HEALTHY LIVING BY DESIGN

Exploring the blue zones as a framework for a multi-generational housing typology

by
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AUTHOR'S DECLARATION

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

ABSTRACT

This thesis begins by examining the pervasive urban sprawl in Toronto, analyzing the profound health impacts associated with suburban living—challenges such as social isolation, poor walkability, and a general decline in well-being. While the city has responded to housing pressures with mid-rise densification, many existing problems persist and are often intensified: smaller living spaces and inadequate community infrastructure continue to undermine both physical and mental health.

In response, the research turns to the Blue Zones—regions where people consistently enjoy longer, healthier lives, largely free from the chronic health issues prevalent in suburban and urban environments. By closely investigating the architectural and spatial qualities of these communities, the thesis explores the fundamental role of design and space in fostering well-being.

The study identifies key overlaps between the principles found in Blue Zones and the recommendations outlined in age-friendly and World Health Organization guidelines. These shared values inform strategies aimed at addressing the underlying health concerns of both suburban and densified urban contexts. Central to this approach is a re imagining of housing: specifically, promoting multi generational homes and neighborhood designs that support aging in place, encourage social cohesion, and create opportunities for intergenerational connection.

This thesis advances alternative models of housing and community development—drawing on co-housing and co-living precedents from Canada and the Nordic countries—that respond more effectively to Toronto's climate and cultural context. Instead of pursuing density as an end in itself, the proposed designs emphasize creating environments where people of all ages can flourish, maintain strong social connections, and lead healthier, more fulfilling lives.

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I would like to begin by acknowledging that the School of Architecture is located on the traditional territory of the Neutral, Anishinaabeg, and Haudenosaunee peoples. The University of Waterloo is situated on the Haldimand Tract, the land promised to the Six Nations, which extends ten kilometers on each side of the Grand River.

I am deeply grateful to the University of Waterloo for the opportunity to pursue my Master's degree at the School of Architecture in Cambridge. Over the past two years, the knowledge and insight gained from the faculty have been both invaluable and far-reaching, profoundly shaping my academic and professional development. The courses offered a well-rounded education, encompassing not only speculative and theoretical explorations of architecture but also practical approaches that have grounded my learning in real-world application.

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148	115-116	Elevation Drawing : Proposed From Parking lot	Illustrations by Author.
149	117	Exploded Axonometric of the Atrium Design	Illustrations by Author.
150	118	Section Drawing : Fire Safety Systems	Illustrations by Author.
151	119-120	Section Drawing : Proposed Townhouse Cluster	Illustrations by Author.
152	121	Visual : Townhouse Cluster	Illustrations by Author.
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164	139	Ground floor plan Option 1	Illustrations by Author.
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166	142	Visual : The connector Space re- imagined	Illustrations by Author.

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INTRODUCTION

The Hidden Costs Of Suburban Living

Imagine you live in the outskirts of Toronto, in a single-family home initially chosen for affordability and more space to be more independent, make room for future family expansion and be part of a community. Each morning begins with a stressful 90-minute drive to your downtown office, navigating congested highways, and the same on the way back, around 3 hours a day in the car. Running errands like grocery shopping, going for a nice place to eat, getting a hair cut require additional trips in your car across sprawling neighborhoods. Over time, the sedentary nature of prolonged driving takes a toll on your health. Studies in Canada have shown that urban sprawl leads to increased reliance on vehicles, which is associated with higher rates of obesity, cardiovascular disease, and diabetes due to physical inactivity and stress from long commutes.[1] As you transition into family life, the demands of suburban living grow more complex. Your family's activities i.e. school events, sports practices, and medical appointments, are all scattered across distant locations, further increasing their reliance on your car. This lifestyle leaves little time for social interaction or community building. Urban sprawl in Canada has been linked to reduced opportunities for social cohesion due to the lack of walkable neighborhoods and shared public spaces like parks or community centers[2]. The result is a growing sense of isolation for you and your family. Research has shown that sprawling communities foster environments where residents are less likely to engage with their neighbors or participate in community activities, leading to weaker social networks and diminished mental well-being.[3]

The long-term consequences of this car-dependent lifestyle are significant. Urban sprawl in Canada has been associated with decreased life expectancy due to factors like traffic-related fatalities, limited access to healthcare facilities, and poor air quality caused by vehicle emissions, The constant stress of commuting also contributes to mental health issues such as anxiety and depression. By the time you reach your retirement age, the challenges of aging in place become apparent. Suburban infrastructure is not designed to support older adults who can no longer drive. Without accessible public transportation or amenities to meet your daily needs, you find its increasing difficult maintaining your independence. Canadian studies highlight how sprawling suburbs isolate elderly populations, making it harder for them to access essential services or maintain social connections eventually, you have no choice but to move into a nursing home as your health deteriorates and your mobility declines. The lack of walkable neighborhoods or community support systems in sprawling suburbs accelerates this transition. For you, the suburban dream has turned into an isolating reality where your later years are spent disconnected from the community you once hoped to thrive in.

