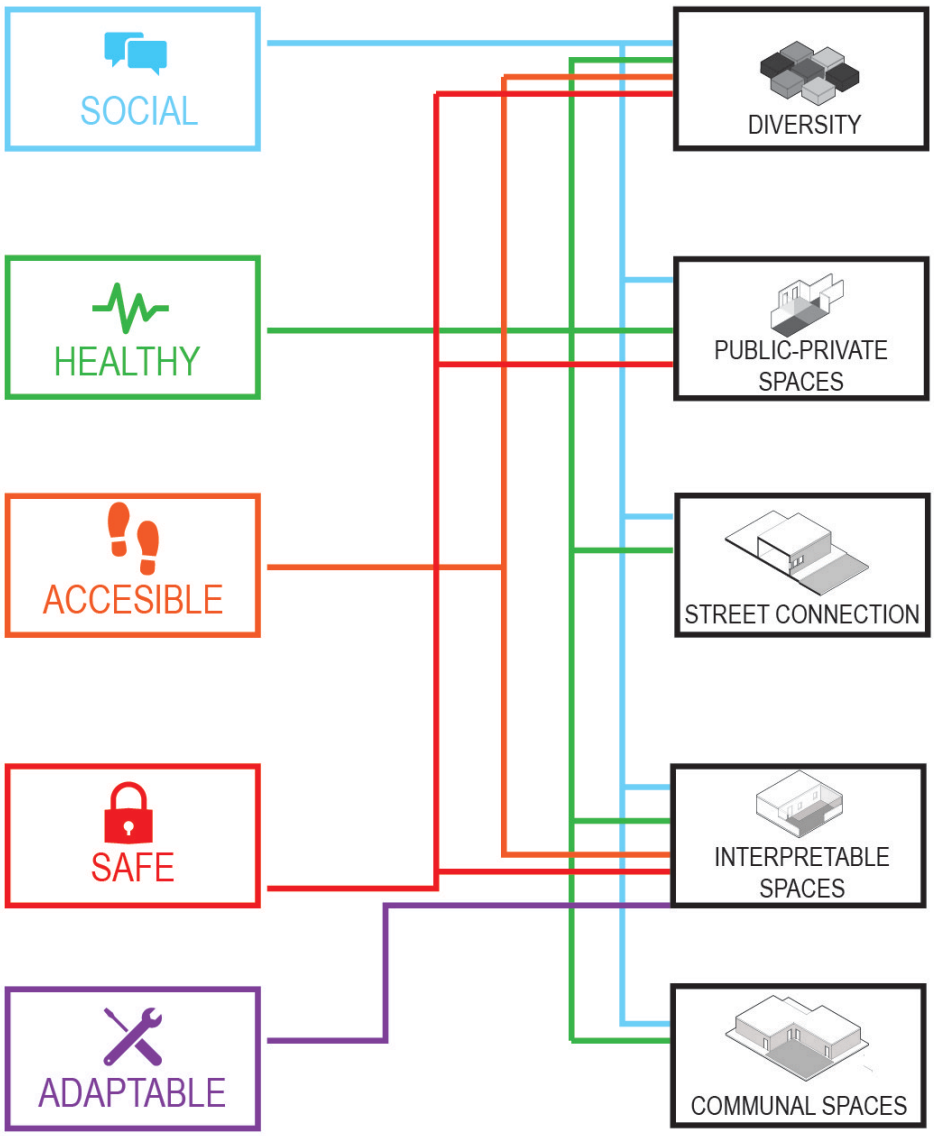


Figure 6-1 Design Guidelines
Illustration: Author

6.1 Diversity

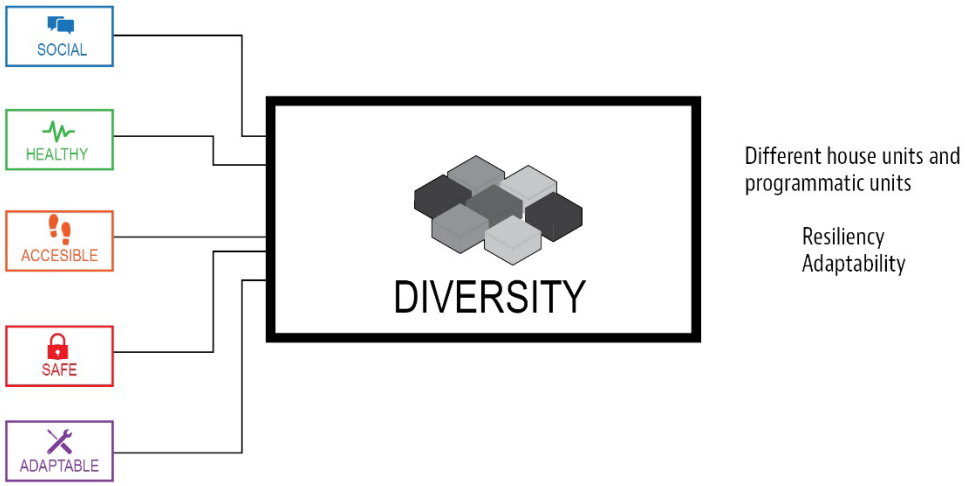


Figure 6-2 Diversity Guideline
Illustration: Author

Diversity is a quantitative dimension that the quality of the built environment becomes resilient and furthers the presence of a sense of a place. In an ecological context, biodiversity introduces an important factor to increase the resilience of an ecosystem to respond and adapt to changes while maintaining its core function and character.[112] A multigenerational building should then offer a diverse use of residential units, functional spaces, and various social interactions as the multigenerational building caters to diverse age groups.

A diverse multigenerational building becomes resilient as it can address various and multiple needs of the society with its housing demands. No age group can live independently, so it is important to think of all age groups and their various needs will provide a wholistic and living ecosystem in

[112] Alexandros Washburn, *The Nature of Urban Design: A New York Perspective on Resilience* (Washington: Island Press, 2013). 56

context of the build environment. The future needs of housing will be an issue that Hawai'i needs. High levels of diversity allow multiple people to fill the in the needing gaps throughout the living phases of the individual. As the built environment responds and adapts, the greater resiliency the multigeneration building becomes as a strong physical component against future pressures.

By developing a diversity of units and functional spaces, the guidelines targets four of the design principles of social, healthy, accessible, and safe. The environment will create a greater sense of community with high levels of diversity. Different functional spaces will create different social interactions throughout the buildings. With the addition of various programmatic spaces, similarities will trigger social interactions and dialogue. The foster of social interactions within residents and neighbors will create a sense of ownership and a belonging of the community. As people and residents begin to identify each other with names and know one another better, better trust and safety develops. High interactions within residents will help each other make associations and affiliations to help with the healing process. The quality of a community and belonging creates a healthy environment, individuals internally can feel better and with reassurance. Diversity in the built environment in all levels of the building give a social component to the community.

Designed by Burkhalter Sumi Architects in Zurich, Multengut is a senior center residence that has three different types of rooms for the elderly. Each apartment type provides different room layout according to the preference of the residences. Apartment Type I emphasizes wood wall panels and narrow openings to create spatial sequencing between each function of the house. Type II features a main central core to provide a more open plan between the spaces. A combination of

Type I and Type II is then the product of Type III. Additionally, much of the communal spaces are location within the ground floor and basement areas.[113]

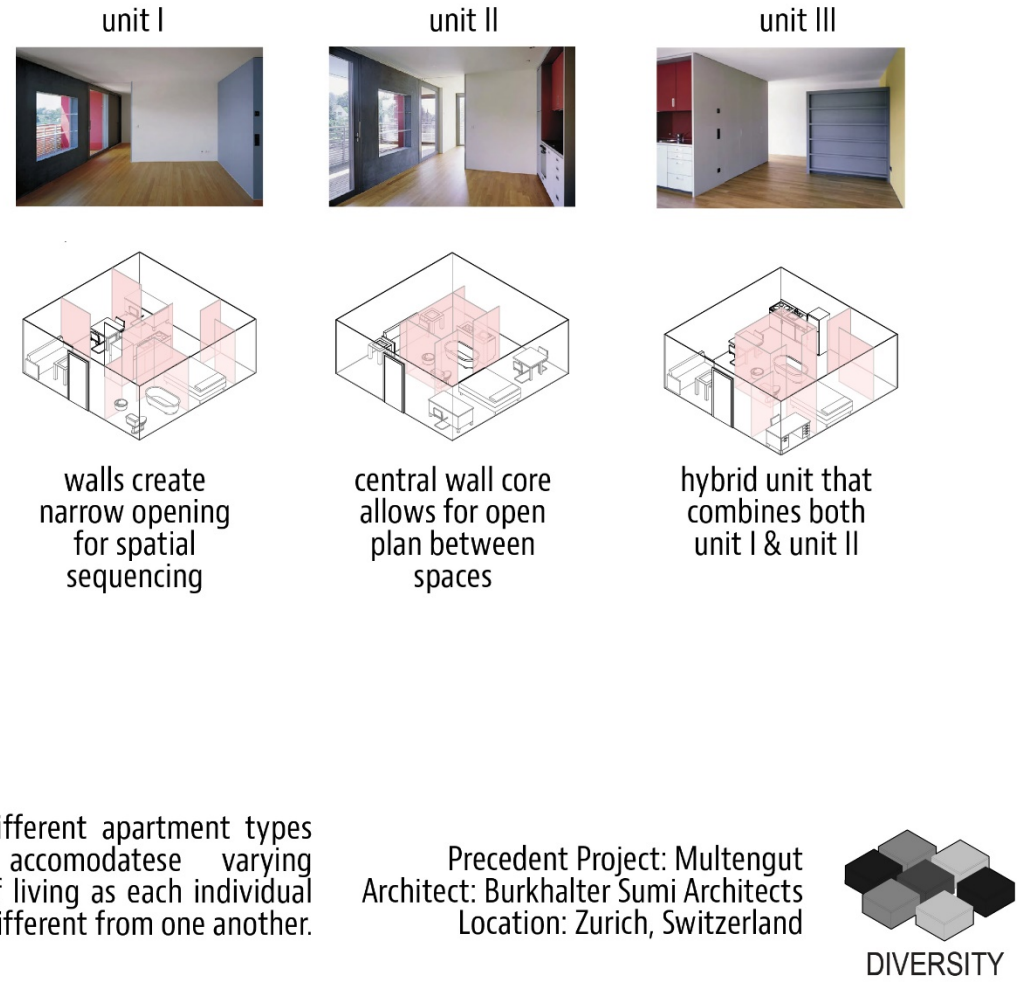


Figure 6-3 Diverse Units
Source: Schittich, In Detail
Illustration: Author

[113] Schittich, *In Detail: Housing for People of All Ages: Flexible, Unrestricted, Senior-Friendly*., 64

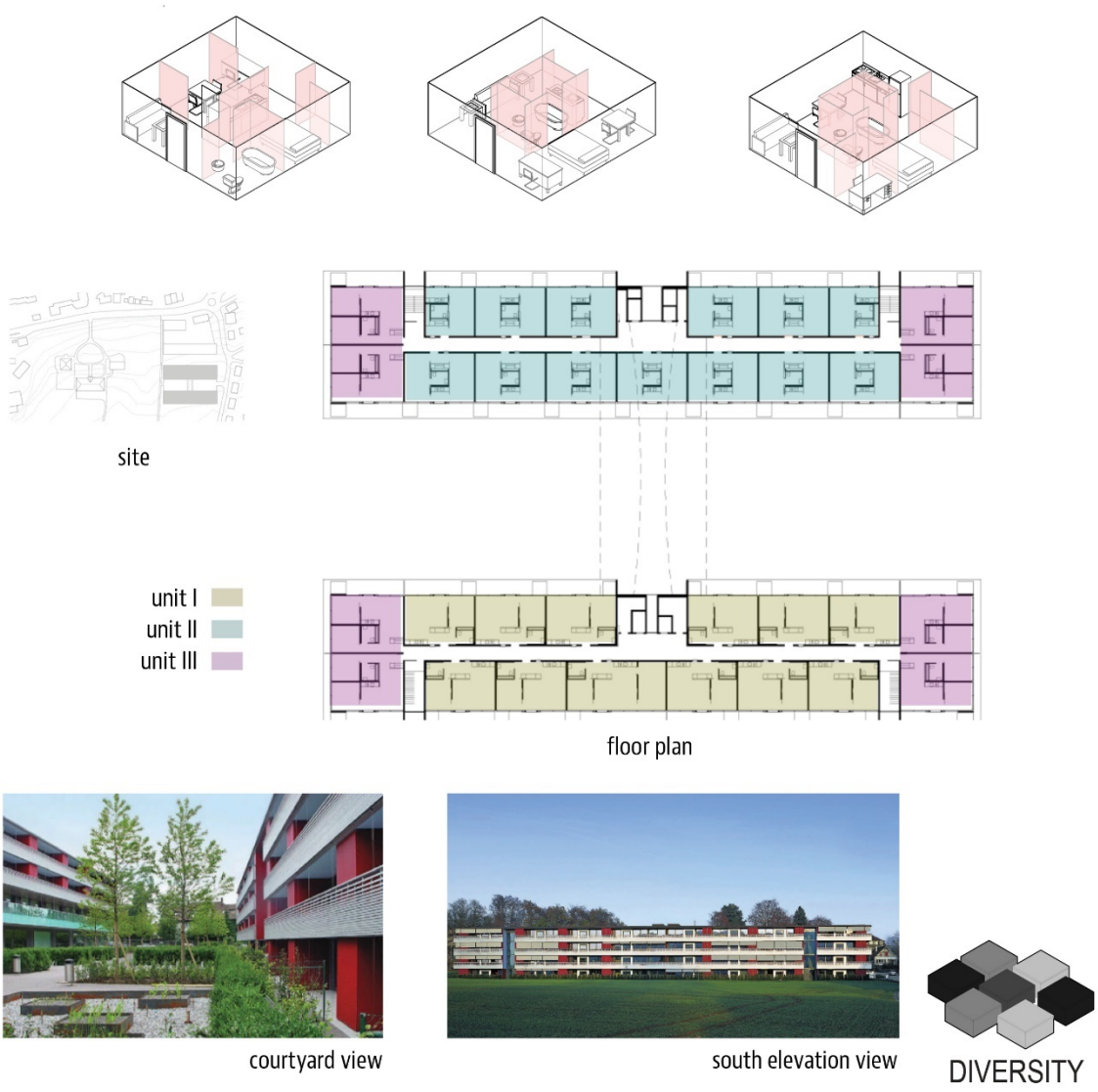


Figure 6-4 Allocation of units in plan
Source: Schittich, In Detail
Illustration: Author

6.2 Public – Private Spaces

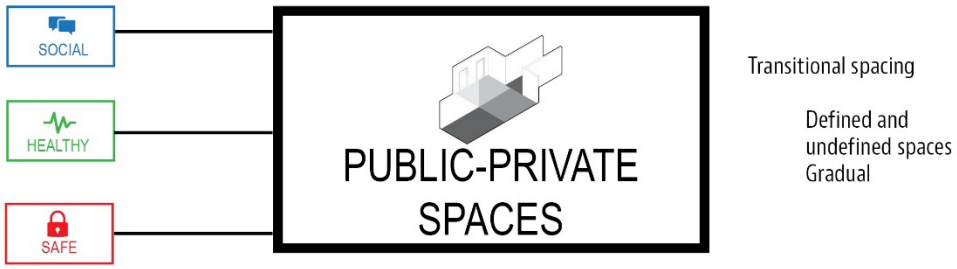


Figure 6-5 Public-Private Guideline
Illustration: Author

The differentiations and transitions of public and private spaces create significant roles in the social, healthy, accessible, and safe environments in a multigenerational building. Clearly defined spaces and transparency within these spaces instills a deep level of community living beneficial of all age groups, but also visual boundaries to connotate to any individual where are the public and private spaces. It is therefore important that these realms are transitioned intricately done by strategic elements.

As different levels of public and private spaces exist throughout the environment, people will create territories for social occurrences. By identifying these spaces, people will feel a sense of belonging as various levels of public spaces in the building address the situation. If these levels of publics spaces are clearly laid out, people will resonate to these spaces as almost their territory, furthering an atmosphere of community. The knowledge of the boundaries of spaces and responsibilities helps to avoid conflicts and misunderstandings among residents which may result in

under-utilized spaces. However, there must still be spaces of privacy as residents are still able to find security and personal space within a well-integrated community environment.

Allowing for various gradation of public and private spaces also adheres to a healthy environment. The experience of these open public spaces fosters cognitive health benefits. As people can interact with other community members, people will feel a sense of familiarity and awareness. A level of familiarity helps residents as health benefits such as feeling calm and less anxiety will develop. Spaces of various levels of pockets public spaces such as green spaces and gardens will aid in health benefits. As these spaces remain public within the building, many social interactions are to occur. The levels of interactions within children, adults, and even the elderly will make for a healthy environment.

Protection of the residents' community building is available when people have a sense of belonging within the community. As people identify these various levels of interactional spaces, they mark territories. Territories becomes identified, a greater sense of responsibility to protect their space is heightened. This fostering of empowering the residents with more responsibility and territories will then create a safe and secure environment.

To create these levels of public and private spaces, it is important to address certain issues. The arrangement of spaces, the importance of limiting the number of users in a common space, and transparency with the boundaries between these spaces with different territorial claims should all be taken into consideration. The spaces of physical access must be organized in a hierarchical order: Spaces must gradually move to public to private, and vice-versa. Spaces should not sporadically shift from different levels to prevent chaos and misunderstanding. Common spaces should also be limited to a decent level of users as too many users occupying a shared space will give little

ownership identity. Lastly, a clear transparency of boundaries between different spaces is important. People must be able to differential these levels of public and private spaces.

Huset I Haven, loosely translated as House on the Harbor is designed by architects Vandkunsten in Copenhagen, Denmark. On the edge of the harbor runs a boardwalk that is open to the public to walk through and under the housings. However, residents are allowed access to the stairs which leads to open yard space that acts as an open semi-public space. Then the private spaces are occupied in the buildings adjacent to the semi-public spaces.[114] So, the transition from public to private allows for gradual understanding of territory and place.

[114] "Vandkunsten | Vi bygger for det bedste i os," accessed April 6, 2018, http://vandkunsten.com/.

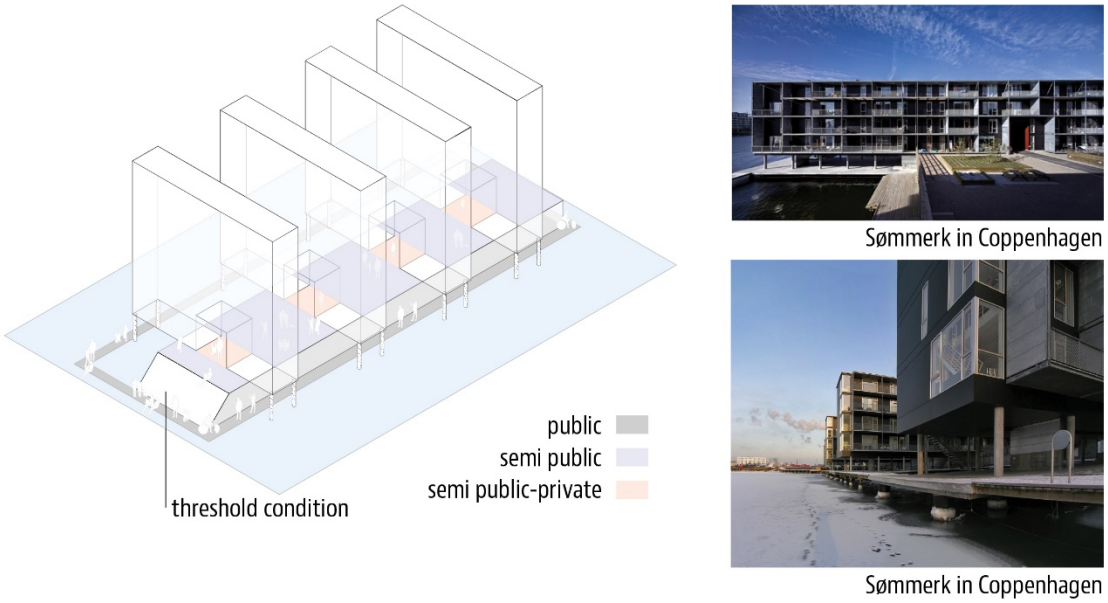


Figure 6-6 Distinctions of various spaces
Source: vandkunsten.com
Illustration: Author

Bridge Meadows in Portland, Oregon in a smaller scale creates careful distinctions between public and private spaces are reinforced through transitional spaces that develop familiarity and territory. The hierarchy of spaces influences the realms of public to private spaces. In this precedent, the front green space acts as a transitional conditional element that serves delineate the change

from public to private. The green space in this case does not naturally encourage individuals to access the green space as the scale of the green space with public scale does not equate with one another. Additionally, the access to the private residence is controlled by a proportioned access point.[115]

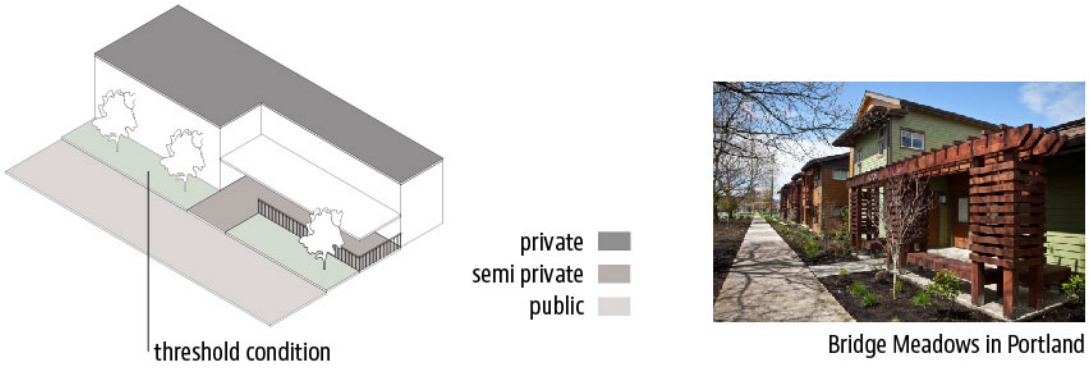
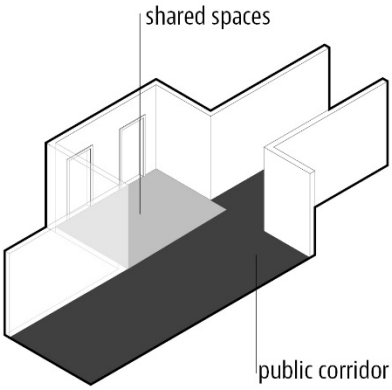


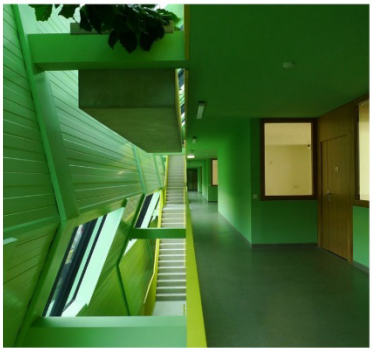
Figure 6-7 Distinctions of various spaces
Source: www.bridgemeadows.org
Illustration: Author

[115] "Home | Bridge Meadows," accessed April 6, 2018, https://www.bridgemeadows.org/.

The last precedent for this guideline approaches within the building and close to the living unit scale. The corridors are important spaces that connotate spaces that individuals can claim territory. This intermediate space between the public corridor to the private residence is essential. It allows for smooth transitions to visually dictate spaces. With this intermediate space, the residence in Mühlgrund in Vienna can further their space into a semi-private space which will bring the resident

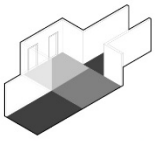
outside their living space. An effect that will create more social occurrences that will allow neighbors to engage in the intermediate space.[116]





Mühlgrund in Vienna

careful distictions between public and private spaces are reinforced through transitional spaces that develope familirity and territory. The hierachy of spaces influences the realms of public to private spaces.



PUBLIC-PRIVATE SPACES

Figure 6-8 Distinctions of various spaces
Source: archdaily.com
Illustration: Author

[116] "Multi-Generational: Living at Mühlgrund / ARTEC Architekten | ArchDaily," accessed April 6, 2018, https://www.archdaily.com/262727/multi-generational-living-at-muhlgrund-artec-architekten.

6.3 Street Connection

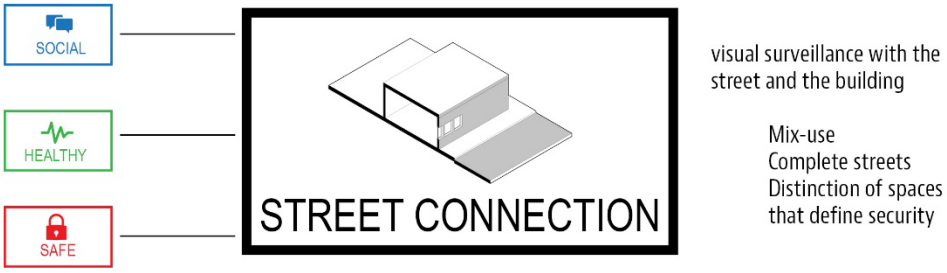


Figure 6-9 Street Connection Guideline
Illustration: Author

To further the discussion of a multigenerational community environment, there must be a talk about the programmatic and visual surveillance with the street and the building. The ability to balance the connection of the street with the building is an important design to adhere a socially interactive, healthy, yet secure environment. The street connection is an important realm that connects the individual and the city together. It is a vital understanding that this street connection with humans involving themselves within the ground level functions the accessibility of the physical and visual.

Programmatically, the ground level of a generational living will require a mixed-use occupancy. But the ability for residents to continue to still have “eyes” to the street while in the multigenerational building continues to bring greater connection with the individual and the community. The importance of the walkability and accessibility of the streetscape is also important to the individual. It is however, important that there is present distinction that the street and building

should also be connected but separated. There are three major dimensions; the building, the street, and the in between space that acts as a threshold for the two other forces.

By incorporating a mixed-use street level, the adherence of a community is further developed. The addition of services such as a grocery, retail, pharmacy, and other services will bring greater connection with the community giving a better sense of living. By providing these programmatic services, it encourages people to go outside within walking distances. The more instances residents can easily walk and go into the grocery stores, the more social interactions there will be among residents, and therefore, familiarity will breed to create a sense of community.

The street must provide an accessible environment. The street offers various spaces, and services that range from groceries, pharmacies, banks, and public transportation. And how these services are designed for the accessibility for the residents must be important for optimal use. To able to differentiate that building and street is also an important element to balance the accessibility for the residents. Another dimension that needs to be addressed is the allowance of the residence having accessible vision to the street. While having vision from the units to the streets may seem like a surveillance, a good balance of design will make the residents feel more secure and safe if they are able to see.

Taylor Family Housing designed by architect David Baker creates clear distinctions of public and private realms within the ground floor of the project in San Francisco. The 8-story project is a 100% affordable housing project of various room types, with landscaped and commercial areas on the ground level. Located on the bottom floor, the retail grocery store flanks of Eddy Street while residential functions occupy the Taylor Street side of the site.[117] The clear distinction of public and

[117] "David Baker Architects: 222 Taylor Family Housing," accessed April 2, 2018, https://www.dbarchitect.com/project_detail/141/222%20Taylor%20Family%20Housing.html.

private is very important as interrupting the privacy of the residence. Communal spaces located at the ground level and eliminating any residential units relieves any privacy and safety concerns for the residents.

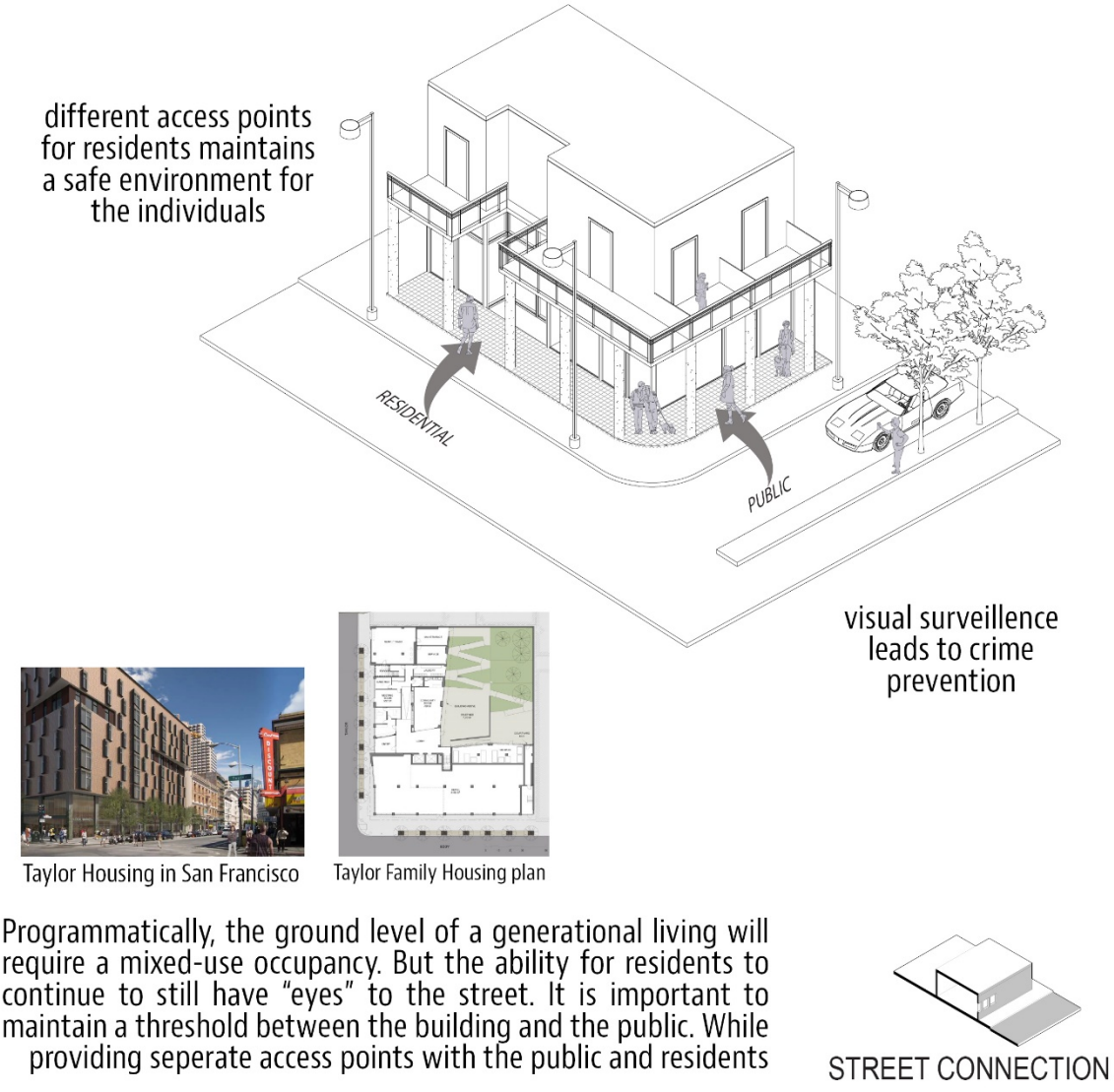


Figure 6-10 Visual Surveillance and different access points
Source: dbarchitects.com
Illustration: Author

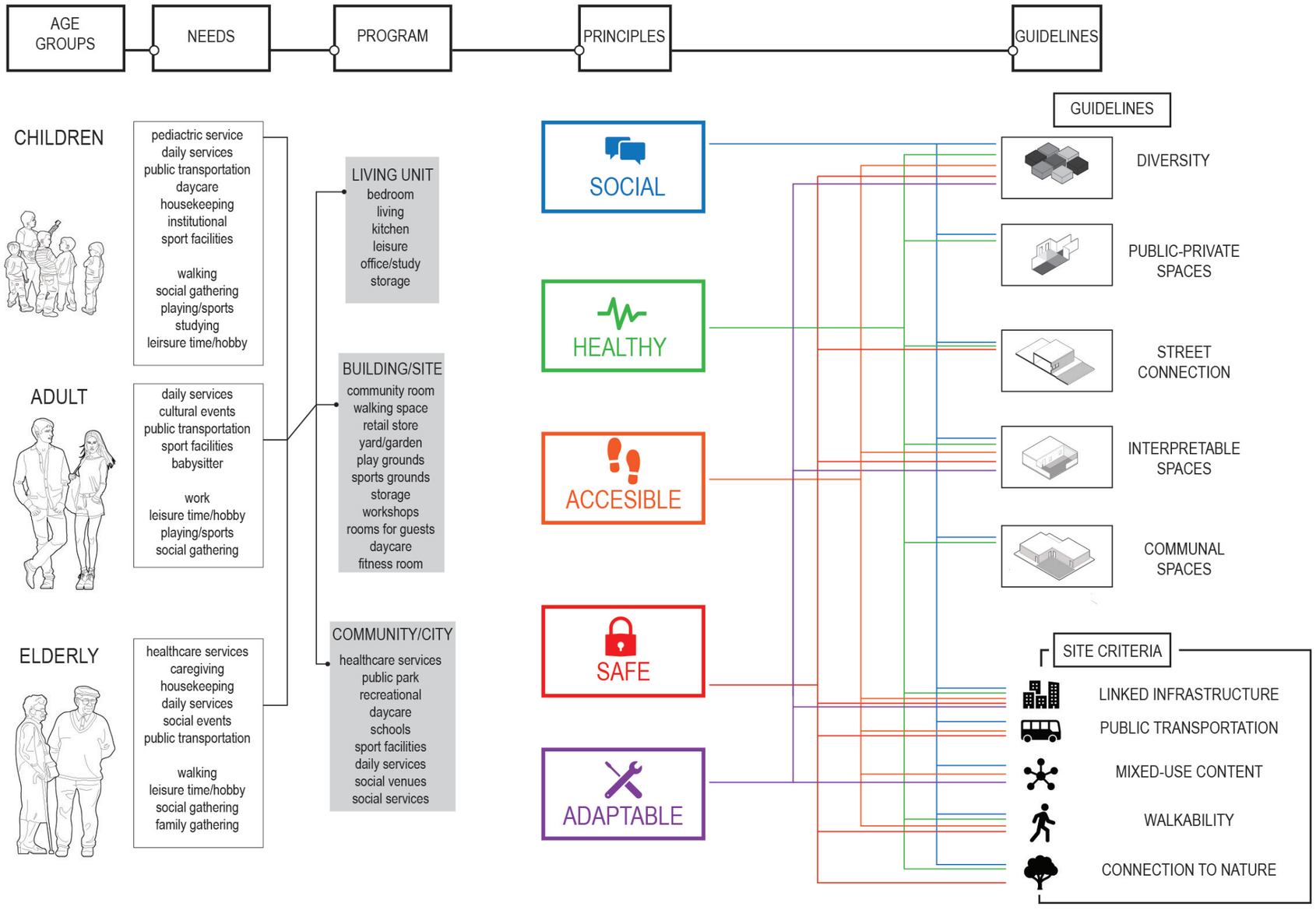


Figure 6-18 Detailed Design Framework
Illustrated: Author

To add more security and safety for the residents, public paths should be transparent. Stairs like the Bullitt Center in Seattle is a defining feature of the building. Its clear transparency of the stairs aid in the security to have eyes on the streets in the building. It is important to maintain a threshold between the building and the public. While providing separate access points with the public and residents.[118]

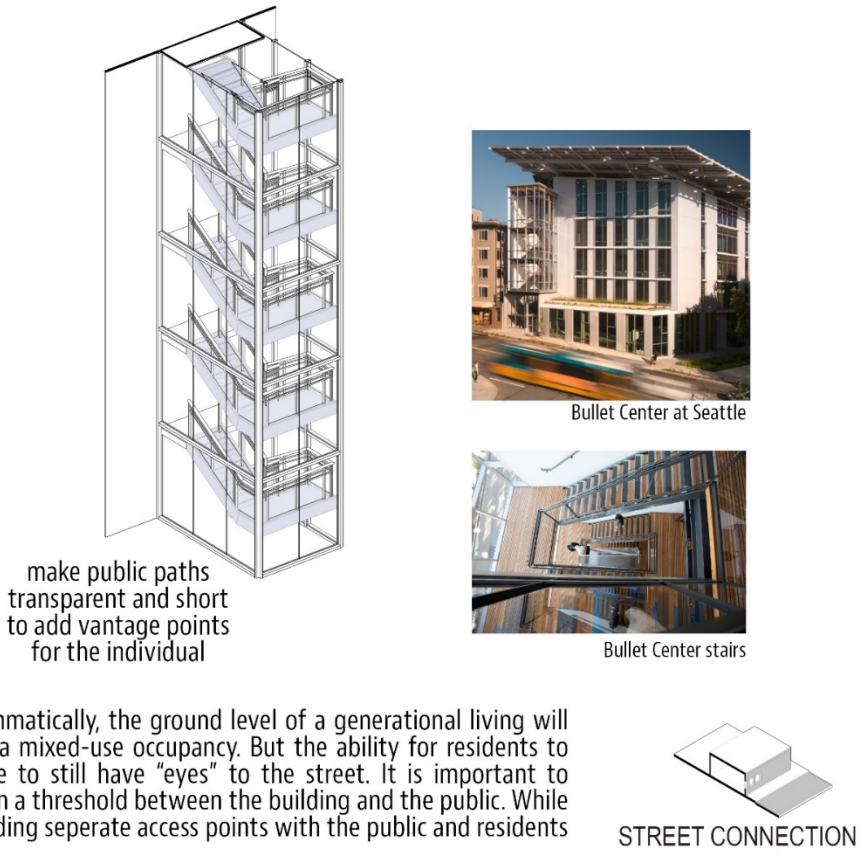


Figure 6-11 Transparent public paths
Source: bullittcenter.org
Illustration: Author

[118] DEI Creative in Seattle WA, "Bullitt Center," accessed April 6, 2018, http://www.bullittcenter.org/.

6.4 Spaces for Interpretation

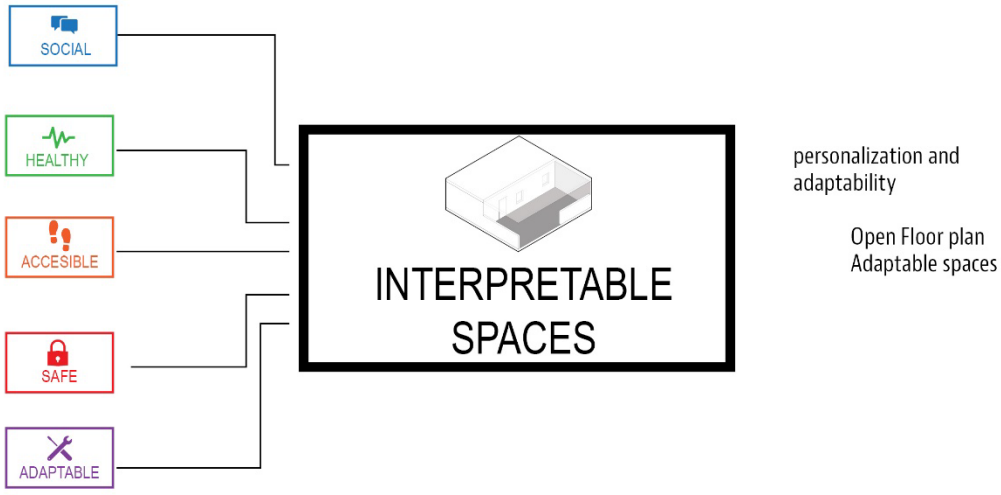


Figure 6-12 Interpretable Spaces Guideline
Illustration: Author

Specific spaces are designated to be personalized and adaptable. Greater power is given to the residents for ownership of the environment. When the support and main structure is built, it gives the residents empowerment to add personal touches to make it their own space as careful thought is given in the design to cater to its more personal and specific needs. As needs continue to shift and change over time, the space needs to be able to accommodate. Leupen makes an argument that polyvalent spaces involve a possibility to change functions and activities between rooms.[119] The spatial relationship of rooms between each other is very important.

If the basic structure is designed, residents can interpret that spaces according to their specific needs. It is also within an understanding that the design of these units become open plans where possibly only the bath unit walls would be designed. A generic floor plan will provide

[119] Bernard Leupen, *Frame and Generic Space* (010 Publishers, 2006). 26

adaptability and specific needs of the residents. Spaces could also be designated for adaptable spaces that allow for transformation to accommodate the preferences of the users.[120]

The social responsibility of the environment is addressed as the power of ownership is given to the residents to design for their specific needs. The responsibility for residents to become a driver to the design gives again moments of belonging. As they are responsible and are given the opportunity to interpret the spaces or partitions as they wish to, more thought and care is given more attention. Having an adaptable space creates greater belonging as these spaces are meant to change according the needs of the residents and as time continues to change these needs. More personal belonging to the environment means that the residents has made connections to the community while maintaining a personal sense of identity, an investment in the building and the community.

Being able to personalize and have adaptable spaces that fit the residents' needs will promote a healthier and accessible environment. Health concerns can be catered differently according to the specific needs of the residents. That also becomes applicable to having a more universal and accessible design that adjust to the certain needs of the resident for all age groups. As needs of the residents change over time, the needs of these spaces must still create a healthy and accessible environment for all people.

If people are then given a place to personalize and identify as their own, the environment becomes safe. By adapting to personalize needs of the residents, accidents can be prevented and have less occurrences. Having personalized spaces will further people to have a sense to protect their spaces and address issues of crime prevention.

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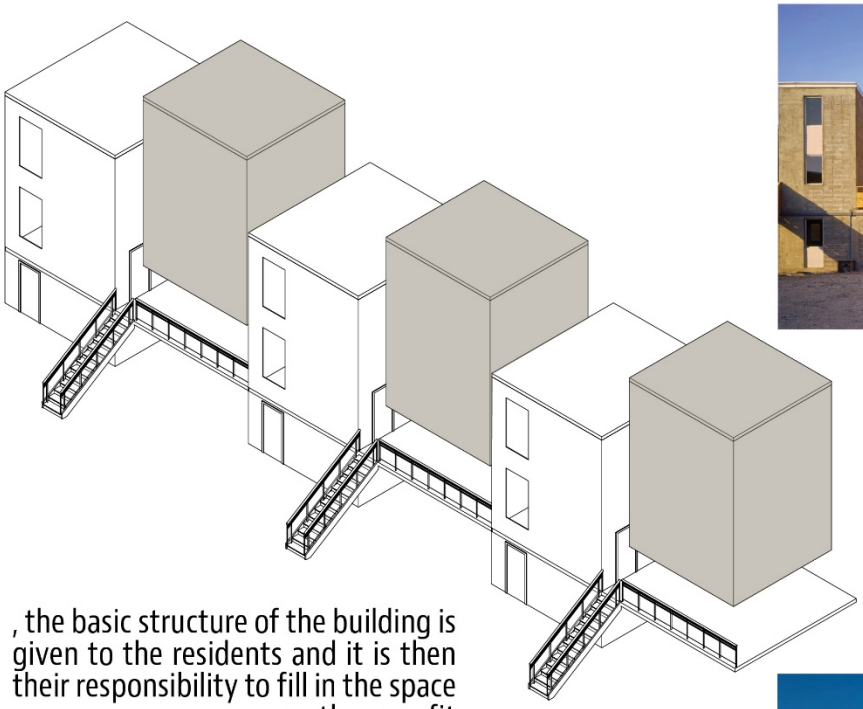
[120] Ibid.

Incremental Housing is a project concept developed by Pritzker Prize winner Alejandro Aravena that achieves interpretable housing and spaces by building “half a house”. In an attempt to solve the housing crisis in Chile, the project creates the “DNA” or the basic structure of the house. It is then the objective of the resident to interpret and create their sense and remainder of the house that is reflective of their own needs. In this sense, the basic structure of the building is given to the residents and it is then to fill in the space as they see fit to adapt to their interpretation. The concept is reinforced that the community is built as a whole through community interaction.[121]

[121] “Projects «Elemental,” accessed April 2, 2018, http://www.elementalchile.cl/en/proyectos/.

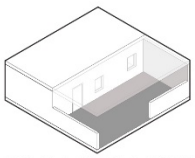


Quinta Monroy in Chile

, the basic structure of the building is given to the residents and it is then their responsibility to fill in the space as they see fit

Quinta Monroy in Chile

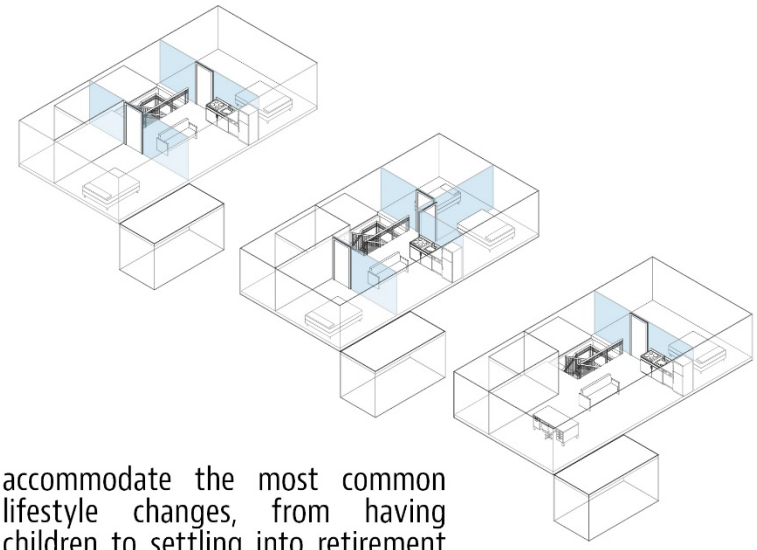
The social responsibility of the environment is addressed as the power of ownership is given to the residents to design for their specific needs. The responsibility for residents to become a driver to the design gives again moments of belonging.



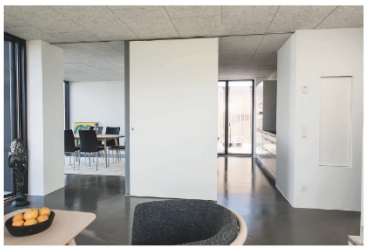
INTERPRETABLE SPACES

Figure 6-13 Interpretable Spaces
Source: elementalchile.cl
Illustration: Author

Another way to provide ownership to the resident is to allow adaptability within the architectural scheme. Adaptable house in Denmark accommodates the most common lifestyle changes from having children to retirement. The different chapters of life a person goes through in life typically need different layout arrangements in terms of the number of rooms. The Adaptable House's solution is to provide moving partition walls that slide to create or eliminate rooms.



accommodate the most common lifestyle changes, from having children to settling into retirement using sliding partitions



Adaptable House in Denmark

Adaptable House in Denmark

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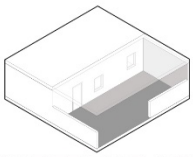


INTERPRETABLE SPACES

Figure 6-14 Adaptable Spaces
Source: archdaily.com
Illustration: Author

6.5 Communal Space

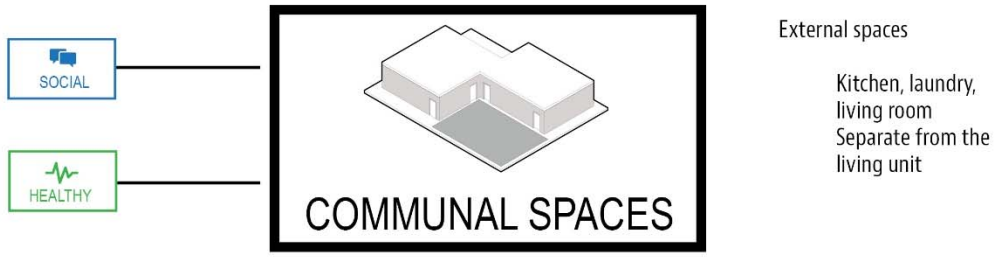


Figure 6-15 Communal Spaces Guideline
Illustration: Author

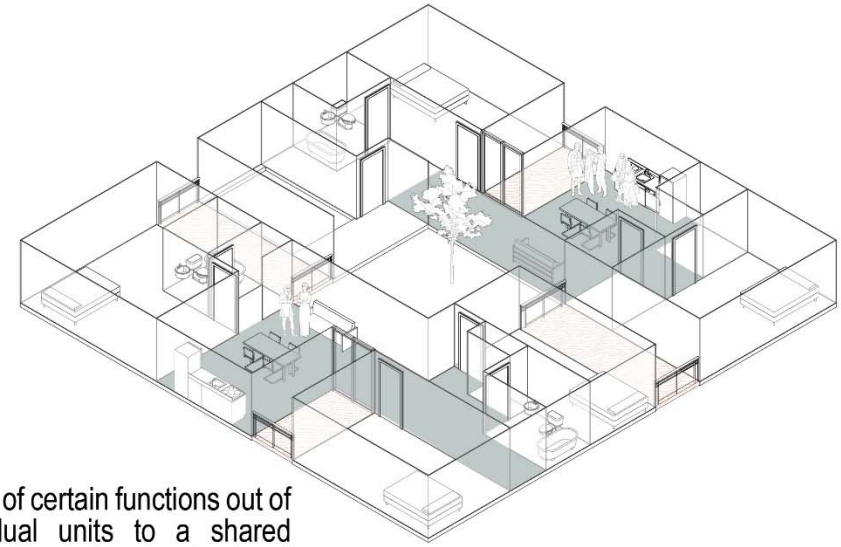
The use of communal spaces emphasizes the interaction of the residents. Relocation of certain functions out of the individual units to a shared environment are the emphasis of these communal spaces. Communal spaces stresses again a social integral environment that also reduces the cost of housing. The cost of housing is reduced as the spaces are shared so that the efficiency of these spaces or function increase at an optimal use.

Possible functional spaces include the kitchen, laundry room, fitness room, living room, and entertainment room. Today, a growing trend in affordable housing clusters apartments are the emphasis of these communal spaces, and the private apartments include a sleeping area, a small office space, and a bathroom. Everyone shares these communal spaces according to the level of social interactivity the housing allows, while the living units only provide spaces that require absolute privacy.

Communal spaces are an important role in the interactions of the social environment as people create shared levels of engagement and responsibilities regardless of age and capabilities. The idea of a shared community of certain functional spaces forces people to meet and socialize with people and prevent any social isolation. The balance of private and public spaces allows for residents to control levels of privacy as well as levels of socialization

The Gap House in Seoul, South Korea is a 4-storey project that clusters four buildings in a very tight site. Because the need for density is required, outdoor space is usually the first line item to be eliminated in a project. However, the architects in this project thought that outdoor spaces were a prime component to living. As a trade-off, communal spaces were implemented. Typical apartments with high-densities tend to have poorly design living and kitchen spaces. Therefore, the solution proposed by the architects were to provide well designed communal spaces.[122]

[122] "Seoul Apartment Block by Archihood Features Gabled Corners," accessed April 2, 2018, https://www.dezeen.com/2015/08/21/seoul-apartment-block-housing-archihood-wxy-balconies-gables-south-korea/.



Relocation of certain functions out of the individual units to a shared environment are the emphasis of these communal spaces

Communal Spaces

Gap House in South Korea

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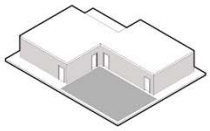


COMMUNAL SPACES

Figure 6-16 Communal Spaces
Source: dezeen.com
Illustration: Author

"The typical character of high-density residential areas in the capital such as the monotonous and generic-looking units – which were designed for maximum profit and efficiency of space – has left residents with living spaces that were poorly designed to support the ideal lifestyle and routine," says architect, Kang and Kang.[123]

[123] Ibid

6.6 Site Criteria

Location is key for any project. For this certain type of typology of a multigenerational housing in a mid-rise apartment, it is essential that the location of the apartment be critical and analyzed. The importance of the selection of the site is to convey and communicate a neighborhood environment that is healthy, socially integrated, accessible, safe and that is adaptable to every need of the residence, but also a reflectance of the critical outlook of Hawai‘i’s housing need. This site criteria include; link to infrastructure, public transportation connection, mix-use content, walkability, and connection to nature.

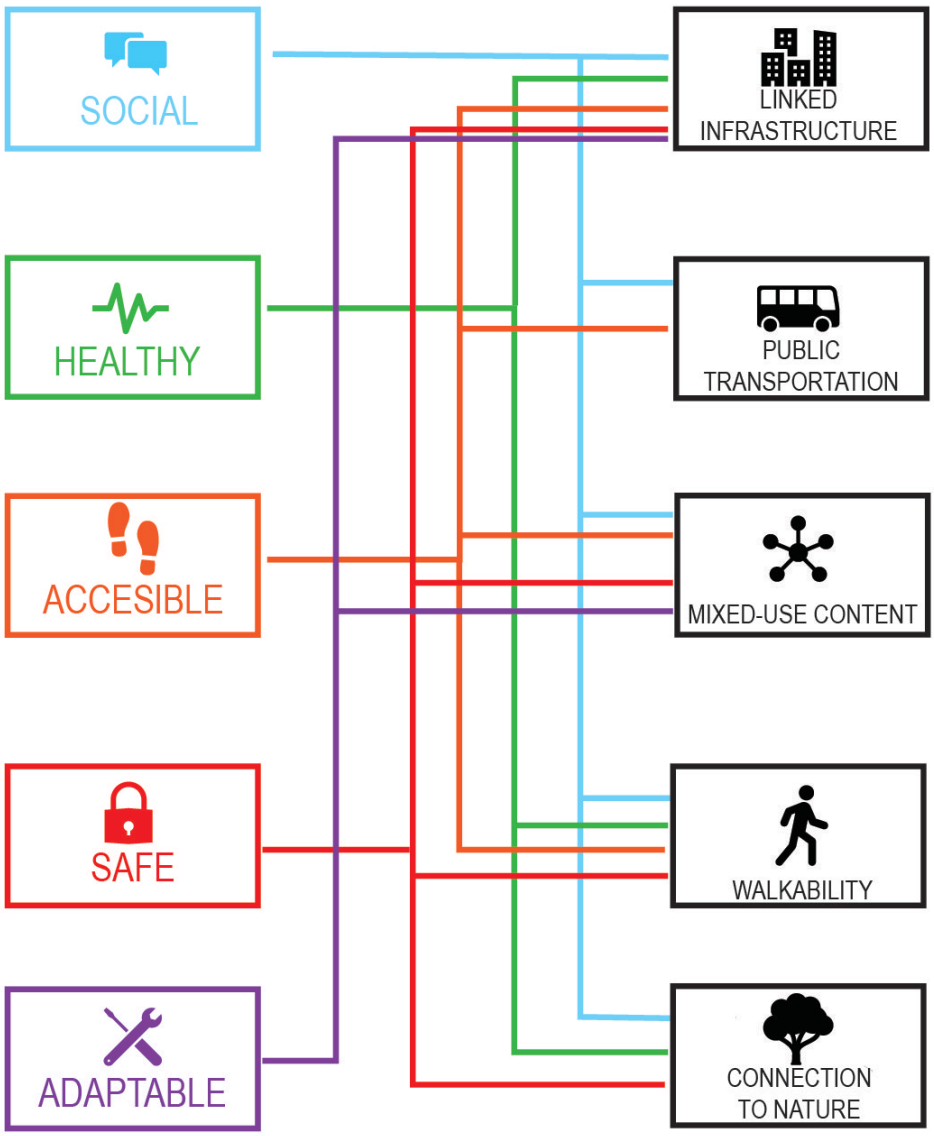


Figure 6-17 Site Criteria
Illustration: Author

Link to Infrastructure

A link to existing infrastructure is key and important to any multigenerational community. When the existing infrastructure is linked to the multigenerational community, future implications of the project in the existing urban fabric envelopes character and develops functional and transportation networks. When the needs and services of the society and people are dispersed, it creates further need to accommodate and schedule ahead of time, making continual inconveniences. The objective is to have people spend less time driving to places throughout the day, and have more people spend time doing other things other than traveling from place to place. The link to an existing infrastructure of people and the urban fabric asserts to an important neighborhood connectivity.

Public Transportation

The dependency on the car creates a lot of traffic and burdens much on the road. The connectivity that site and public transportation relies is on accessibility. Public transportation provides first an alternative transportation that is inexpensive and sustainable. Public transportation come in the forms of city buses, campus shuttles, bicycles, and even shared-taxis. When less cars are on the road, traffic congestion is reduced which lifts a heavy burden especially on Hawai‘i freeways and roads. With less cars, pollution that cars emit is obviously reduced. Secondly, public transportation does not restrict the age of the person. As public transportation is available for children and seniors, the safety of driving is ignored and falls better in the hands of a more able driver.

Mixed-Use

Diversity again connects to resiliency. A diverse environment reduces the time for traveling which reduces the dependency of the car. A diverse environment increases accessibility to facilities

and services appropriate for all age group from infancy to elderly.[124] Lack of mixed-use occupancies will only serve and meet the need of only a certain group of people which will further competition with similar services, where a diverse occupancy can meet all conditions to all age groups.

Walkability

Walkability is measured within 1,600 feet radius. People should be able to conveniently walk to either public transportation, nature, mixed-use and other places without physical obstacles. The conditions of the sidewalk, safety of the crosswalk, appropriate design specific to the climate and topography of the surrounding site are all important considerations for the walkability of the site. The walkability of the site must be accessible to all age groups and should not hinder anyone. The 1,600 feet is a measured distance where people feel comfortable to walk to either the groceries, bank or to any other basic daily services. Services farther than the suggested distance discourages people from walking and furthers the dependency of the automobile.[125] While the distance is considered important for a site's walkability, the comfort and quantitative dimension of walking should not be neglected. In a place like Hawai'i, walking on the sidewalks and through crosswalks should provide pedestrian with sufficient shade to increase the comfortability. A compact, and high-density environment that stresses walkability creates a community and neighborhood with a sense of place as many functions within a walking distance does not discourage the physicality of the residents but creates myriads of social interactions within the community scale.

[124] Epimakhova, *Designing for Multigenerational Community: Creating a Supportive Environment for Young and Old in the U.S.A.*73
[125] Jan Gehl, *Life Between Buildings: Using Public Space* (Washington, DC: Island Press, 2011). 133

Connection to Nature

The built environment is not complete with its presence of nature. The introduction and placement of parks and other recreational places that emphasize the natural connection helps reduce anxiety, stress, and depression. It also helps to assimilate the inhabitants with the natural environment.

6.7 Conclusion

These defined guidelines address all age groups and all scales. The purpose of the design guidelines is to prohibit social isolation and force the emphasis on social and human activity. Not just within the living unit, but the scale of the building and the contextual site becomes integral factors for a successful multigenerational community. Together with the design principles, guidelines, and site criteria, the sense of neighborhood is further reinforced for an integrated multigenerational community. By implementing both the design guidelines and the site criteria, a conceptual project will be designed that addresses Hawai‘i’s housing crisis with a design alternative solution that become critical about Hawai‘i’s current demographic and composition today.

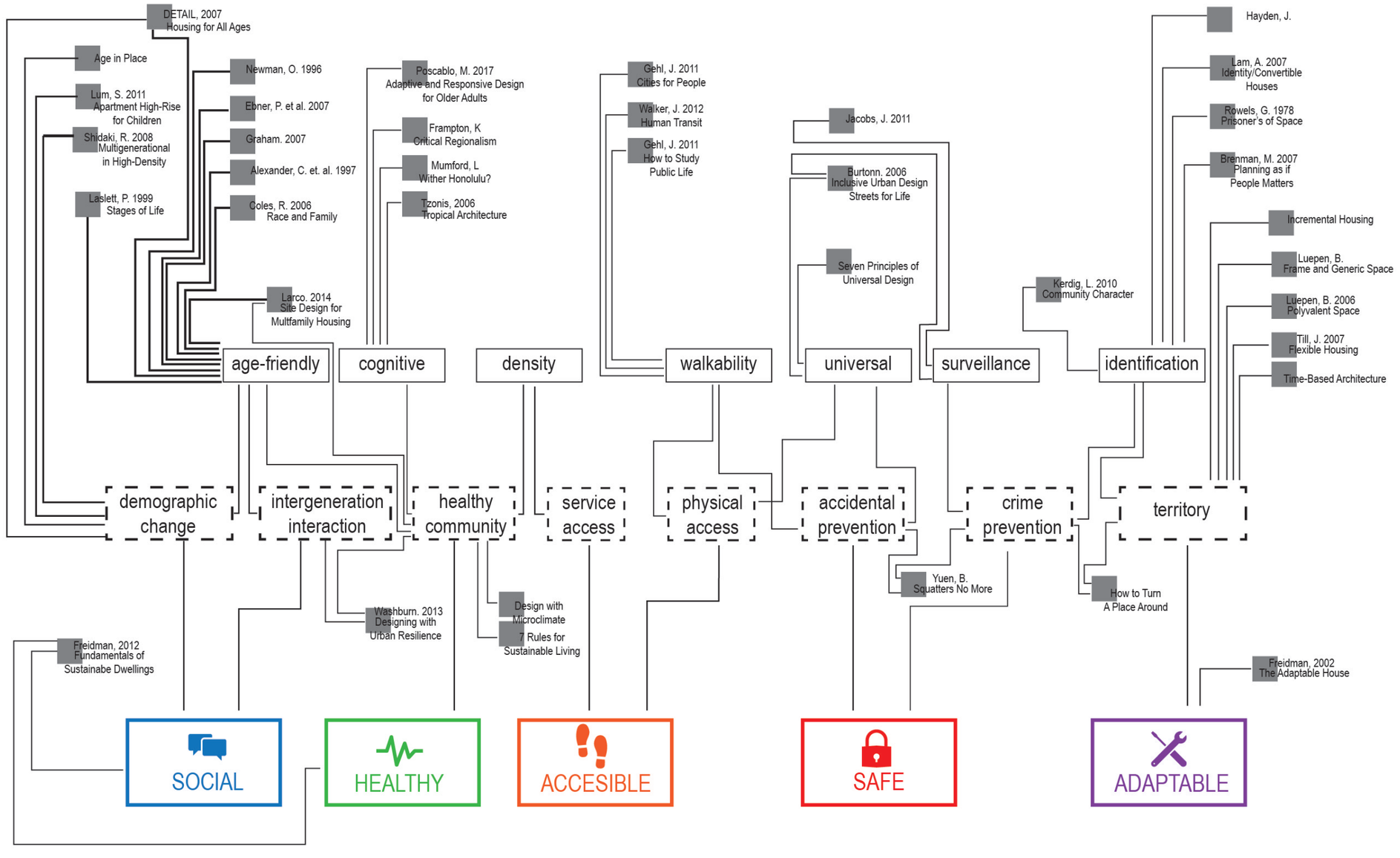


Figure 5-4 Design Literature Review
Illustrated: Author

7| Conceptual Design

The demonstration of the design principles and guidelines defined within the last chapters of this thesis are to then be applied to create a multigenerational mid-rise building fostering a community environment. It is intended through the guidelines; a community of families is housed in a mid-rise so that social isolation is prevented. The structure of this chapter will first select a site appropriate to the criteria, then analyze opportunities and restraints within the site, from which the conceptual idea will be developed, to which the form of the building takes shape. The project will then be analyzed as to how each guideline is implemented into the design. By adhering to the design guidelines, the theoretical framework can become viable tool for future applications towards the housing crisis.

7.1 Site Selection

The proposed site is within the framework of urban Honolulu. Selection of the site must first address all the components of the site criteria. Based on the site criteria alone, there are many possible sites to choose. It was important that the selection of the site along with the surrounding context of the site would allow a sense of neighborhood within the scale of a mid-rise building.

While the recent development of the Honolulu Rail project has garnered many mainstream news, the City and County of Honolulu's development plans around the stations along the rail transit route are creating communities. Transit-oriented development (TOD) surrounds the transit stations to take advantage of the convenience and affordability of transit. It is these TOD's goals that make a neighborhood vibrant, dynamic, and pedestrian friendly.

Based on the rail transit route, three possible sites near the transit stations were at Kalihi Palama Station, Chinatown Station, and the University Station. It was then necessary to pick sites that checked off the site criteria along being linked to an existing infrastructure, have nearby accessible services all in reasonable walking distance. Of the proposed sites were: (1) Kalihi on the corner of Dillingham and Kohou Street over an existing car dealership, (2) Chinatown at the intersection of Ala Moana Boulevard and Nu‘uanu Street, and lastly at (3) Mō‘ili‘ili at the corner of University Avenue and Coyne Street over an existing parking lot and Varsity Circle.

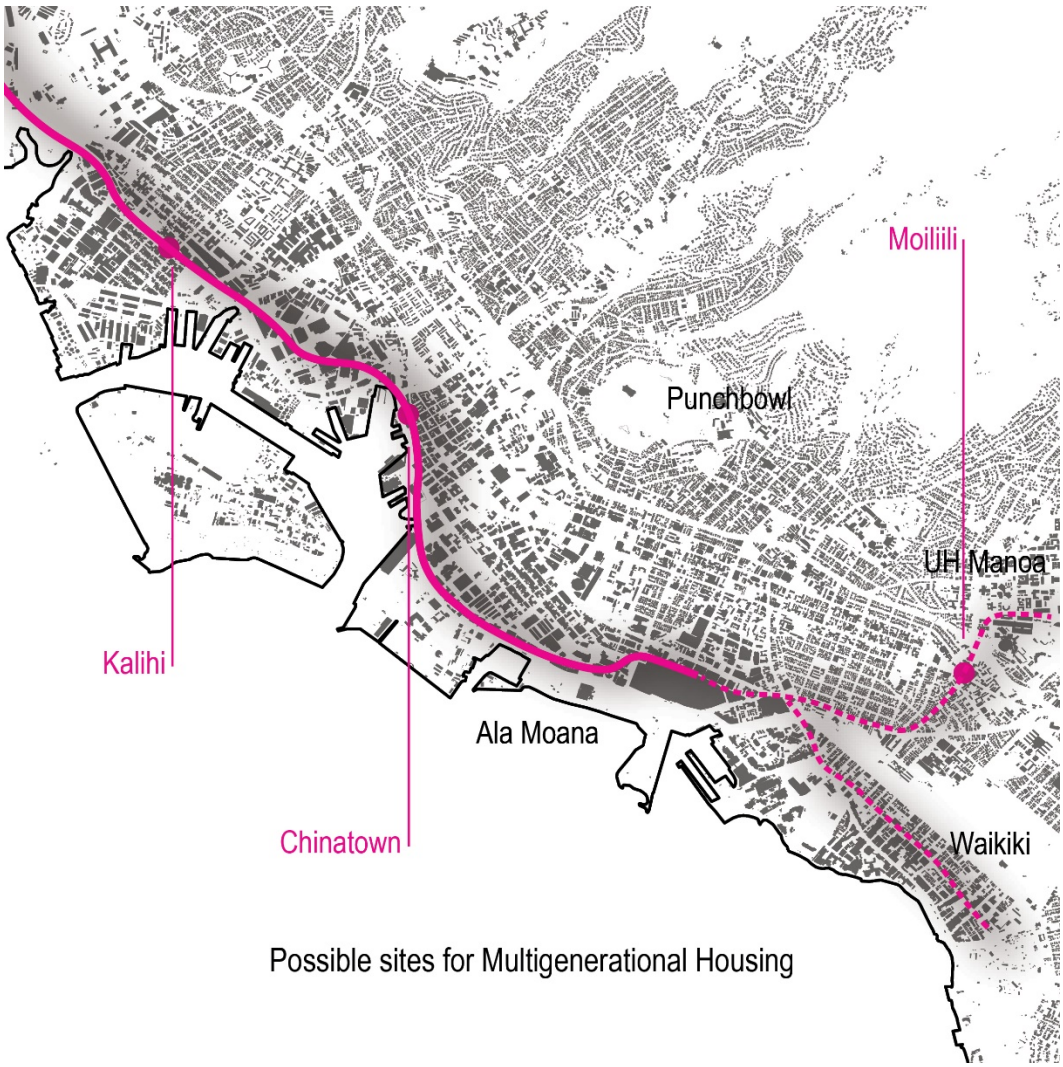


Figure 7-1 Possible Site Selection
Illustration: Author

While the University station is currently not within the scope of the TOD as the current rail plans have the route ending at Ala Moana Shopping Center, the selection of this site satisfies the site criteria selection while at the same time includes some future development. While the rail route is currently designated to end at Ala Moana Shopping Center, the federal government has mandated that the rail must meet the previous agreement as the rail will need to extend beyond to the University of Hawai'i and/or to Waikīkī.[126] As according to early proposals, the intersection of University Avenue and King Street was planned for a TOD station.

Figure 7-2 Proposed O'ahu Rail Route
Source: honolulutransit.org

The chosen site fits all requirements within the scope of the site criteria guidelines. As the site is already in an established urban fabric and neighborhood, it is linked to an existing infrastructure. Within a 500-meter radius, the intersection of University Avenue and King Street has

[126] "Land Prices for Hawaii Rail Route Jump $100 Million since 2006 | The Honolulu Advertiser | Hawaii's Newspaper," accessed April 2, 2018, http://the.honoluluadvertiser.com/article/2009/Apr/12/ln/hawaii904120374.html.

the bus routes A, 1,4, and 6 with numerous bus stops. The site is also located near various mix-use business such as a Puck's Alley, restaurants, small shops, and a future student housing dorm. All these services for alternative transportation, services, and shops, and as well as to the open parks such as Old Stadium and Mōʻiliʻili Park are all within a comfortable 500 walking radius to the site.

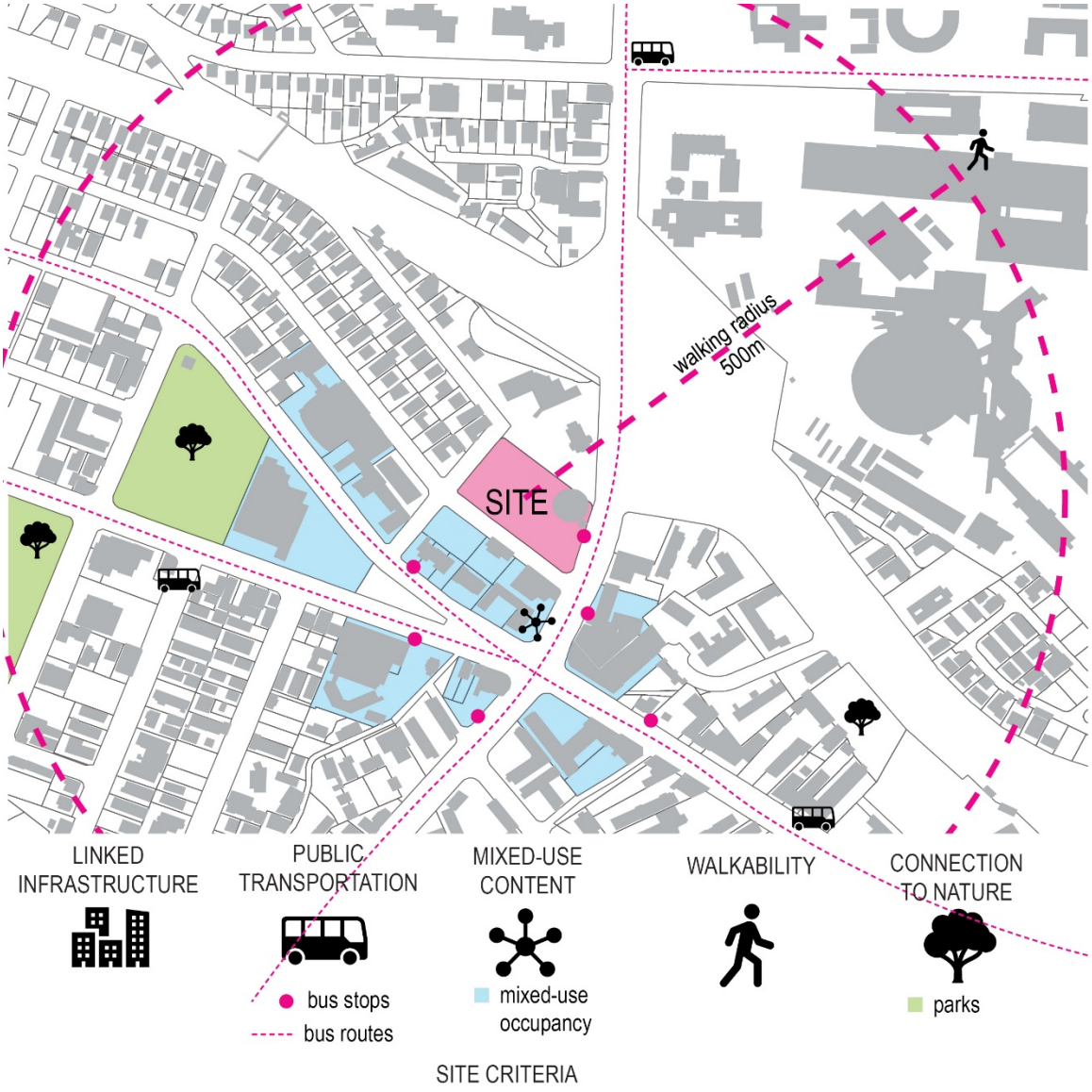


Figure 7-3 Site Criteria Selection
Illustration: Author

At its prime location, the choice of the site investigates the future development to ideally become a prototype that could be applied in other parts of the urban fabric. The site sits between an ongoing future development along University Avenue, however, on the other side of the site sits single-family residential houses. As there is continuous need for future housing units, the future plan and proposal to transform the single-family dwellings into mid-rise typologies becomes possible with the author's design proposal for a mid-rise; dependent on its success. The transformation of these single-dwelling house not only makes for a case to add more dwelling units, but it also reinforces the sense of a neighborhood and to other implications, where the success of Coyne Street could possibly block off the street to vehicles and hold social events for the community.

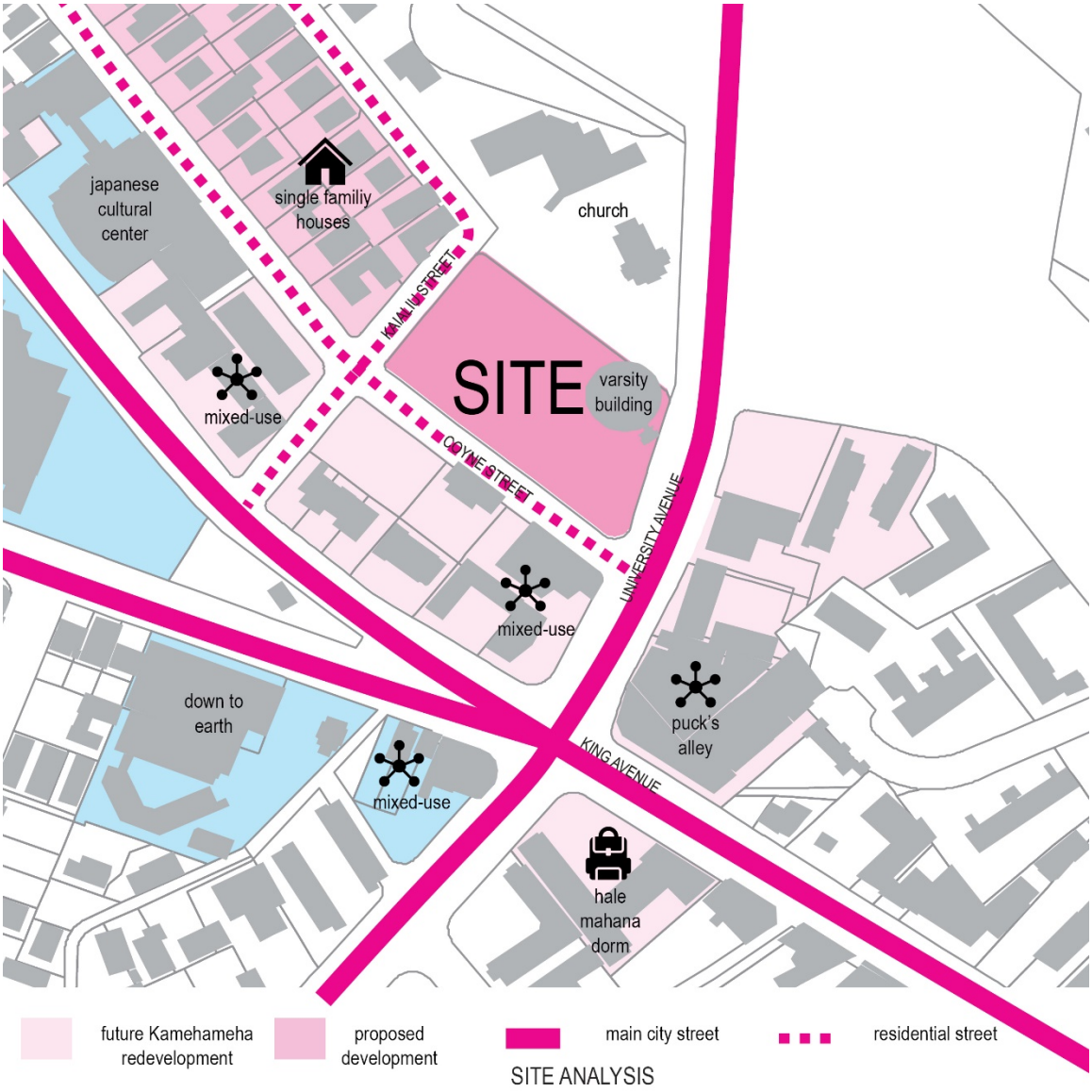


Figure 7-4 Site Inventory
Illustration: Author

Situated between the urban façade at University Avenue and the residential face at Kaialiu Street, the site sits at a perfect medium to make a case for a mid-rise building to house a multigenerational community. While it is meant to add density by adding more units, the importance of the site is to balance density with scale of a neighborhood. The University Avenue and King Street

intersection is busy and lively with many mix-use services. This business façade wraps around the residential façade which has apartments and single-family houses. The problem is the in between transition, especially for the single-family residences as noise and traffic become a hinderance.

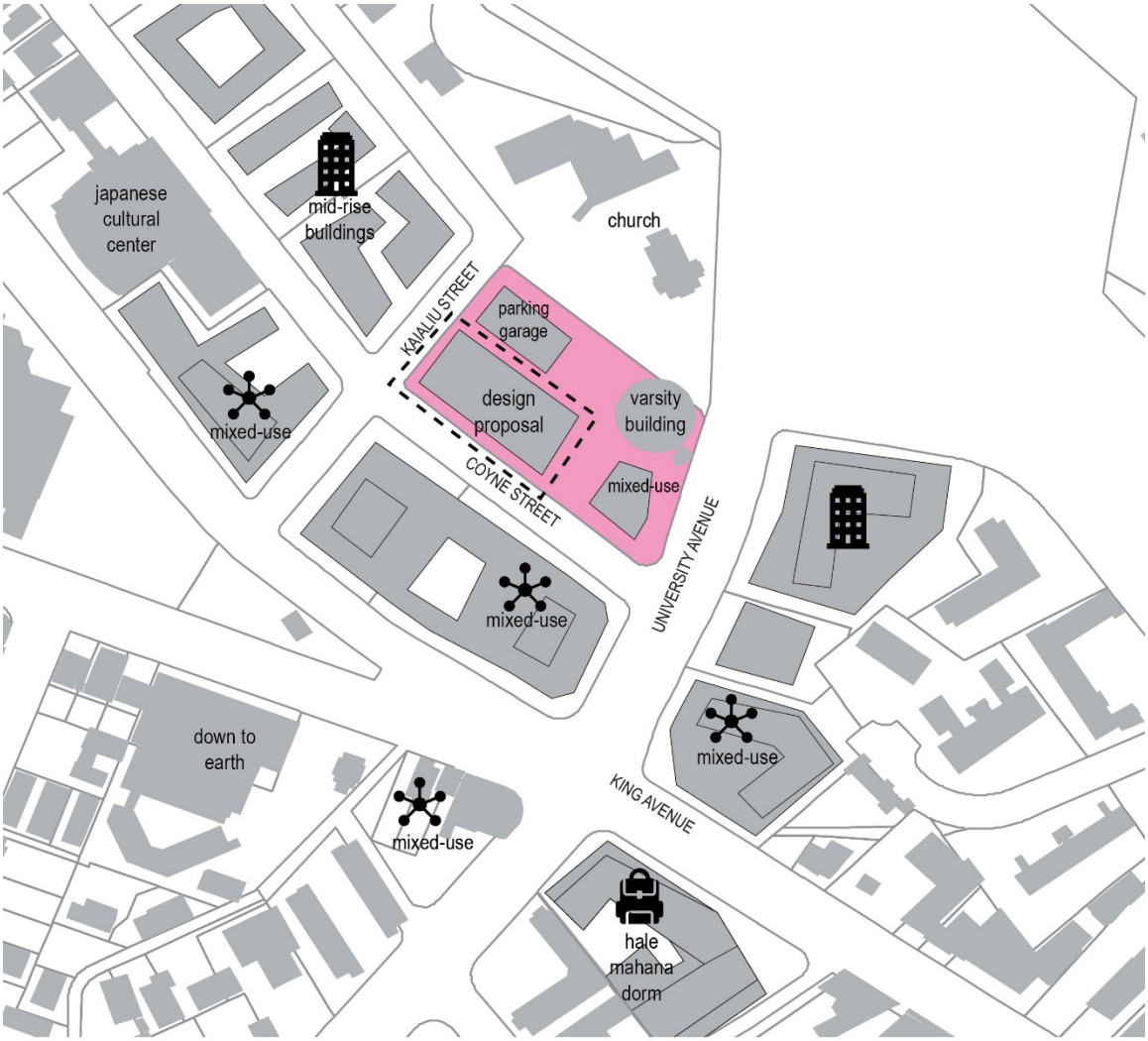


Figure 7-5 Site Analysis
Illustration: Author

Before site analysis and design decisions take place, it is important to take into consideration to limits and constraints of the existing conditions. The lot is currently zoned as BMX-3 which allows for general community business mix-use. Currently the lot allowance is at a building height of 60ft. With a lot size of 74, 682 square feet and an FAR of 2.5, the allowance of total square feet is 187, 155.

Mō‘ili‘ili is primed for a redevelopment that will focus not only on the student body context, but also connecting the neighborhood community, and faculty. As the leases at Puck’s Alley and the surround lots are soon to be expired, the ownership of these parcels shifts back to the Kamehameha Schools. Kamehameha Schools realizes the potential at the intersection of University Avenue and King Street it sees this intersection as cross-center from the University of Hawai‘i to Waikīkī and Honolulu. It is without a doubt that the context of the place should support the student body as the future 10-story residential tower aims for student dorms; primed to open for the Fall 2018 semester. With such close proximities to the University of Hawaii along with other primary schools, the area is intended to be revitalized to meet the students’ demands for a place to gather, eat, and enjoy. However, while the aim is intended to meet future student demands, Aron Dote, communications manager for Kamehameha School also mentions to incorporate the community. Faculty [and] the neighboring communities can come and enjoy [as well],” says Dote.[127] The aim is to add “community spaces” that houses programs according to the needs and assistance of the local residents.[128]

The decision to focus on the Native Hawaiian community in Mō‘ili‘ili comes from a collaboration with Kamehameha Schools and the University of Hawai‘i. On Thursday March 24, 2017 both institutions gathered for a design charrette that would look into the future and vision of Mō‘ili‘ili.

[127] Jocelyn Grandinetti, “Redeveloping Puck’s Alley | News | Manoanow.Org,” Ka Leo, February 19, 2018, http://www.manoanow.org/kaleo/news/redeveloping-puck-s-alley/article_186a4f12-151d-11e8-8df1-57e9cbd2dbfb.html.
[128] Grandinetti.

The consensus is a community that serves the Native Hawaiian community that benefits the students for the university, the Native Hawaiian graduation rate for Kamehameha Schools, but as well as the community of the local residents and the Native Hawaiian community; three baseline essential stakeholders to the future development of Mōʻiliʻili.[129] But what can be taken from this charrette is the increased density of the redevelopment to support a possible thriving TOD as well as place focus on Native Hawaiians and the school body context.

FAR needs to be increased. With the current regulation of a 2.5 FAR, the existing conditions will not support for the demands Kamehameha School envisions. The mix-use spaces and programs that will support a striving Native Hawaiian and student body demand requires a higher density. Additionally, if the plans for a TOD station is to be implemented at the intersection of University Avenue and King Street in the future for the extended rail route to the University of Hawaiʻi, a 3.5 FAR will support for mix-use redevelopment.

Figure 7-6 Design Charrette of the redevelopment of University Avenue and King Street intersection in collaboration with the University of Hawaiʻi and Kamehameha Schools
Source: University of Hawaiʻi

[129] "New Vision for Mōʻiliʻili Development Has Educational Kuleana – University of Hawaiʻi System News," accessed April 2, 2018, http://www.hawaii.edu/news/2016/03/04/new-vision-for-moiliili-development-has-educational-kuleana/.

Figure 7-7 Mōʻiliʻili Redevelopment Charrette – Needed Density
Source: University of Hawaiʻi

7.3 Conceptual Idea

Inspired by the development of housing features in Hawaiʻi, the primary concept for this design was to create a community where different age groups could live with one another and engage in a network of social interactions where the family not only age in place, but also ages throughout the building in every chapter of life. The target group for this design are meant for young families and extended families that support multigenerational families in the future.

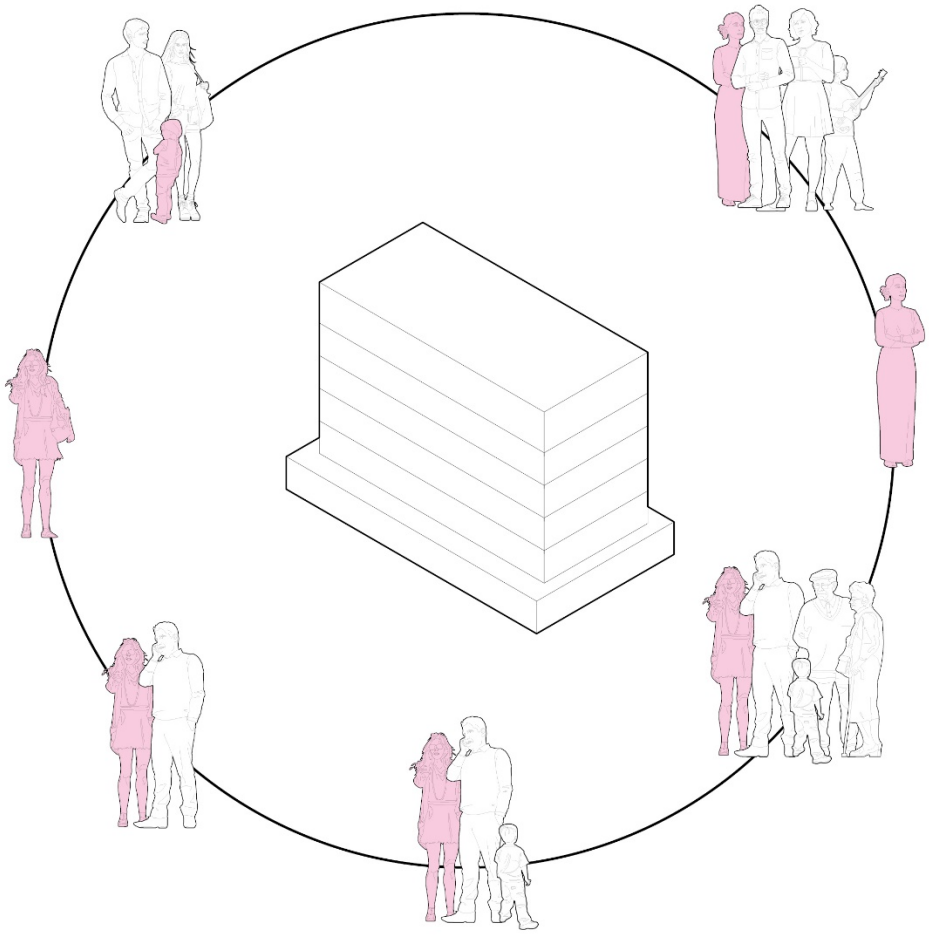


Figure 7-8 Concept Idea – Aging through the chapters of life in the same building
Illustration: Author

Focused on allowing someone to grow in the building throughout his/her entire life through different chapters in their life is the main concept of this design. The core idea of this design is to allow for a couple to start a family in the building but allow for the family to move and change their living conditions reflective of the changing life phases. The phase will allow for a child to live with his/her parents as the child is nurtured by his parents, grandparents, or a member of a trusted

extended family. The child would then be able to move to a smaller unit in the building when he moves to college to allow for privacy but have closer proximity to his parents. Then, as he/she starts his new family, with his/her own family, he/she can rely on his parents to live together or in a communal setting where all generations benefit from one another. As the parents grow too old, he/she then could either live independent in a separate unit or in a more attached scheme.

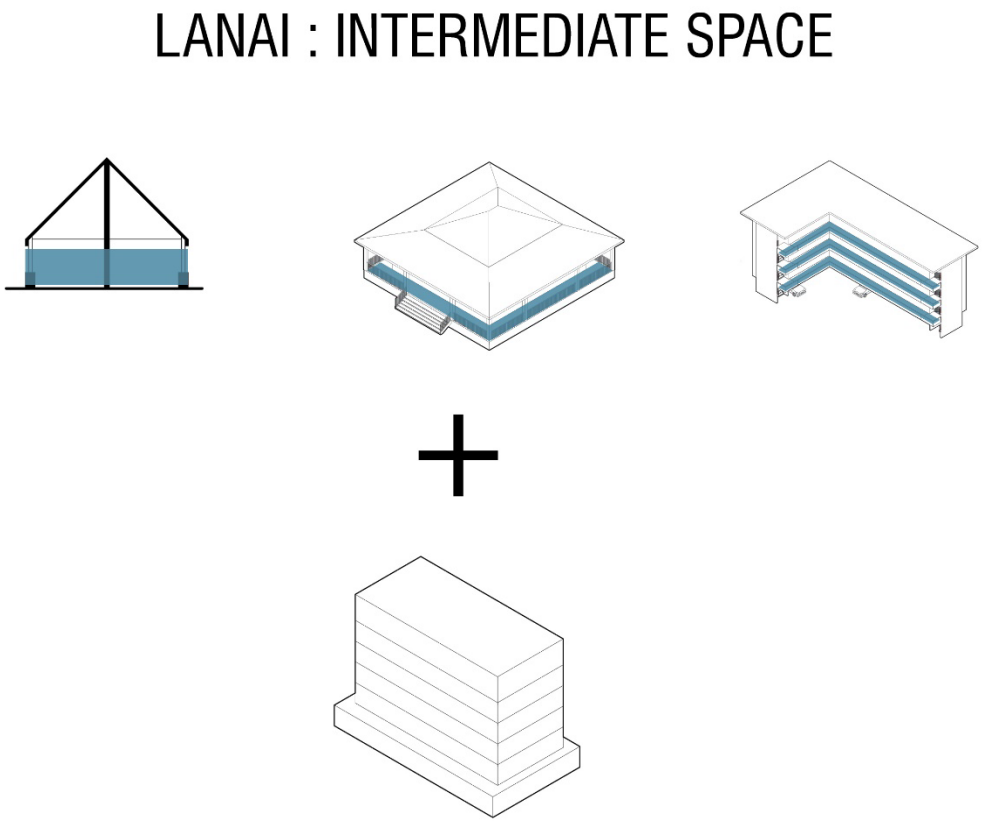


Figure 7-9 Concept inspired by the Lanai
Source: Author

Inspired by the hale, plantation house and as well as the walk-up apartments, it was the intermediate space of public and private realms that lace the intricacies of social interactions. The

lanai, simply another word for patio, porch, veranda, or balcony connotates to an open sided structure covered from the harsh sun and rain but provide shade and a transitional space of the outdoor and the indoor. This gray space, is the intermediate space that will allow for social interactions between residents of all ages in the building, the community. Enclosure will allow for the residents to communicate and interact while not being limited to their intimate private spaces.

7.4 Building

The final massing solution was conducted through a series of careful studies. Using the Why Density? book as a reference to implement strategies to a mid-rise building on this particular site. By selecting three distinct strategies, the disadvantages and advantages were analyzed to see which if any would be best suited for the site.

The first scheme is the Fishbone + Slab typology. The features of this scheme incorporate a slab podium that includes a mixed-use street level. On top of the podium sits L-shaped residential towers and an open green space for each tower. However, the problems with this strategy is the lack of density and the incorporation of a social connection among all the towers. The fishbone or L-shape towers takes great advantages of the maximized potential natural ventilation circulation as well as a resemblance of the walk-up apartments. With an FAR of 2.5, the density of this building among all three of the strategies is the least dense. Also, the slab podium does not allow for transitional public to private therefore the opportunity for social interaction is limited.

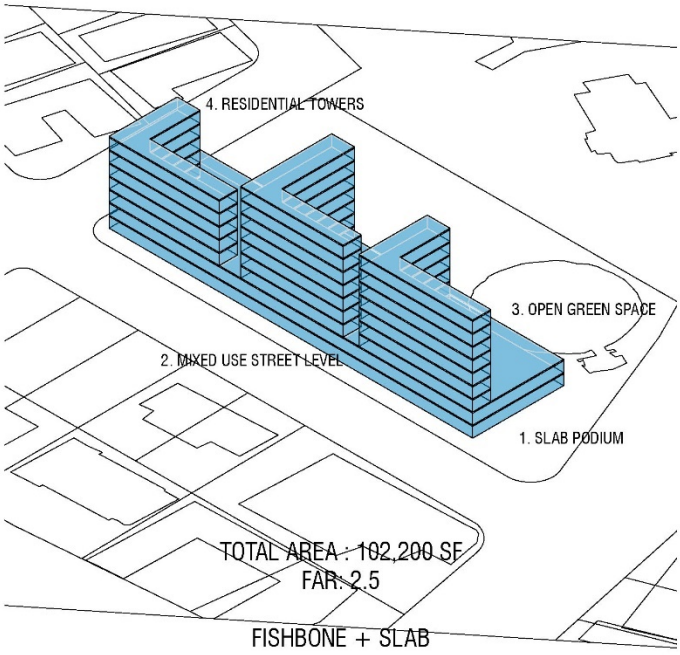


Figure 7-10 Fishbone Massing
Illustration: Author

The second typology has the greatest FAR with 4.9. While the Urban Block strategy adds the most density, the ends of the massing are raised to incorporate a better transition for the public as individuals recognize where public urban zones are clearly outlined. The residential units and other mixed-use spaces take up the rest of the massing. The roofs are terraced with gardens to protect views from Varsity Circle, a key historic landmark to Mō‘ili‘ili. While this strategy employs the greatest density, the quality of units draws concerns for natural lighting and ventilation. The reason walk-up apartment grew in popularity was because the slim massing allowed for comfortable environments as light, shade, wind are carefully designed in consideration with natural systems.

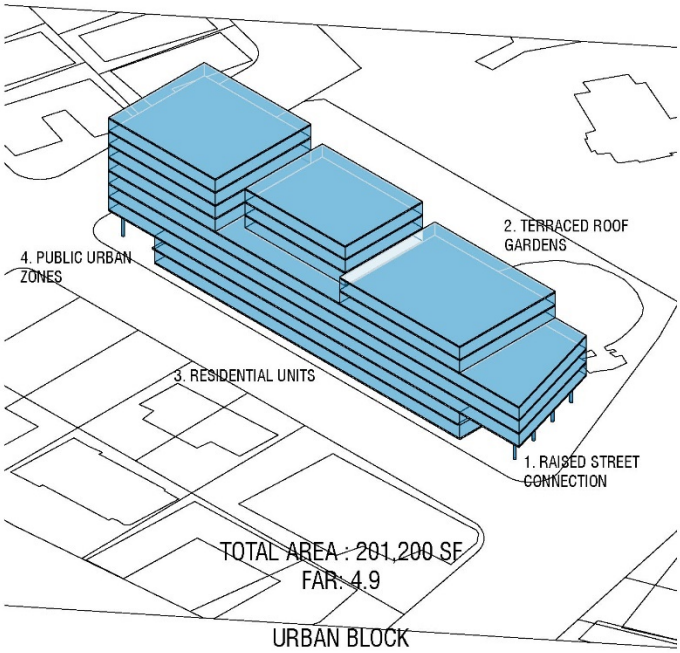


Figure 7-11 Urban Block Massing
Illustration: Author

The Point Building + Slab is the final scheme analyzed. The basic feature of this typology physically separates the commercial and residential spaces. The close proximity does however allow for some connection between both masses. With an FAR of 3.6, the density sits within a comfortable range. The residential towers are slabs that are simply extruded. Situated along the University Avenue façade, incorporates the mix-use point building while the residential towers and communal tower are place on the opposite end to connect to the residential façade. The massing allows for natural ventilation and sunlight while the massing also creates an interesting public-private courtyard spaces that shield to a certain degree from the public.

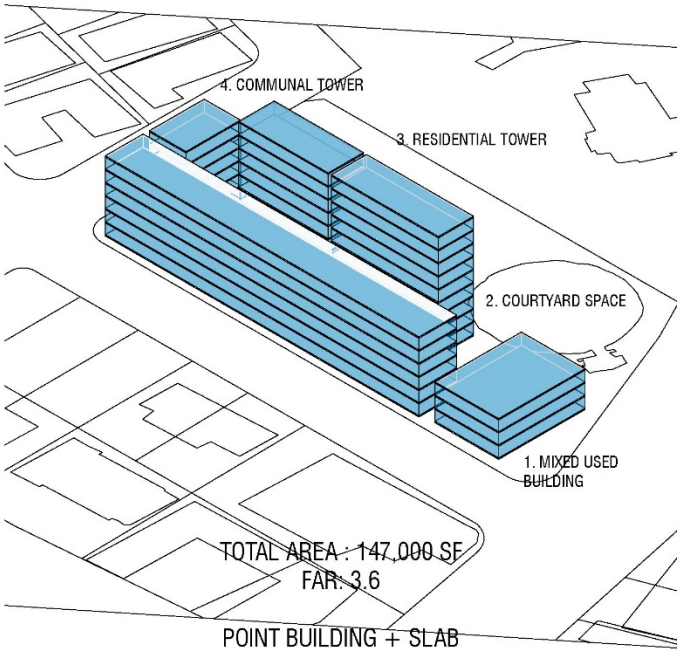


Figure 7-12 Point Building + Slab Massing
Illustration: Author

In comparison with all these typologies, the design decision was to incorporate with the appropriate features from all three to create a wholistic massing that responds best to the site as well as the need for housing in a scale that reiterates a sense of community. The main features that made coherent sense with the long site was to include raised street levels, an L-shaped massing along with a slab massing to increase density while designing for natural systems. The composition of these masses then creates another layer of interstitial space that make up the interior courtyard space allowing for more social interactions.

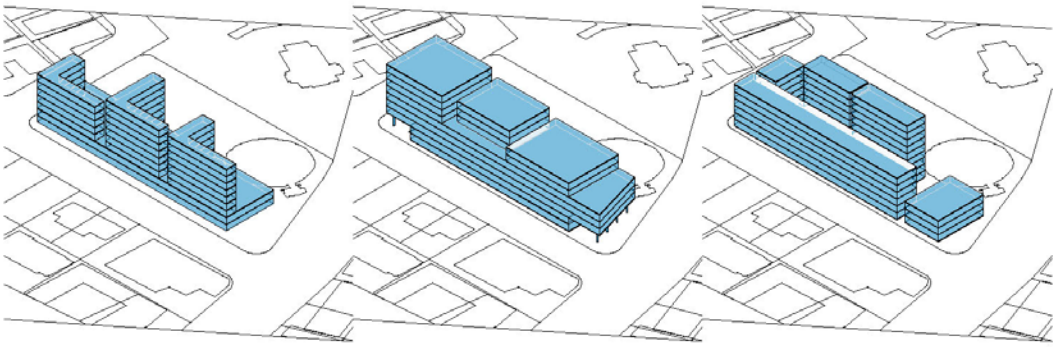


Figure 7-13 Massing Analysis
Illustration: Author

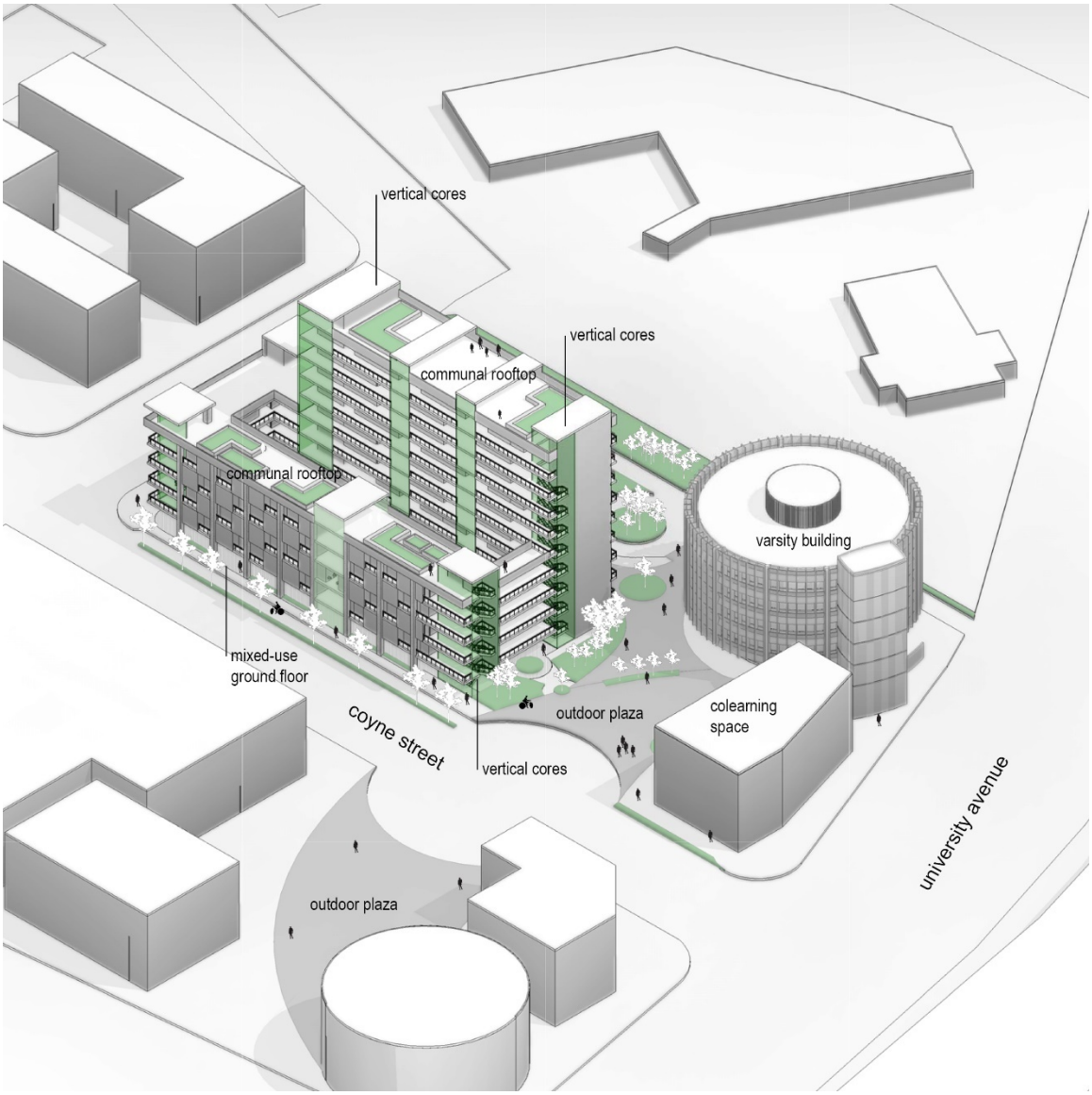


Figure 7-14 Final Massing
Illustration: Author

The final massing then becomes hybrid of all three masses along with components of the walk-up apartment along the lines with some design charrettes collaborated from Kamehameha Schools and the University of Hawai‘i. The ground level is partially lifted to outline outdoor plaza spaces to address a stronger street connection. The L shape 5-story residential tower address

more smaller units, while the 10-story slab residential tower includes larger living spaces. At the ends of the residential towers are the vertical cores of the building to allow for residential circulation familiarity. Each tower is equipped with a single-loaded corridor that act as the public lanai while private lanais provide public outdoor spaces.

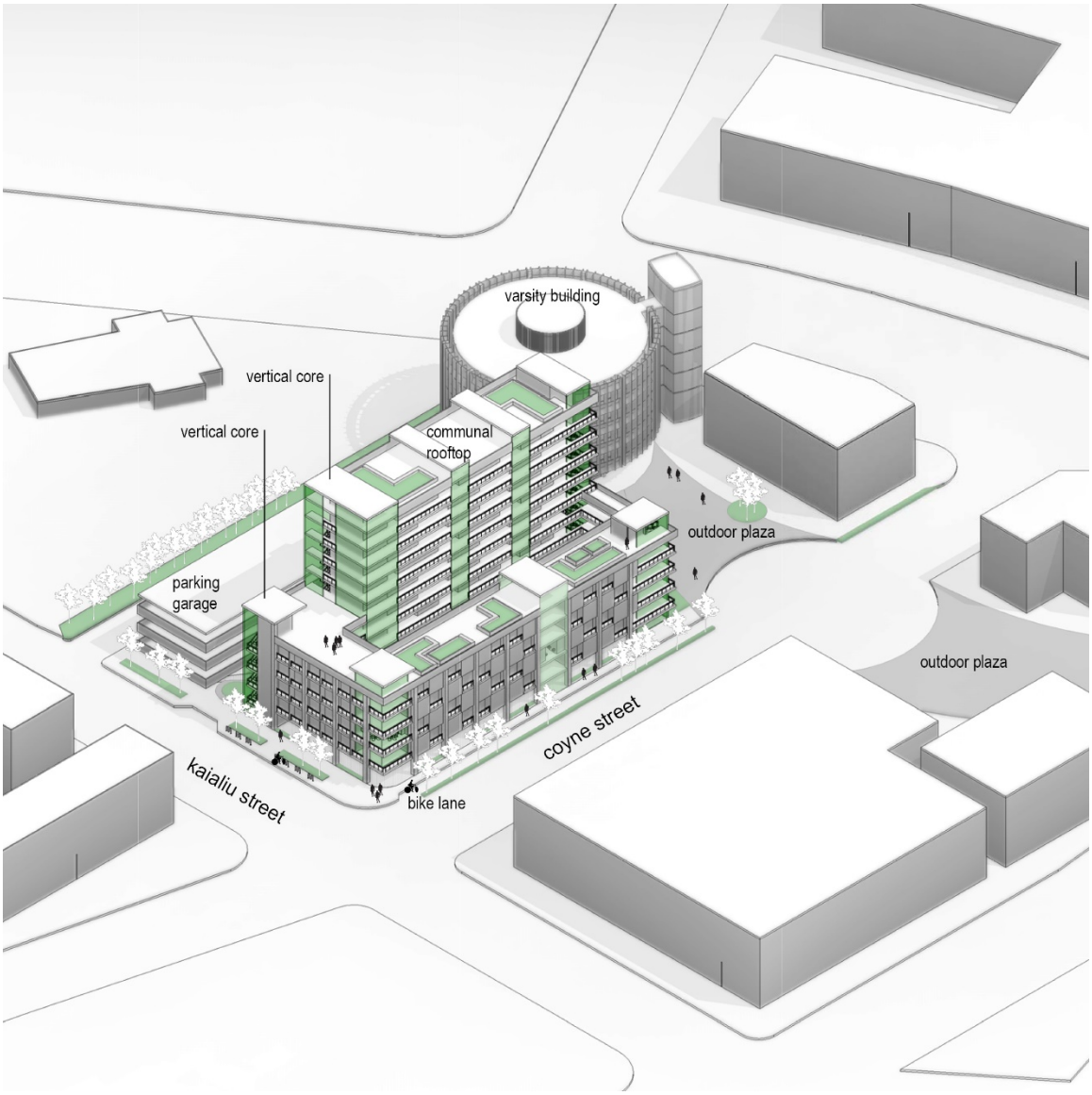


Figure 7-15 Final Massing
Illustration: Author

Designated pedestrian and vehicular entrances are key to reinforce the concept of community. The vehicular entrances of brise-soleil are established at the back ends of the site from both sides of University Avenue and Kaialiu Street which connects to a parking garage. This allows for Coyne Street to remain at a relatively public façade without disturbing any pedestrian circulation. The main pedestrian circulation to the housing is then connected by the nodes that connect Coyne Street with Varsity Circle. Additional pedestrian access is accessible from Kaialiu Street between the parking garage and residential tower.

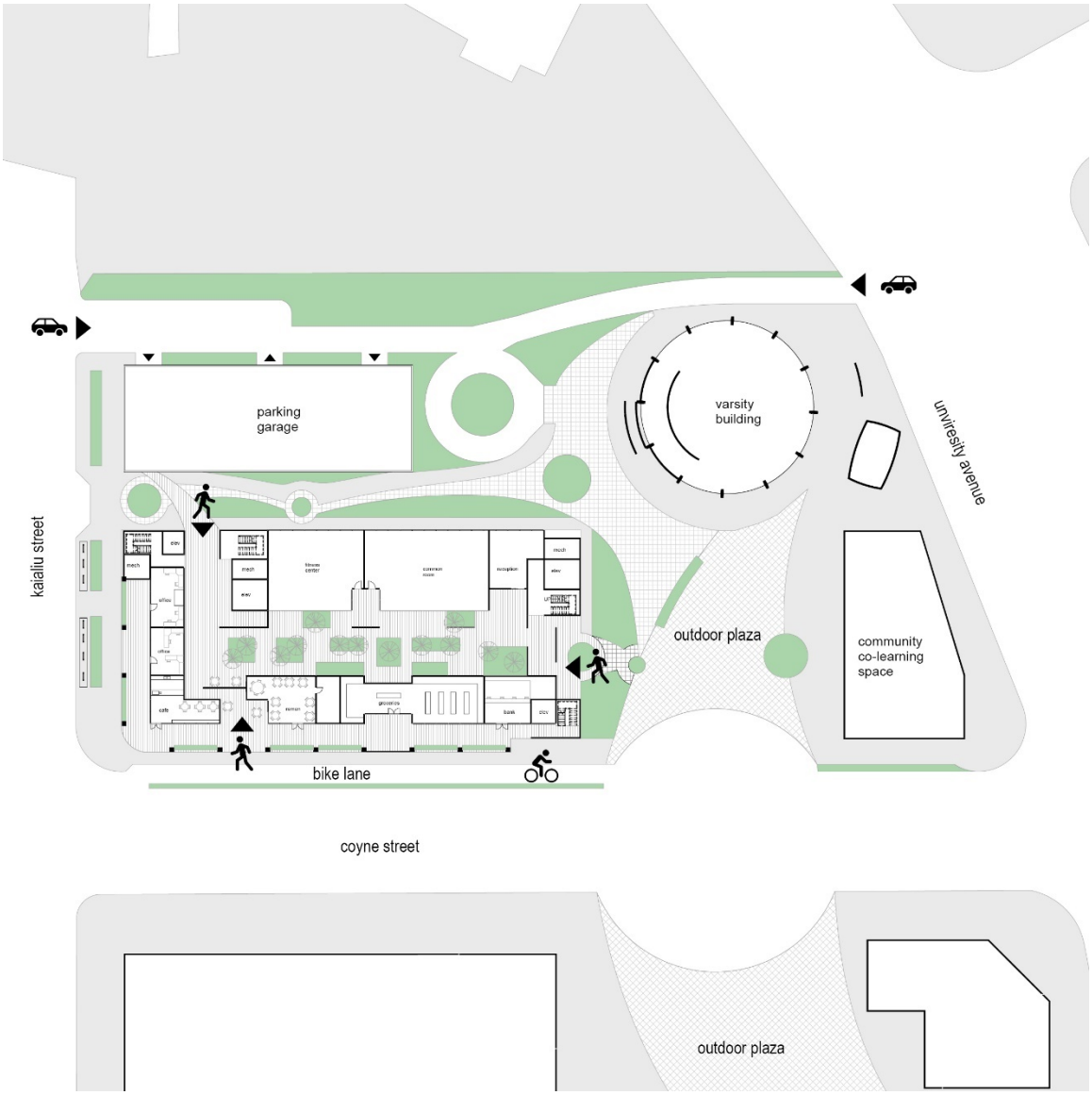
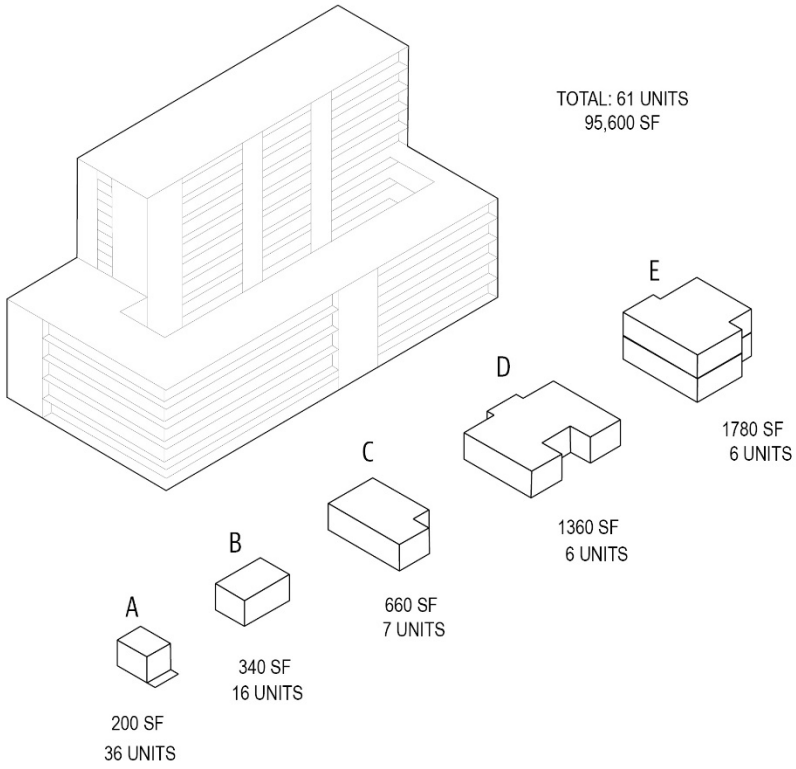


Figure 7-16 Site Plan
Illustration: Author

7.5 Units



Units

Figure 7-17 5 Unit types
Illustration: Author

The various units allow the ease for an individual and family to move and transition from unit to unit according to their needs during their different phases of their lives. As a result, five different units were designed to match the needs of each of the phases a family would typically live through.

The various units differ in square footages but also implement various strategies that have been analyzed in Chapter 3. The following paragraphs will explain in detail how the unit functions and its purpose, as well indicate the suggested resident in each particular living unit.

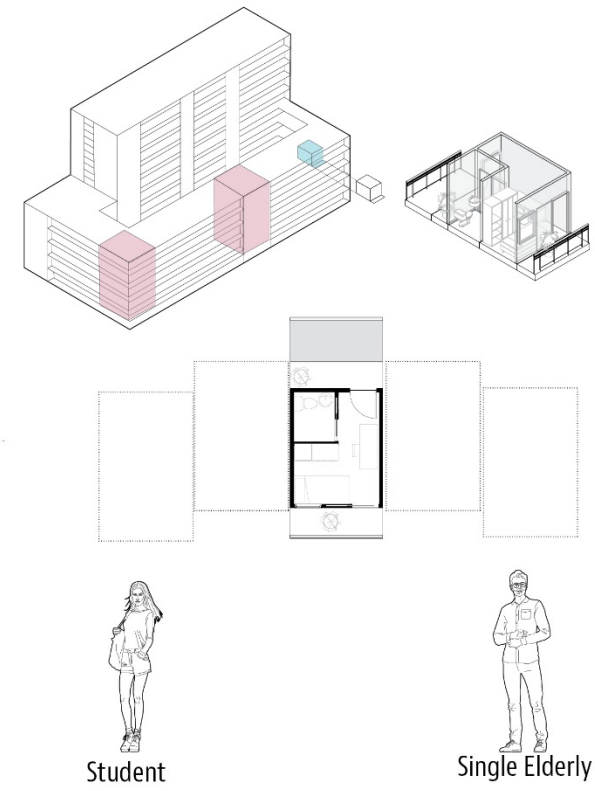


Figure 7-18 Unit A
Illustration: Author

Unit A

Unit A is a micro unit apartment located along the smaller 5-story tower. At the smallest living unit possible, the target residents are meant for individuals. Whether the resident is meant for a college student or a single elderly, the design for Unit A is meant to only provide the necessities to

sleep and bathe. Other needs such as the kitchen, laundry, living room are all clustered and designed through a communal space located on each floor. While the room is considerably small, the purpose of this unit is to be only occupied when the need for privacy and sleep is at top priority. At other times, the resident should be encouraged to leave the micro unit and socially interact with the other resident and/or family members with the communal areas.

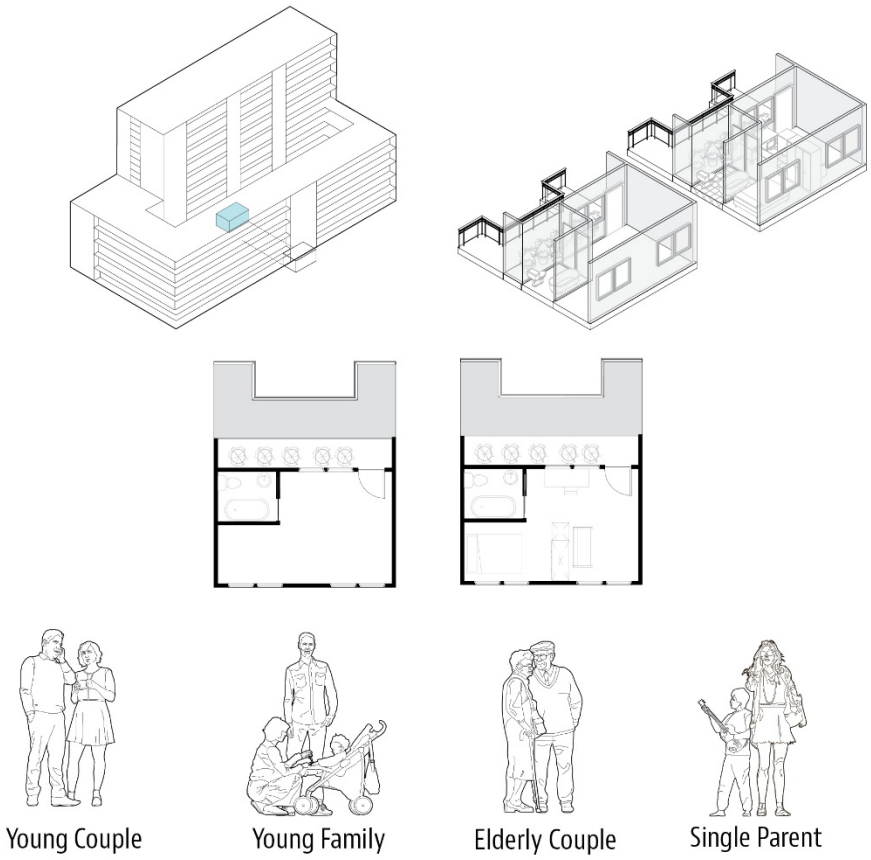


Figure 7-19 Unit B
Illustration: Author

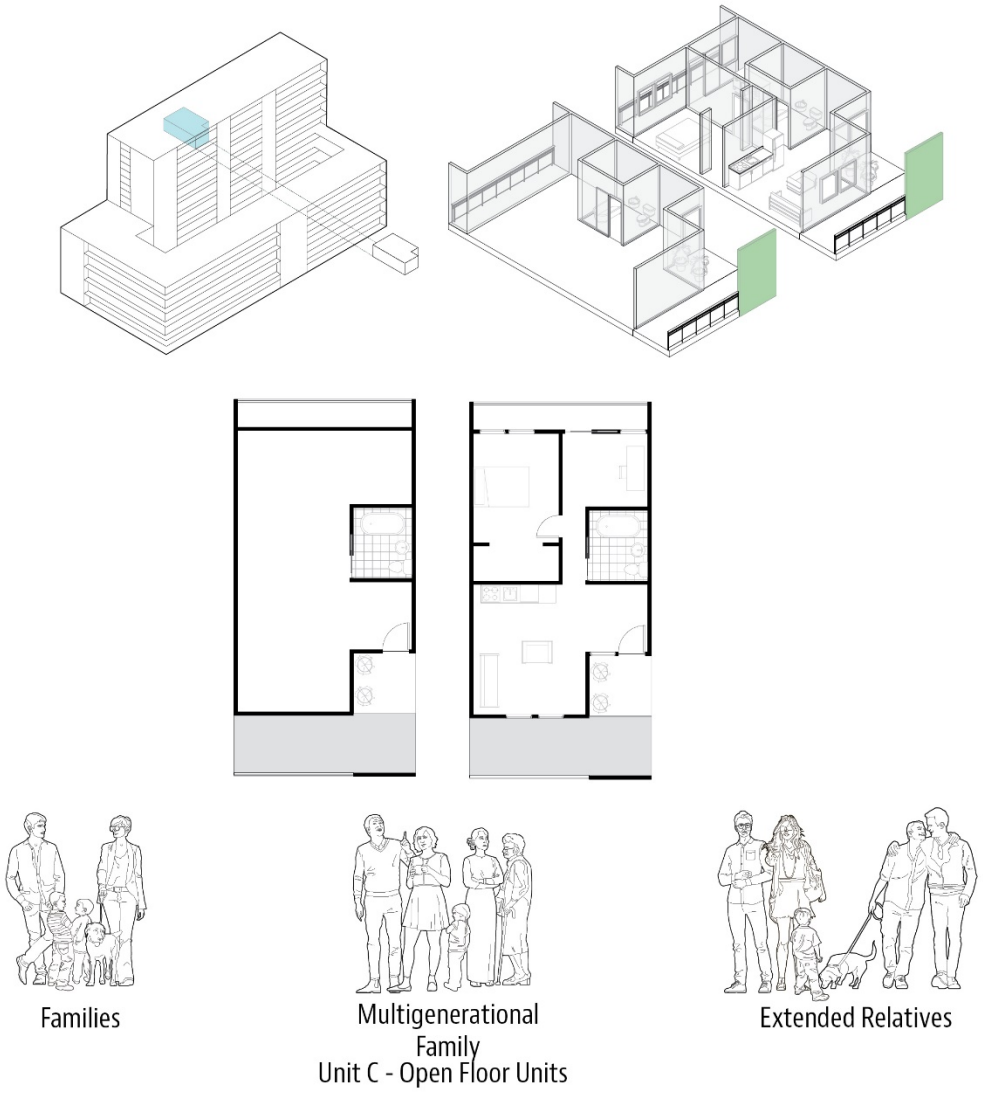


Figure 7-20 Unit C
Illustration: Author

Unit B & C

Both Unit B and C are open-neutral living unit. Unit B are designated for couples and/or small families. The initial space is an open floor plan with only the bath unit configured. Is it then the interpretation of the resident to design the apartment according to their specific needs, whether it be to add rooms for privacy or to add enough walls for spatial sequencing. Unit B includes a private

living space with 260 square feet with an additional 120 square feet of outdoor space. Unit C acts in a similar fashion but instead includes a total of 600 square foot of private living space. Larger families with either 3 or more generations or with families with extended families.

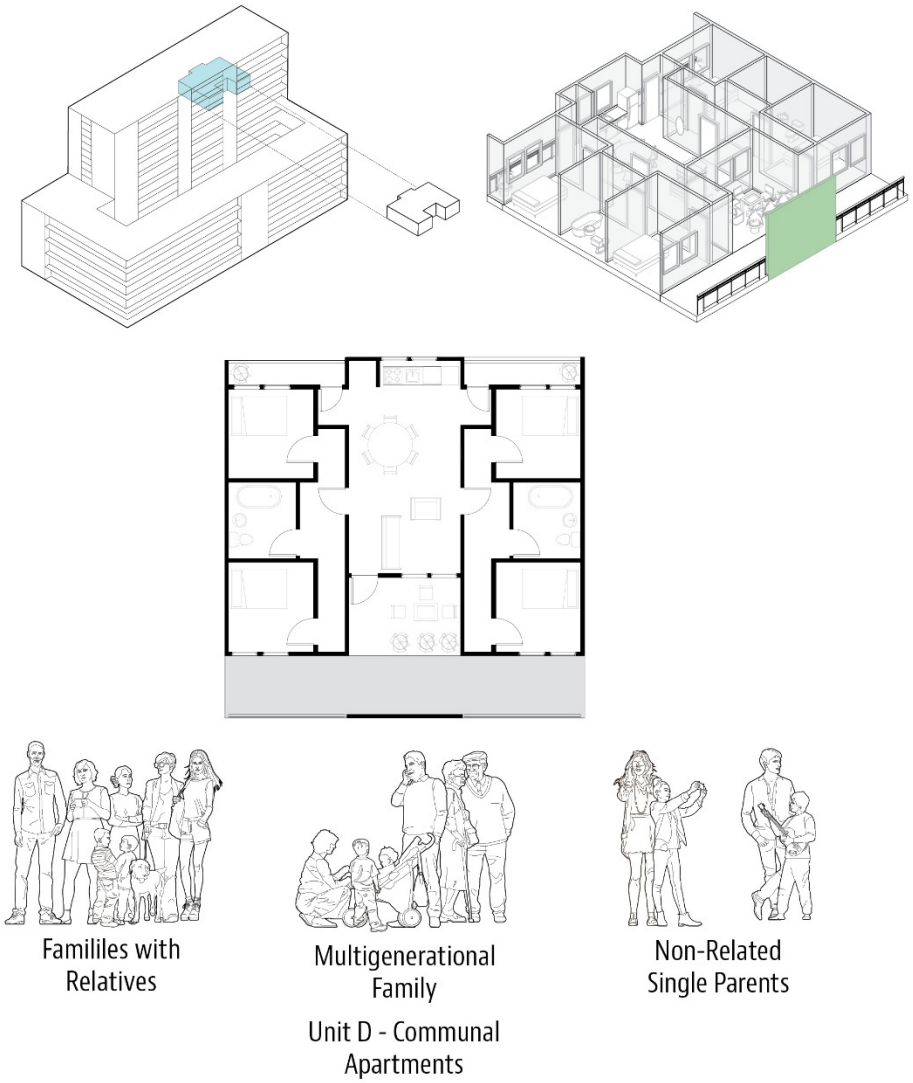


Figure 7-21 Unit D
Illustration: Author

Unit D

Small families or even extended families that don't mind sharing communal spaces are beneficial for Unit D. The living area is 1200 square feet. Ideal for even single parents who can depend of other family members or with other families with similar situation. These smaller interactions control the necessary social interactions while being able to take advantage of financial and domestic benefits.

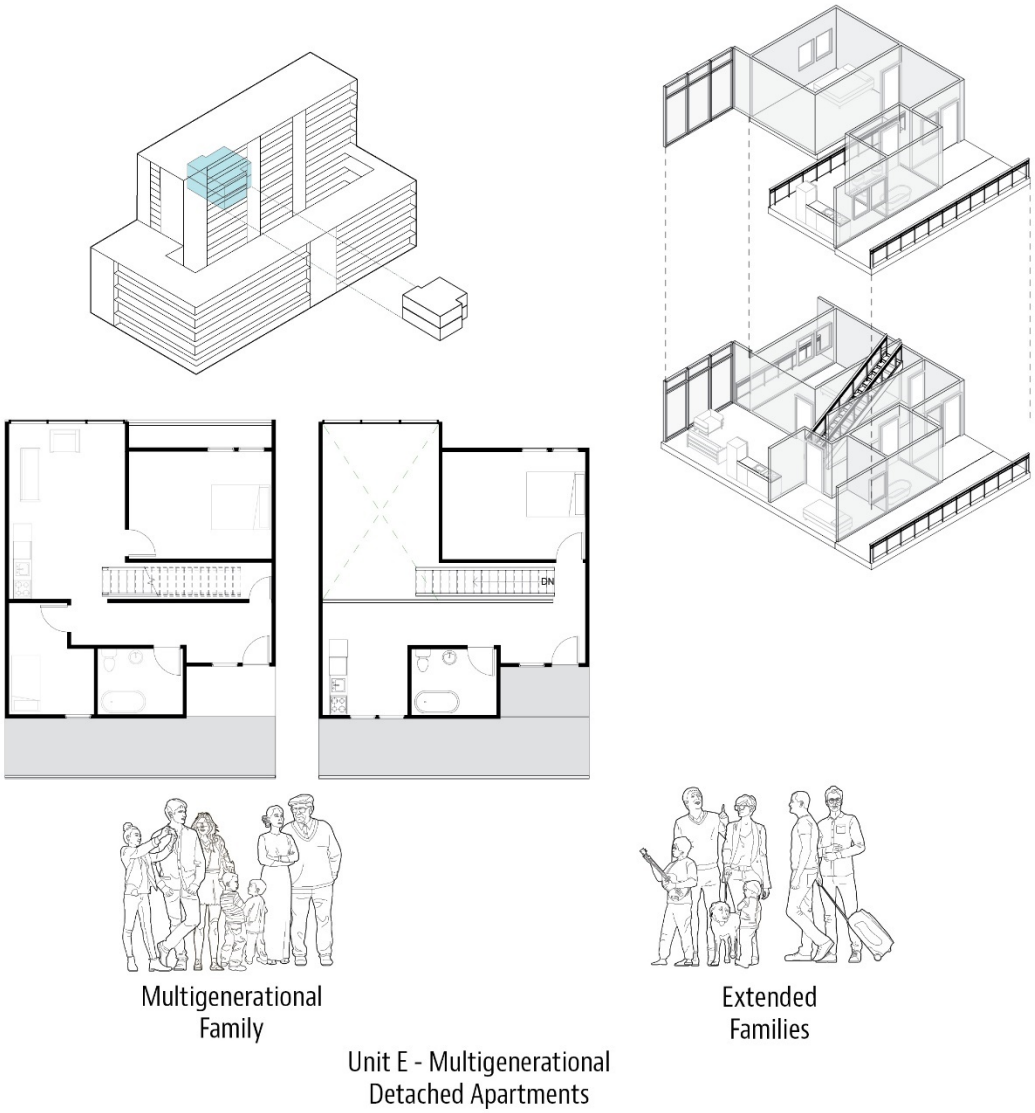


Figure 7-22 Unit E
Illustration: Author

Unit E

Unit E is designed for multigenerational families that need a certain level of privacy. Like a detached scheme, this two-story apartment allows for generations of the family to respect their privacy but also live in proximity with one another. Both generations are given separate entries to the apartment to respect privacy other either generations. The bottom level of the unit is 900 square feet,

while the upper level of the unit has a loft space and an area of 560 square feet, a sum of 1460 square foot.

Unit Mobility Economics

With the ability to allow for unit mobility to transition from unit to unit, how then can a family financially move around in one building? The purpose of this section is to address and propose briefly an economic model that can support the design concept. While the economic model may not be thoroughly thought out with numbers, a proposal of the basic understanding will give this dissertation a backbone rigor to allow the concept of this design add some realistic circumstances.

Homeownership is quite a complex topic to tackle. However, buying or renting an apartment can come through two possible ownership methods; condominium and cooperative ownership. Condominium owners own an actual unit or apartment to a building. Condominium owners are in possession of a real property. Buying a condominium comes at a fairly simple process typically financing nearly 90 percent of the purchase price and sublet your apartment in the form of ownership. This process allows flexibility for many owners who are investors, foreign buyers, or parents purchasing for their parents.[130]

[130] Greg Jacobs, "Co-Op vs. Condo: What You Need to Know," *Huffington Post* (blog), June 28, 2013, https://www.huffingtonpost.com/greg-jacobs/coop-vs-condo-what-you-ne_b_3460551.html.

Figure 7-23 Cooperative Ownership diagram
Illustration: Author

One of the rising trends in home ownership is cooperative ownership (Co-op). Cooperative ownership differs much from ownership that of a condominium. Co-op is owned by a corporation. Co-op is not a form of real property ownership. In a simple sense, coop home buyers instead invest in a share of a stock in a corporation that owns a building. As a shareholder, you are entitled to exclusive use of a housing unit in the property.[131] Because everyone in a co-op owns a share in the building, the community is concerned as to who occupies the building as a whole.

Shared living spaces and shared economic security are the two biggest reasons most people are interested in cooperative housing. Cooperative housing then makes a logical sense for a group of families with a common identity. Co-housing is a concept which brings people with the same common goals and desires to develop a housing project to live together. In its earliest phase, you

[131] Lisa Smith, "Housing Cooperatives: A Unique Type of Home Ownership," Investopedia, January 1, 2008, https://www.investopedia.com/articles/pf/08/housingco-op.asp.

can choose your neighbors and to who should occupy the building. The financial decisions such as maintenance are made within the residents because you share part of the housing not the actual unit. In a mid-rise apartment that focuses on a multigenerational community environment, the power to come together as a community just only reinforces the idea. Social interactions continue to become a foundation that brings an environment where isolation is absent as this is made possible if people with the same shared common interest can mutually collaborate. Decisions are then made within the shareholders who occupy the building and not through some outside investor who does not occupy the building. The most important social aspect of cooperative ownership is that you are not investing is a single unit that isolates to a property, however, the investment is rather on the building and the occupants. By investing in building and your neighbors, it reinforces the concept of a sense of multigenerational community.

The proposed economic model for this building is a hybrid of both cooperative ownership and rental. The suggestion is a limited equity cooperative that allows members to sell their shares for a limited profit. Limited equity cooperative allows for flexible individual profit, which keeps the housing market rate reasonable. As a shared holder is allowed one vote, this allows for cooperative housing. Micro units in the building are the exception. Due to its small footprint and typical large turn-over rate and number of available units in the building, micro units make sense through a one-year rental through the shareholders which allows them to provide additional income. The remainder of the unit types then become part of the cooperative ownership. As owners begin to invest and accumulate years of ownership via a credit system, equity rises and allow to switch over their existing unit with another larger unit. In other cases, the need may need to switch to a smaller unit. However, the addition of rental for aided mortgage and credit equity system through cooperative ownership all aid in the concept of unit mobility.

Flexible Architecture

The design of each unit needs to address flexibility to handle the changing needs that arise for a family. In a typical setting, a family would move from house to house to address these life changes. Rather moving from house to house, the goal of this design project is to eliminate the need to move. The objective of each unit was then to allow aging in place through flexible design.

Polyvalent spaces allow for interpretation. For the purpose of this dissertation, the flexibility of the units will focus on just one unit, Unit C. If flexibility in the architecture can aid in the aging in place through one unit, all other units are able to achieve when following the same principles are applied. The principles of a flexible unit are to allow the interior partition walls to be easily dismantled without destroying the structure of the existing component. The components, in this case, the interior walls should be able to be reused. If these walls are to be reusable, then the components need to be modular and prefabricated. In figure 7-24, Unit C is configured within a multiple of 4 feet for modularity and standardization. The dimension allows for functional spaces from bedrooms, living rooms, office spaces, and more.

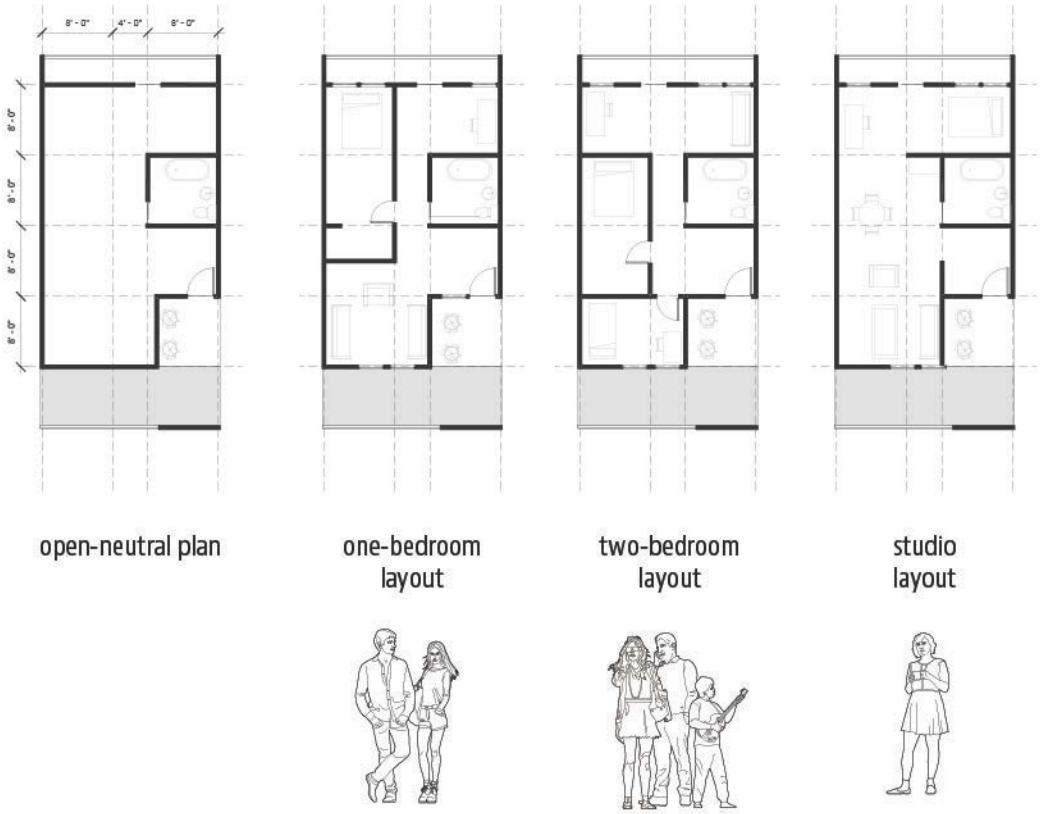
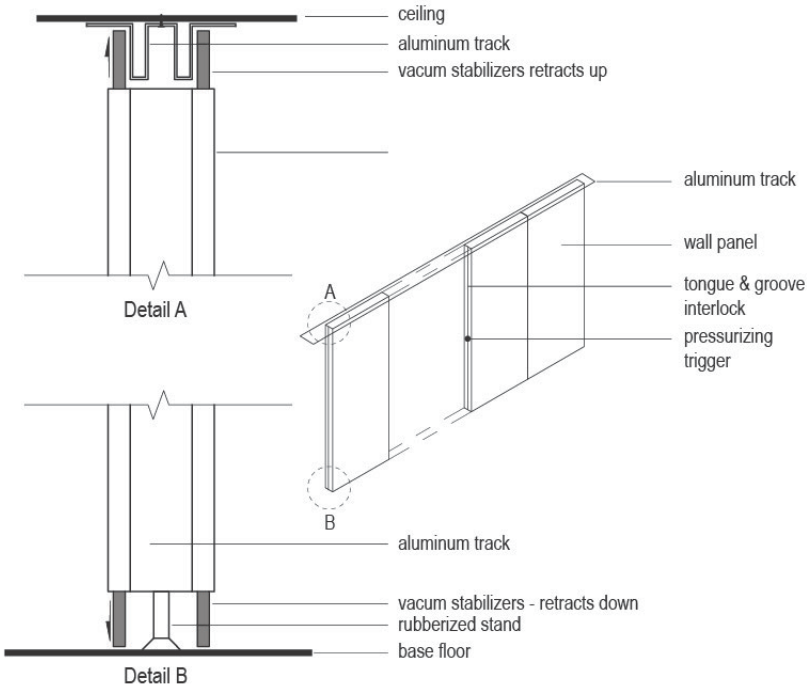


Figure 7-24 Flexible architecture
Illustration: Author

The ability for flexibility is in the design of the walls. To reduce minimal attachment to the existing and permanent structure, a top rail track is installed through screws along the ceiling, aligned with the grid system. The walls are not attached to the top or bottom through a roller or track system. Eliminated is any use of the bottom track. Instead, in a similar patent technology VACUWALL®, the walls utilize a pneumatic device within the wall component. Walls are built within minutes and are meant to create interior spaces. The attachment and detachment system allow for reuse at any time. Since the need for a bottom track is eliminated, the storage of the walls is not limited at the ends of the track. Once the wall is set in place, a trigger is activated a bottom and upper device provides

pressure to keep the wall in place. The interlocking system is simple as it does not need anchoring to the floor or ceiling.[132] The decision to take this design direction was based on the amount of times the floor plan needed to change. Because the frequency was much less than say a conference room, there was no need for the walls to be on a roller/track system.



Wall Assembly Detail

Figure 7-25 Wall Assembly Detail
Source: Liko Partitions
Illustrations: Author

[132] VACUWALL® | Partitions and Movable Walls," accessed April 3, 2018, http://www.liko-partitions.com/en/vacuwall-movable-walls.

7.6 Implementation of Design Guidelines

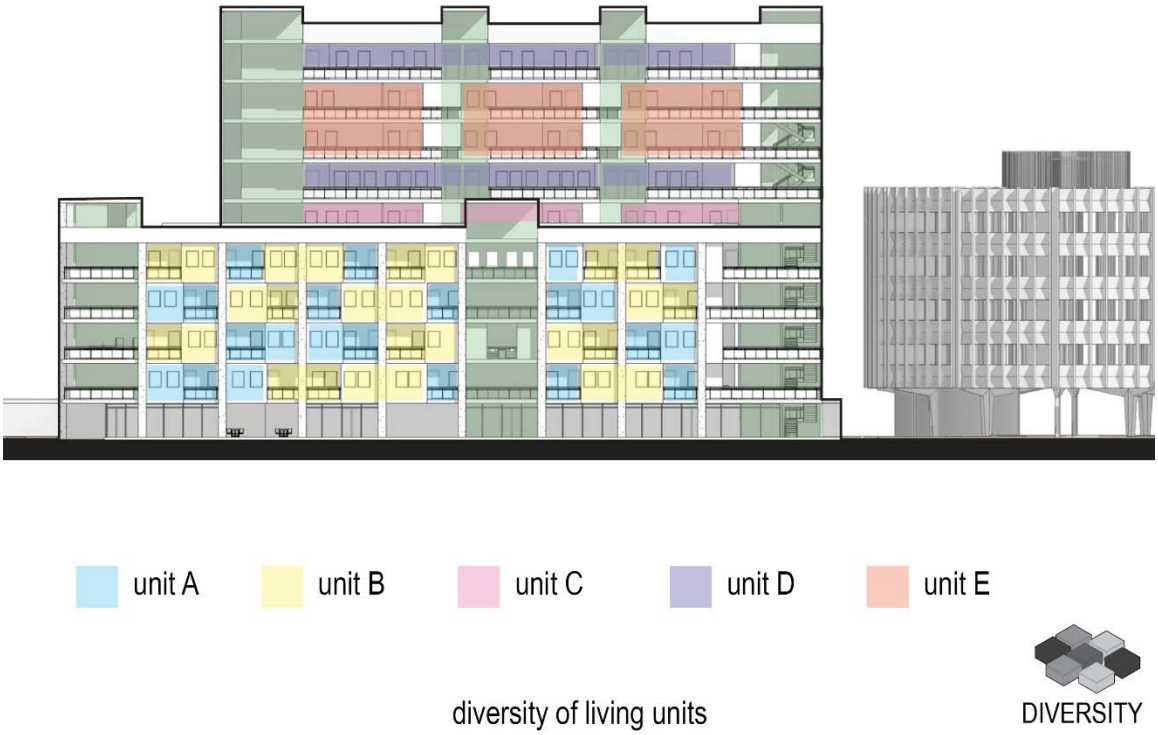


Figure 7-26 Diverse units
Illustration: Author

Diversity

The objective of this design guidelines was to add resilience and adaptability to the ever-changing environment of the needs and growing life phases of a family. By adding different living units to adapt to any situation of the family, the building become resilient as the needs are always addressed (Figure 7-26). By adding 78 new dwelling units in 5 different layouts in a dense environment, resiliency and adaptability is not sacrificed. Different levels of social interactions from large public space to various levels of intermediate space to private spaces allow people to control the necessary encounters the residents have with their neighbors (Figure 7-27). The various mix-

used commercial spaces also add convenience to the residents allowing for more social interactions to create a community environment resilient to social solitude (Figure 7-28).

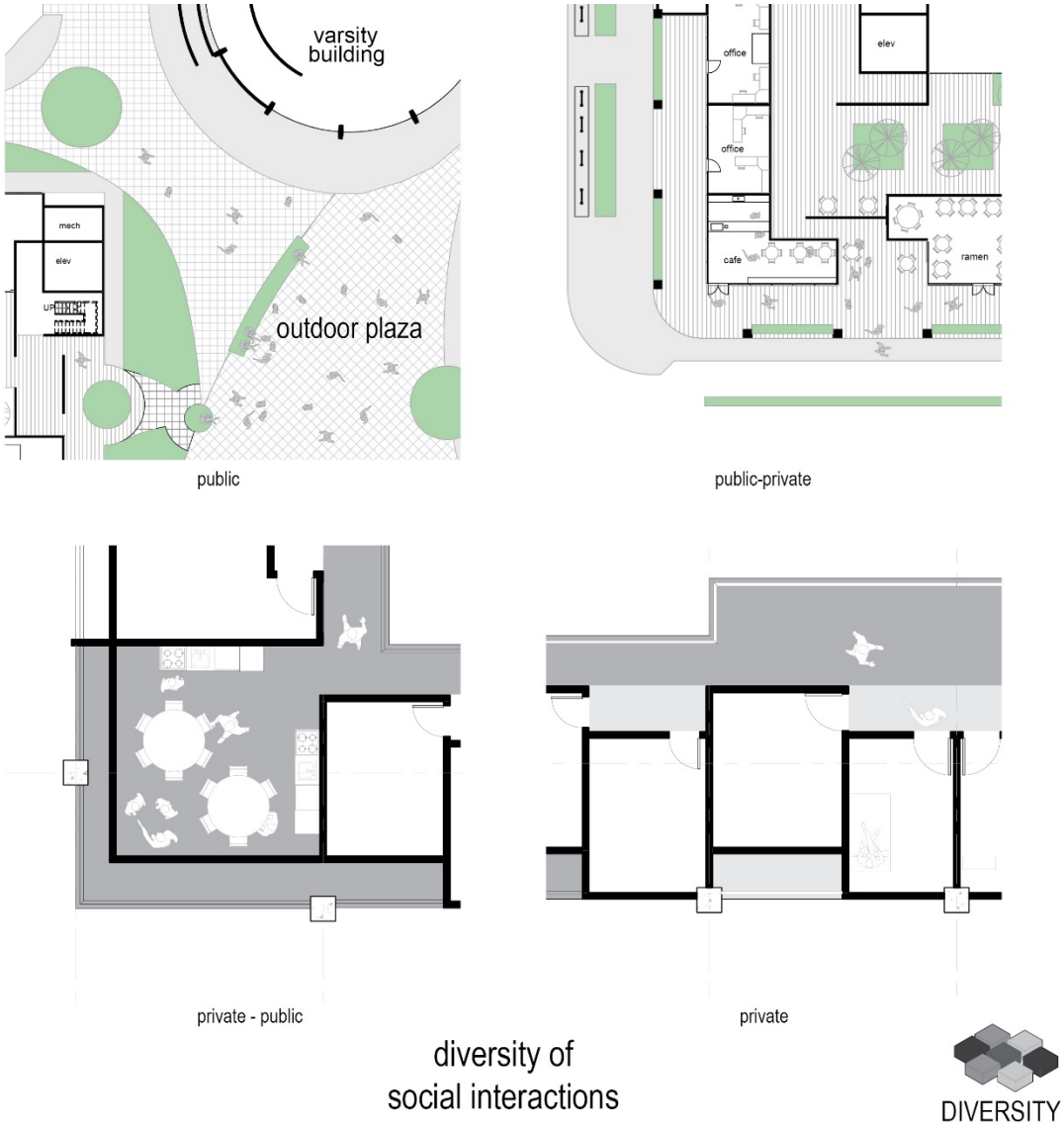


Figure 7-27 Diverse social interactions
Illustration: Author

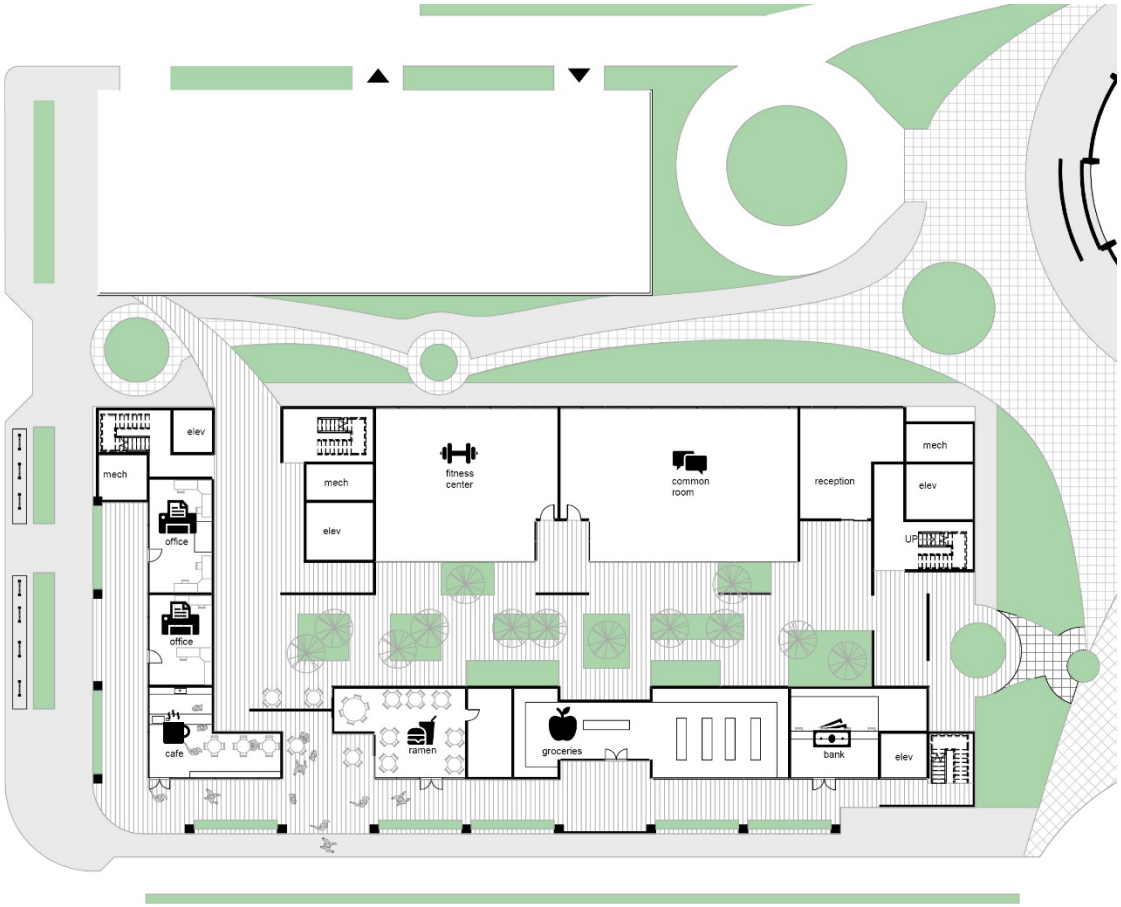


Figure 7-28 diverse and mixed-use spaces on the ground floor
Illustration: Author

Public-Private Space

Figure 7-29 Ground Floor thresholds of transitional spaces
Illustration: Author

This guideline takes place at the building scale as well at the living units. The sequence of public to private spaces are interrupted with a smooth transitional intermediate space. At the ground level, articulation of the street sidewalk includes a covered lanai space separated by a threshold of

greenery. Sequencing of spaces from public to private spaces are controlled by the articulation of the threshold (Figure7-29). Majority of the units also incorporate a transitional space along the public lanai. The recessed space becomes a territorial space that is articulated by the resident. In a tropic environment, these semi-open spaces embrace the implementation of plants and gardens. The articulation done by the residents at these transitional spaces is determined by addition of plants (Figure 7-30).

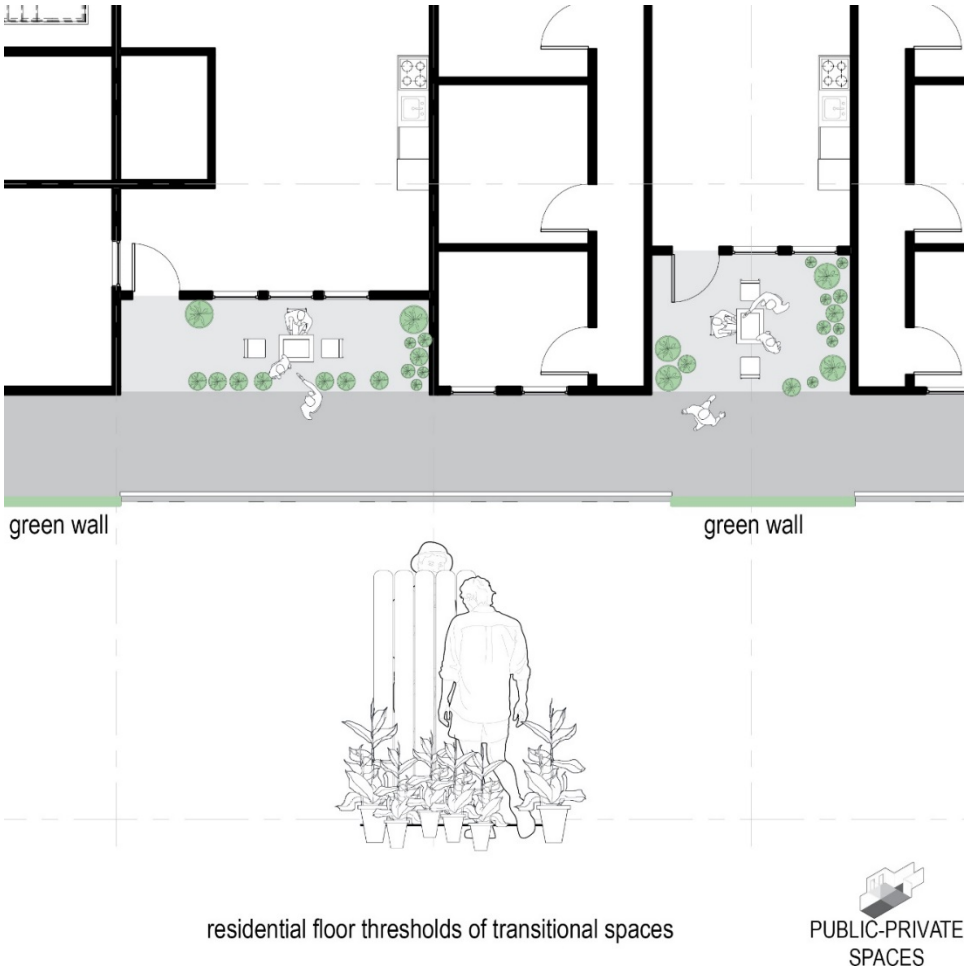


Figure7-30 thresholds of transitional spaces
Illustration: Author

Survey shows that residents with more plants in the forecourts tend to know more neighbors and have a higher sense of community, belonging and security.[133] The activity of gardening at these intermediate spaces allows for more casual social encounters with neighbors as gardening increases exposure for residents to interact with other residents. While gardening becomes environmental benefits that aid in more fresh air, and lower ambient temperatures, there is a strong correlation of higher intensity of plants with higher number of social interactions versus places that only include narrow corridors. Gardening at entrances contributes physically and psychologically to create desirable environment for social and healthy sustainable communities.

[133] Joo-Hwa Bay and Boon Lay Ong, eds., *Tropical Sustainable Architecture: Social and Environmental Dimensions* (Amsterdam: Elsevier, 2006).. 74

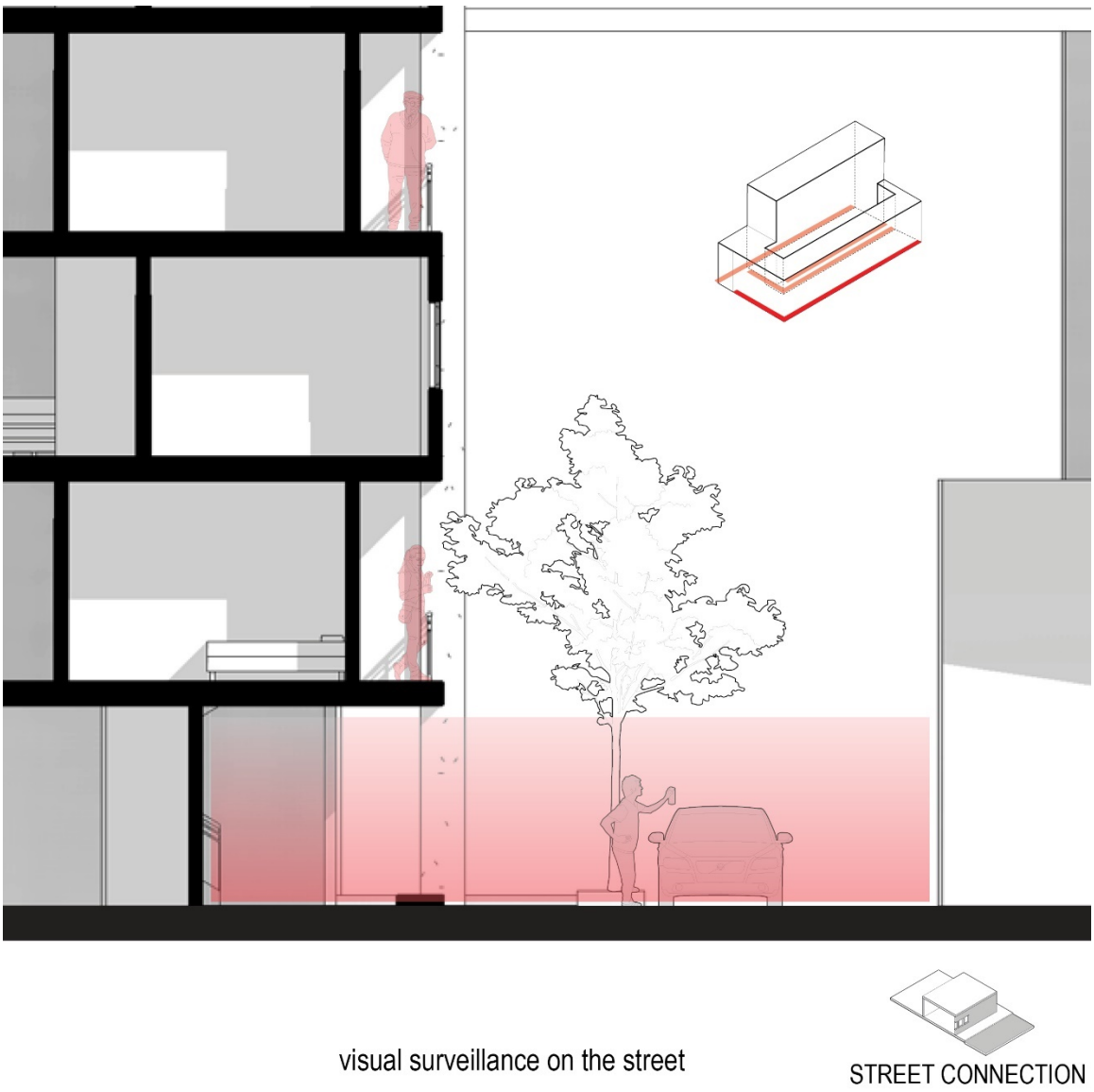


Figure 7-31 Eyes on the street
Illustration: Author

Street Connection

Connection with the street is meant to provide a safe security environment for the residents while at the same time provide access to mix-use spaces. The visual surveillance of the street prevents any crime and accidents. This is done with the addition of lanais overlooking the street, as well as transforming the vertical cores of the building into visual lookout points. The stairs become

public paths which add visual surveillance by becoming transparent so that eyes are on the public street (Figure 7-32). The ground level is emptied of residential units to protect the resident. Instead, the ground level is filled with mix-use spaces that aid in the security of the building. Additional security of the building is enforced by differentiating separate public and residential access to the building (Figure 7-33).

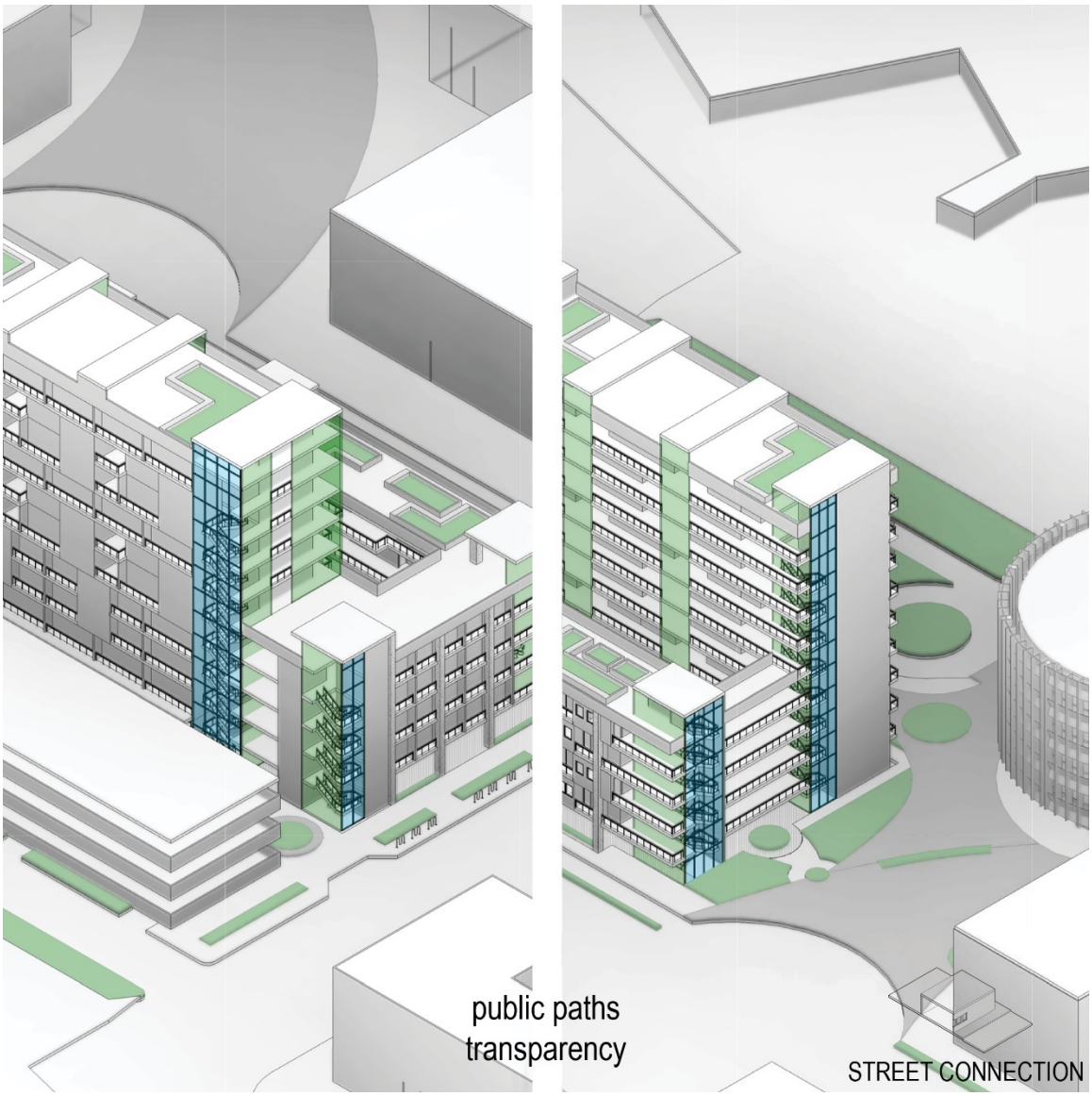


Figure 7-32 Transparent Stairs
Illustration: Author

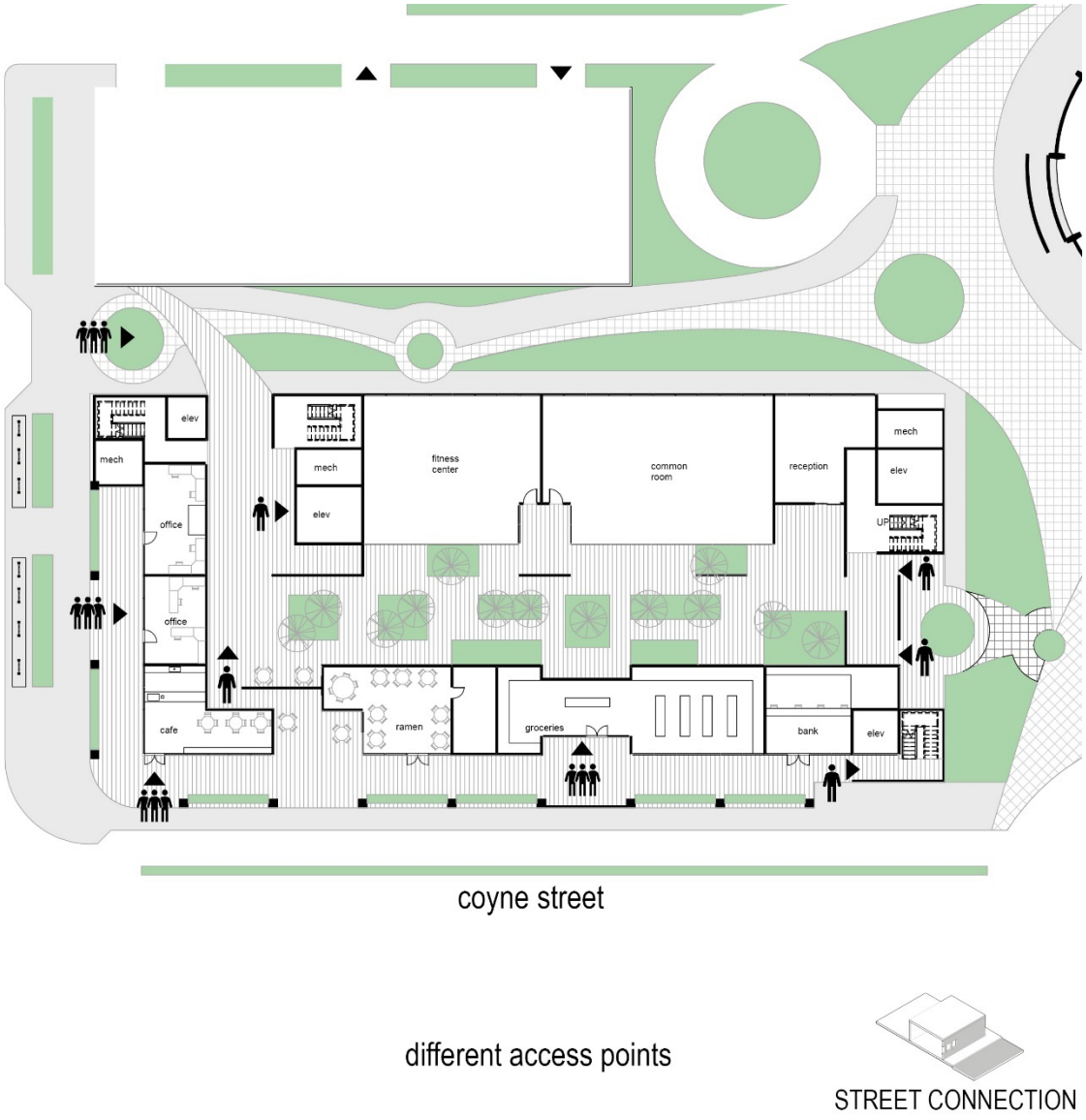


Figure 7-33 Different accessible points for public and resident
Illustration: Author

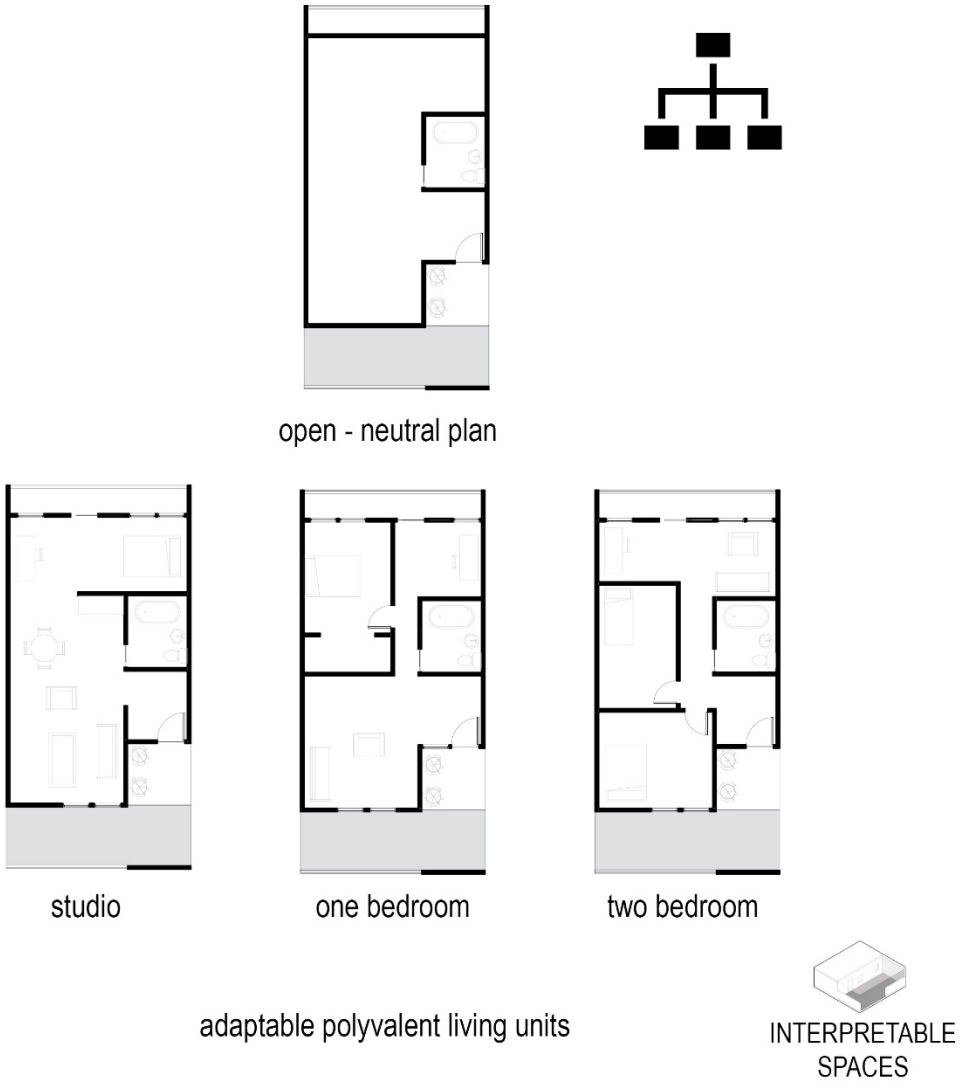


Figure 7-34 Adaptable Spaces
Illustration: Author

Personalization of open spaces gives power and authority to the resident. Open floor unit plans allow for personalization which adapts to specific residential needs. Units B and C provide an open plan layout with only a bath unit as the only space that is provided (Figure 7-34). It is then the

responsibility of the resident to interpret the space to the best of his/her needs whether it be adding more specific spaces with the construction of partition wall or to keep the plan as open as possible without the use of walls. Additionally, as mentioned in the second guideline, the threshold condition that are meant for personalization gives the resident a sense of belonging and authority. By adding an activity such as gardening and planting, the space can be personalized for his/her touch. There are also other places on the ground level, communal spaces, and the rooftop where the residents can add more personalization and interpret the space whether as an individual or a community. By allowing decisions to fall upon the residents, residents can design according to their needs. One possible scenario is the following figures which transforms an empty space into a children's area. At whatever scale of interaction this personalization takes place, the sense of community is established.

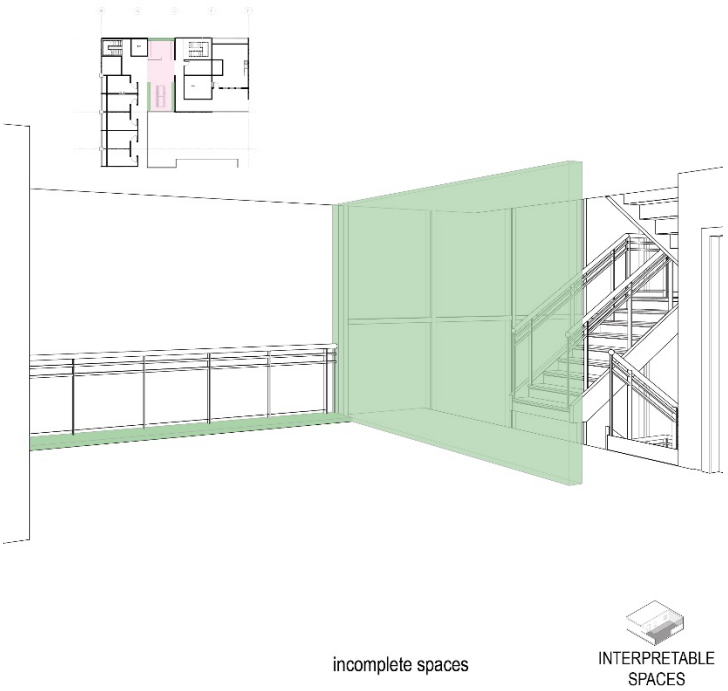


Figure 7-35 Incomplete space
Illustration: Author

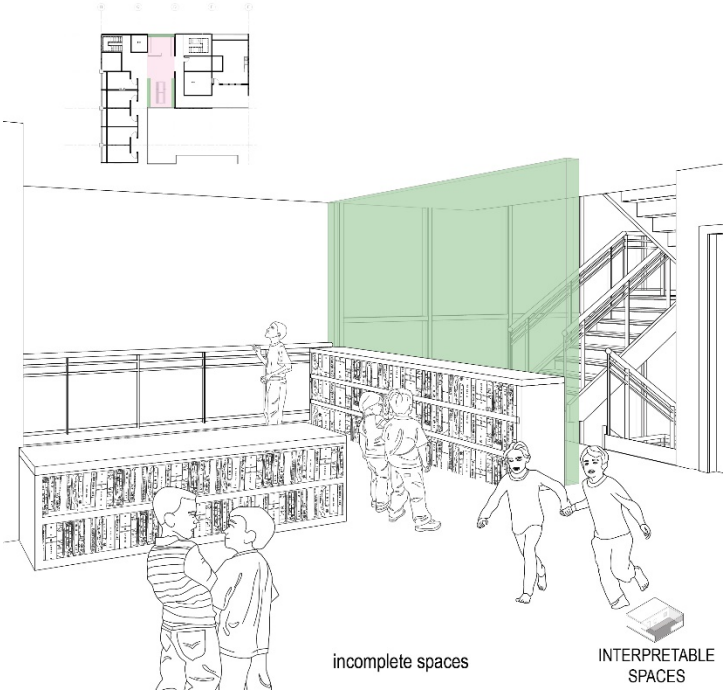


Figure 7-36 Complete space
Illustration: Author

Communal Spaces

The purpose of these communal spaces is meant to increase the residential interactions among others. The density of compact living influences people to talk. In a multigenerational system, support is key. And as more people begin to talk and share encounters, the levels of trust and belonging are increased. As gardening and plants have already been established as a social trigger, common activities and as well as food becomes opportunities to share and communicate. It is imperative that the kitchen is designed to become communal dinning to that people share and interact. The rooftop of the complex includes the laundry room not only to social interact, but also take advantage of the environment to air dry their clothes. And strategically located throughout the building, common rooms allow for people to engage together in activities. As more and more time people get out of there private living units, the imminent for social chatter is undeniable. It was then imperative to take advantage of the rooftop to not only become a laundry room, but also a place for community gardening to again to emphasis the social interaction.

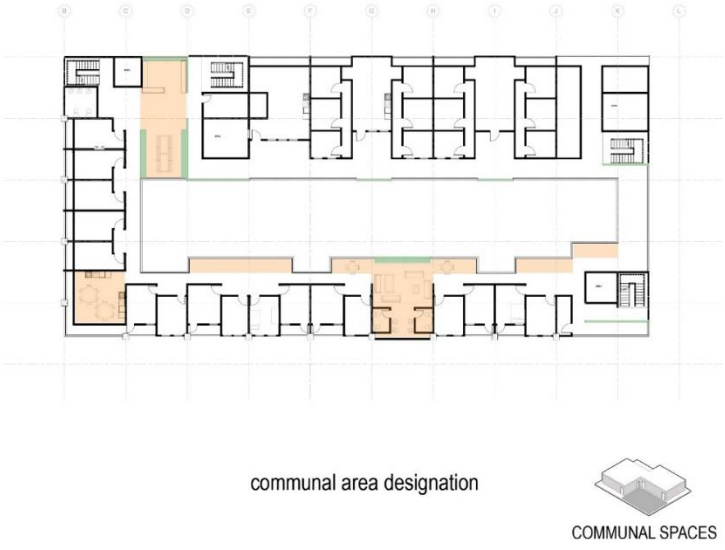
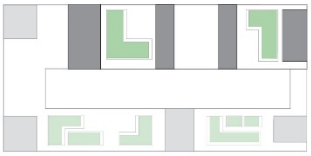
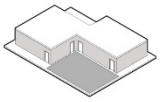


Figure 7-37 Communal spaces
Illustration: Author



roof top communal space



COMMUNAL SPACES

Figure 7-38 Roof Top Communal Area
Illustration: Author

8| Conclusion

The purpose of this dissertation was to engage in the changing demographic of Hawai‘i’s family and illustrate how a multigenerational environment in a mid-rise typology can become an alternative solution towards a livable community. Seniors are living longer not only due to higher life expectancy, but because social isolation is being treated. To understand how social isolation can be prevented, it was imperative to understand different strategies in co-generational living. How individuals socially interact can be dependent of the built environment. While urban sprawl and urban compression both failed to provide a sense of community, the proposed solution towards this multigenerational living was for a mid-rise building as it allowed for the greatest amount of social encounters. Then through a rigorous study of precedents and literature review, principles and guidelines became the framework for design. While it was important to comprehend the theoretical framework, it was also important to evaluate the principles and guidelines through a design solution at the site in Mō‘ili‘ili. As a result, the dissertation proposes several innovations.

The mid-rise typology is a typology that Hawaii has not seen in full development. The innovation to introduce a mid-rise typology into the urban fabric instills the ability to engage in the community along within the individual. The scale is appropriate to battle again social isolation, at a scale that will reinvigorate the cultural concepts of ‘ohana and kuleana. Hawai‘i is sacrificing its beautiful lands at the scale of low-rise development and high-rise development. Low-rise developments are consuming precious agricultural estate. While high-rise buildings are creating concrete structures, obscuring the views of the mountain and sea. The mid-rise typology is the solution for moderation that will allow for added density.

The innovation of aging in place through flexible unit design through articulated walls addresses the ever-changing family needs. The realization that the family structure is never stagnant should be interpreted in architectural design. Architectural components must then allow for modularity, fabrication, reuse, and functionality. The flexible use of spaces aids in all generations of all age groups. The concept to age an entire life in a building also brings innovation as it solves the problem to move dwellings after the current dwelling inhibits family changes.

Due to the levels of human interaction at the community scale, building scale, and at the living scale, the epidemic of social isolation becomes treated. Remedies for social isolation at various scales introduction brings a new perspective to go beyond the building's architectural elements. At the community scale, the ground floor interweaves the residents with the surrounding services to draw out the individuals. In the figure below, Coyne Street closes off for block party events to portray how the community interacts with residents. Foods trucks, entertainment, and social gather activities and nodes all aid in the community and neighborhood living.

This social isolation is prevented through the architectural innovation of the lanai. The lanai is a vernacular feature that provided comfort and shade. In this design concept, the focus of the lanai, or intermediate space was not the human comfort, but a catalyst for social relationships. People was able to seek interactions because it is neither public or private. This moderation of space, which has been the repeating element of this dissertation, brings familiarity as it does not present opposites of a spectrum. This midpoint is which social interactions occur can then be fully developed according the success of the relationship.

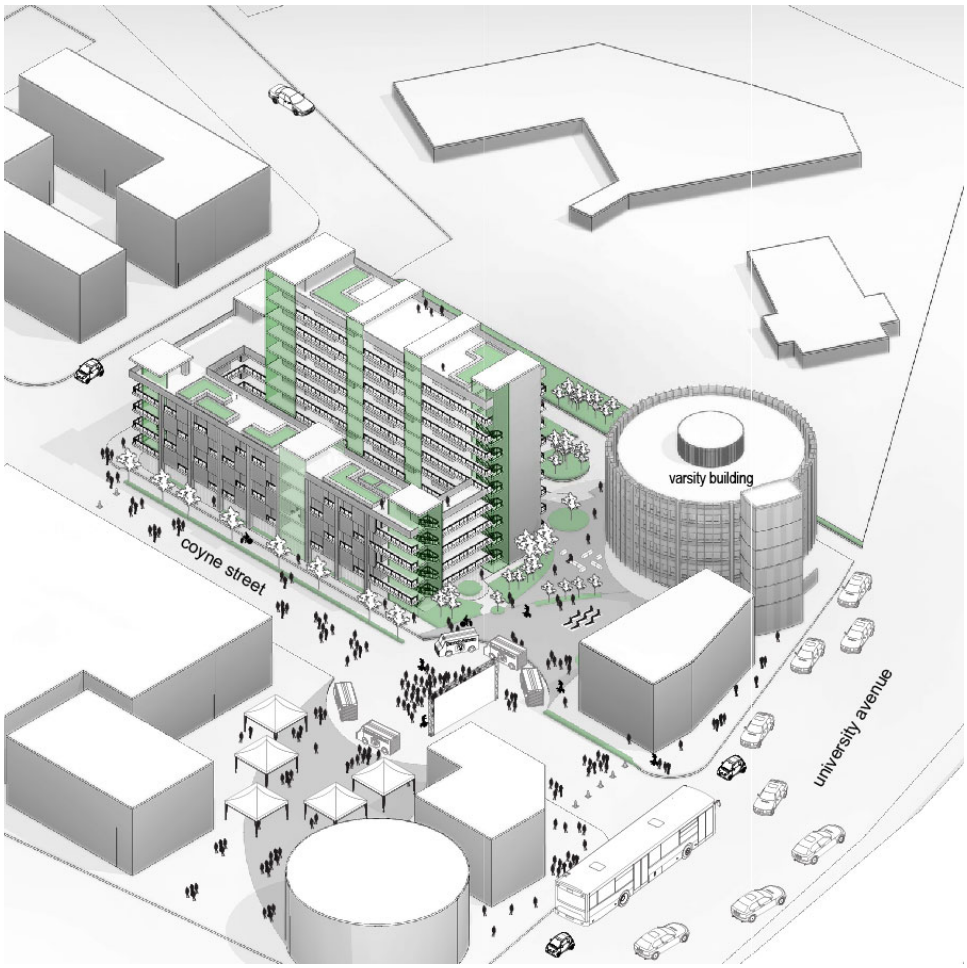


Figure 8-1 Community integration
Illustration: Author

At the building scale, various levels of social interactions occur while reflecting a vernacular architecture of the walk-up apartment. The figure above illustrates the transformation of the surrounding context into a block party event, ultimately connect the residents, community, and as well as the surrounding businesses. The outdoor plaza is placed behind the University Avenue façade to mitigate control. On the ground floor, controlled transparency. At the public paths of the stairs, the transparency engages visual awareness on the streets. On the residential floors, intermediate spaces dictate social conversations via communal spaces and through social activities.

Figure 8-2 Social interaction at the building scale
Illustration: Author

At the building scale, residents know their neighbors. With the abundance of intermediate and communal spaces, it is difficult to avoid your neighbors. While not every resident will get along, the focus is that the residents as a whole share the same ideals and goals. But because of these interactions, various activities such as sharing a meal, taking a walk together, or gossiping of the latest fashion are all possible. The mid-rise maximizes density while as the same time fosters the greatest levels neighborhood engagement.

The living unit scale also aids in the social dynamics by incorporating the multigenerational family structure. Dependency on the family allows for social and economic benefits for all age groups. No longer are the elderly neglected, but with a greater emphasis of family support via an architecture that does not prohibit interactions. More time are spent with families, rather that time to commute as family members can live within the same living unit or live close enough to be only a minute walk away. Happiness and wellbeing is then sought through the social quality of how the family protects the value to prevent isolation.

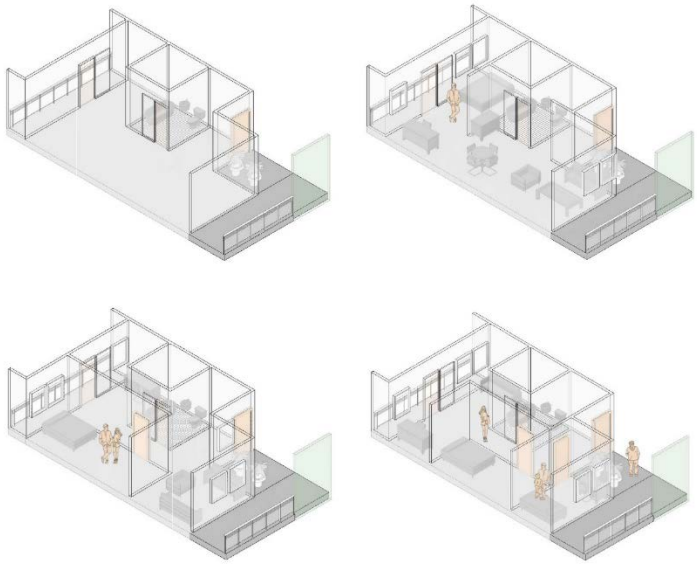


Figure 8-3 Multigenerational family living in different phases
Illustration: Author

The thesis does fall short on the understanding and implementing financial and operation solutions towards this mid-rise multigenerational community. While cooperative ownership seems like the most logical approach, understanding of the finances and operations requires another level of research and understanding. The cost effectiveness and efficiency of this alternative solution in terms of construction and maintenance also limits the contribution to this thesis.

The future contributions that this thesis presents are its antidote for social isolation that reflects the critical regionalism of Hawaii's family. The design proposal is intended as a foundational resource for future development in mid-rise housing and multigenerational environments. As this design is not limited to Mō'ili'ili, the future TOD will ask for more mid-rise buildings that support the values of a sense of community. Both the housing demand and the multigenerational family will become topics where future discussions and planning in Hawaii take place.

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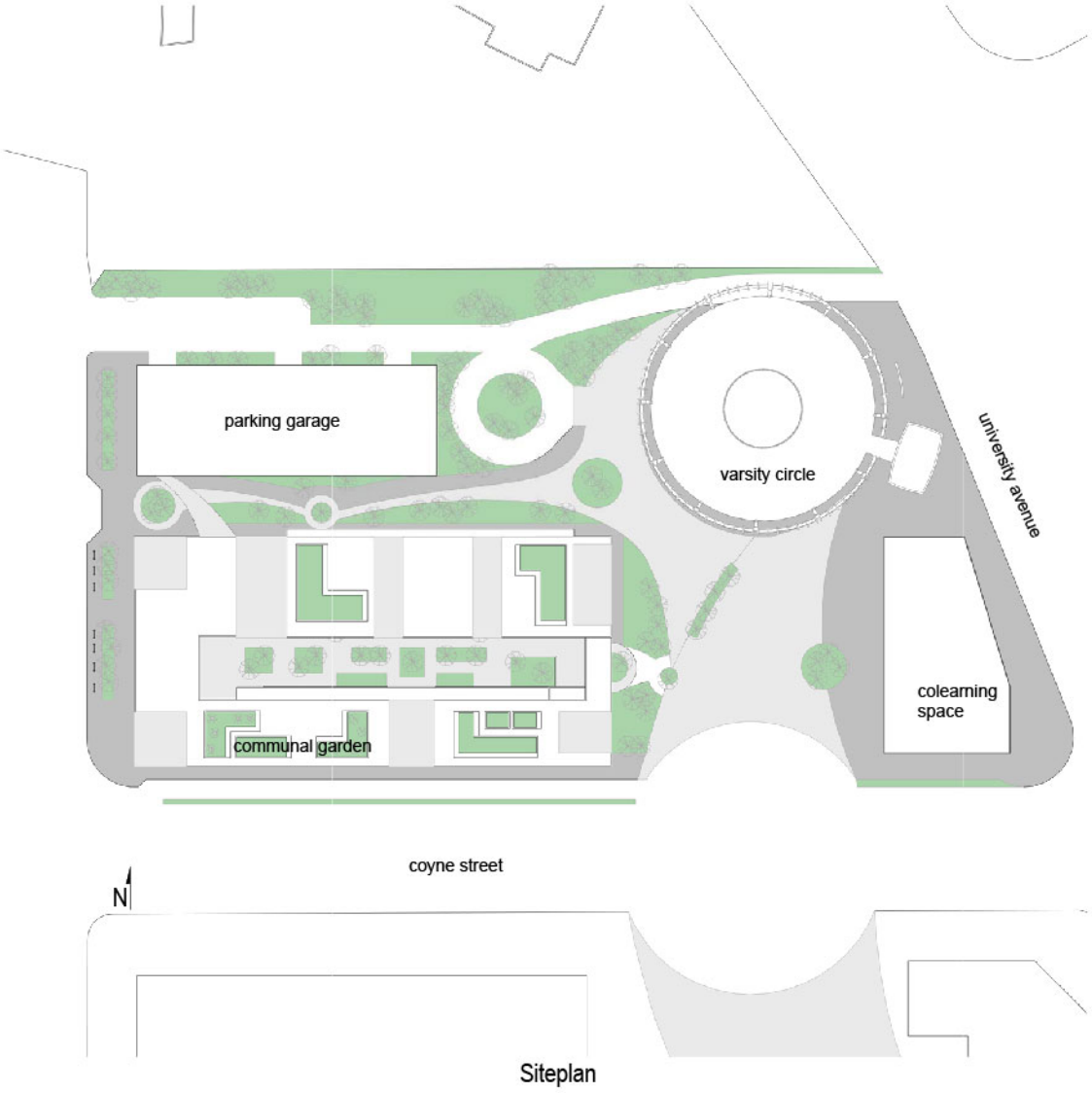
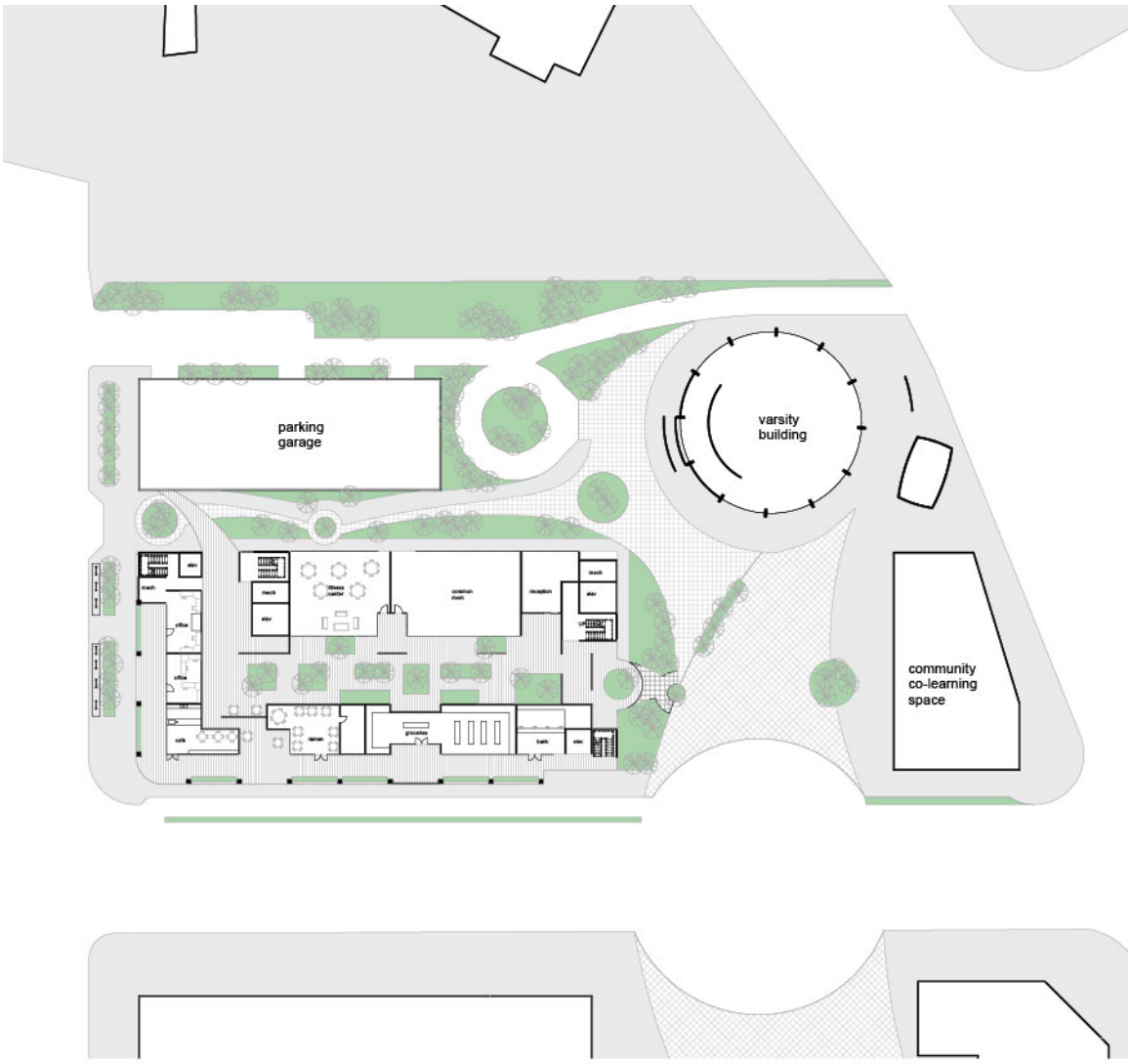
Appendix



Siteplan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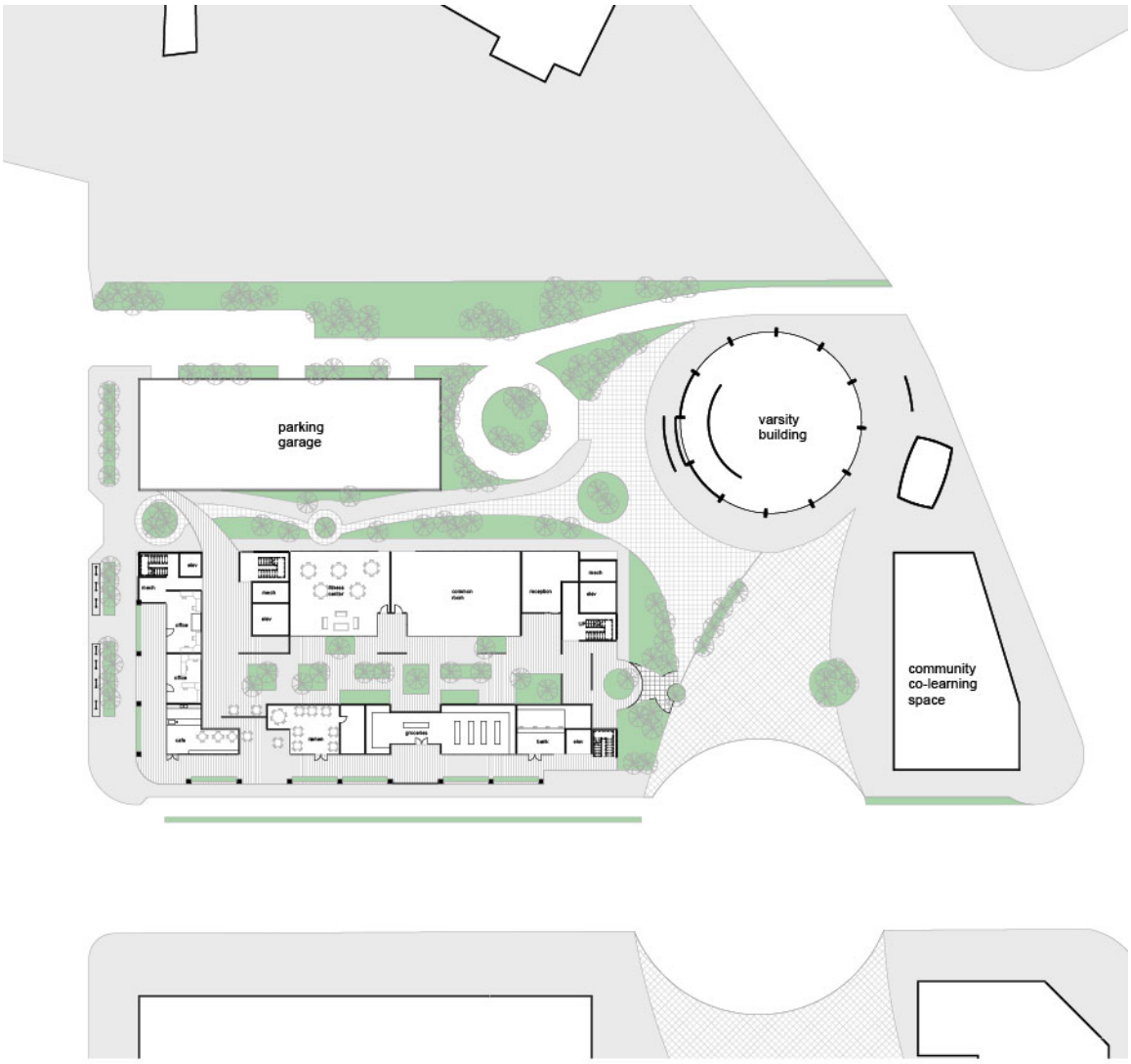
building
community
co-learning
space

Ground Plan


parking
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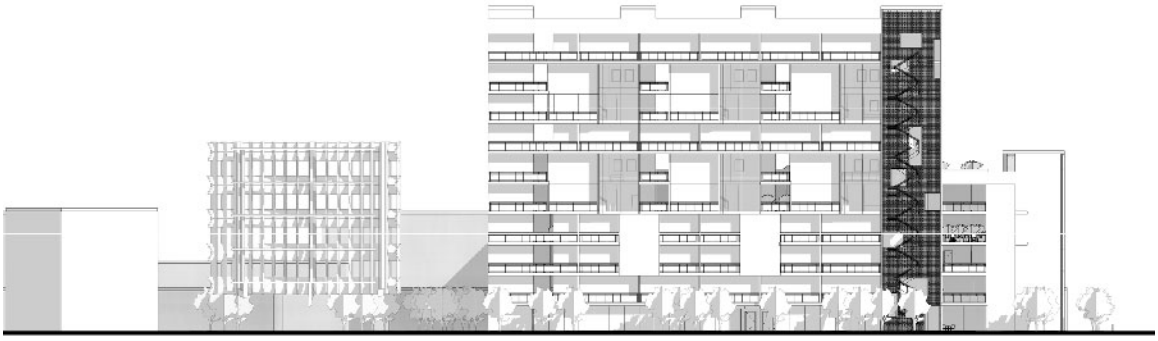
building
community
co-learning
space

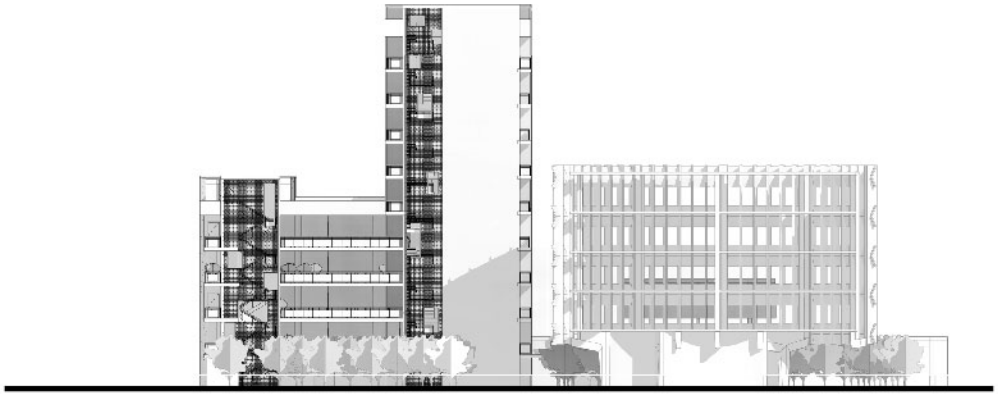
Ground Plan

South Elevation

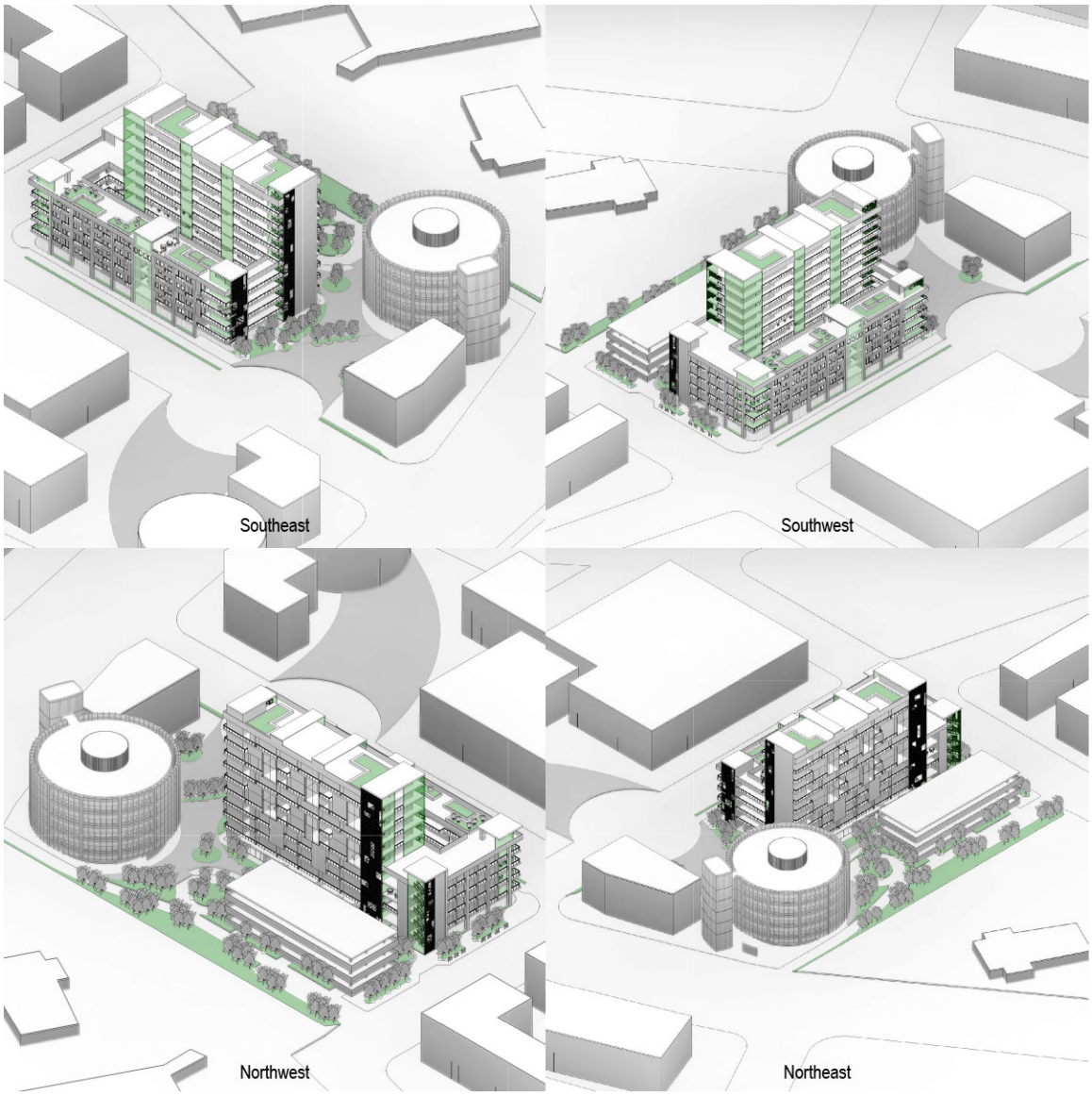


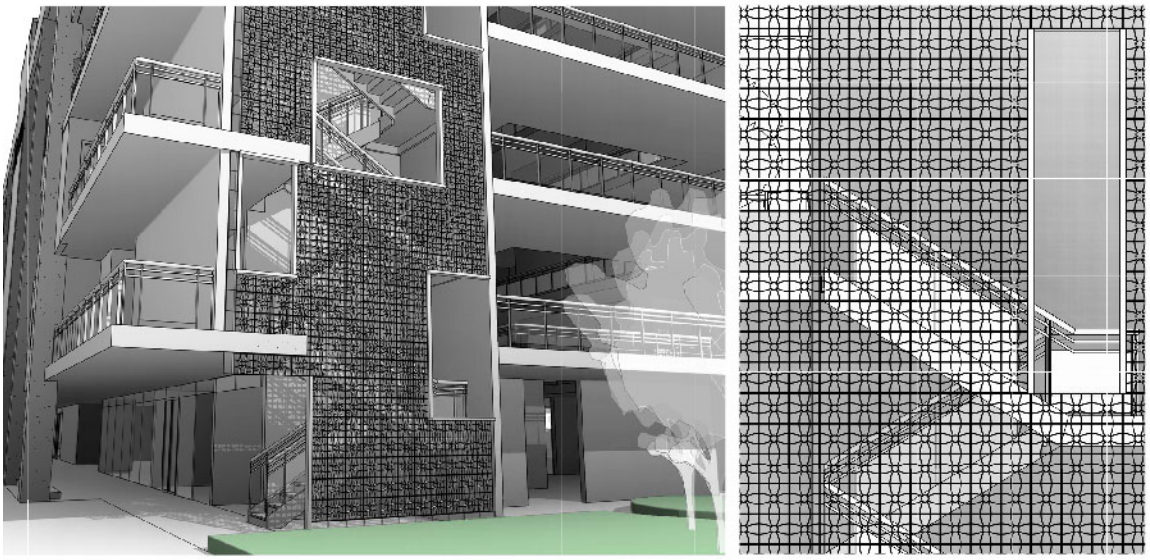
North Elevation

East Elevation



West Elevation


Southeast
Southwest
Northwest
Northeast



Vertical Core
Block Pattern