This life cycle imagined earlier is a reality shared by thousands of Canadians. According to recent research, 66% of Canada's population live in some form of suburb, with a significant portion residing in auto-dependent suburbs

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[1] R. Bray et al., *Report on Public Health and Urban Sprawl in Ontario : A Review of the Pertinent Literature*, January 1, 2005, https://www.osti.gov/etdeweb/biblio/20612657.
[2] "Impact of Urban Sprawl: Consequences, Environmental Degradation, and the Threat to Food Security," Canadians for a Sustainable Society, https://sustainablesociety.com/research-material/urban-sprawl/.
[3] "Discourage Urban Sprawl," *David Suzuki Foundation* (blog) , https://davidsuzuki.org/what-you-can-do/discourage-urban-sprawl/.

and exurban areas. This trend is particularly pronounced in mid-sized metropolitan areas, where 88% of the population lives in transit suburbs, auto suburbs, or exurban regions. [4]

Stacking In the Suburbs

Canada's housing demand continues to grow, driven by record immigration levels and population growth. This has created significant pressure on housing markets, particularly in cities like Toronto, Ottawa, and Hamilton. In response to this demand, developers are increasingly turning to suburban and exurban areas to build new housing. To combat environmental impacts of the sprawl and the cost impacts of hi-rise building. The Ontario government recognizes that continued outward, low-density expansion threatens the province's remaining quality farmland and endangers its most vulnerable species.[5] In response, mid-rise housing developments typically up to 12 storeys are often promoted as efficient, cost-driven solutions to densify urban sprawl. These projects frequently include marketable "amenities" such as gyms and communal spaces to attract residents. However, while mid-rise buildings are sometimes conflated with the "missing middle," the latter refers to a range of low-rise, multi-unit housing forms such as duplexes, triplexes, and courtyard apartments, that bridge the gap between single-family homes and larger apartment blocks. These mid-rise developments often fail to address the inefficiencies of suburban sprawl. Mid-rise buildings provide more living units than single-detached homes, their placement in car-dependent areas still leads to increased traffic congestion and longer commutes, ultimately adding to the destruction of the well being of the residents in the urban sprawl. one such development is looked further into detail in this thesis.

How The Built Environment Shapes Us

This thesis investigates the challenges of urban sprawl and the current push for densification through mid-rise housing, an approach that often overlooks the lived experiences and needs of its residents. As inherently social beings, humans flourish in environments that foster connection, well-being, and a sense of belonging. Yet, both single-family homes and mid-rise developments in sprawling urban contexts frequently fail to support aging populations, making it difficult for older adults to age in place or engage in meaningful community life. These housing models, typically designed with nuclear families or younger residents in mind, lack the adaptability and social infrastructure necessary to accommodate the evolving needs of multi-generational households. In response, this thesis argues that housing in Canada must go beyond simply increasing density; it must also confront critical health and social challenges to create more inclusive, supportive, and resilient living environments for all ages. To that end, this thesis proposes a typology that sits between these two categories: a modest, walkable, multi-generational living model that challenges the current emphasis on economic efficiency by prioritizing health, social connection, and long-term sustainability.

[4] David Gordon and Remus Herteg, *Canadian Suburbs Atlas* (Queen's University with University of Toronto, Toronto Metropolitan University, and Council for Canadian Urbanism, 2023), https://doi.org/10.24908/32559.
[5] Phil Pothen, "Killing Growth Plan for Greater Golden Horseshoe Is a Disaster for Ontario's Environment and Efforts to End Housing Shortage," *Environmental Defence*, August 20, 2024, https://environmentaldefence.ca/2024/08/20/killing-growth-plan-for-greater-golden-horseshoe-is-a-disaster-for-ontarios-environment-and-efforts-to-end-housing-shortage/.

Lived Experience

As an aspiring architect, I believe that the built environment holds a profound influence over people's health and well-being. Thoughtful, human-centered design is not just about aesthetics or efficiency, it is essential to supporting both mental and physical wellness in our everyday lives. As discussed earlier, many of today's health challenges can be linked to the way our environments are planned and constructed. Whether it's limited access to walkable, green spaces or the social isolation often caused by certain housing typologies, our surroundings deeply affect how we feel, move, and connect with others.

Having grown up in various mid-rise and high-rise residential buildings, I've experienced firsthand how architectural design can either nurture a sense of belonging or contribute to disconnection. These personal experiences have shaped my belief that architecture should go beyond the logic of square footage and unit counts. Instead, it should prioritize spaces that promote community, support daily well-being, and respond to the rhythms of human life. When thoughtfully designed, architecture has the potential to reduce stress, encourage healthier lifestyles, and foster environments that are both restorative and socially enriching.

Research Objectives And Significance

My research begins with asking myself, how can I design a human centric housing typology? Which lead me to start my research with the Blue Zones. Blue Zones are regions known for longevity, where people live to 100 without any underlying health issues like mentioned in the beginning and understanding how their built environments, natural environments contribute to physical and mental health.[6] I will also analyze Singapore's housing policies, which emphasize community-oriented design and intergenerational living, as well as case studies of cities internationally and in Canada, that have implemented co-housing and multi generational housing models to foster social connectivity. My methodology will involve a combination of qualitative and quantitative approaches, including policy analysis, spatial mapping, and precedent studies. I will examine architectural typologies, demographic data, and urban design strategies through literature reviews, case study comparisons of international and Canadian housing communities that promote multi generational living and aging in place. By synthesizing these findings, my research will propose design strategies that enhance density while prioritizing social and health benefits in Canadian mid-rise housing.

[6] Dan Buettner and Sam Skemp, "Blue Zones: Lessons From the World's Longest Lived," *American Journal of Lifestyle Medicine* 10, no. 5 (2016): 318–21, https://doi.org/10.1177/1559827616637066.

Relevance

The increasing longevity of Canadians, with centenarians being the fastest-growing age group[7]is converging with the rising trend of multi-generational living to reshape housing dynamics in Canada, particularly in Toronto. This shift is driven by a combination of factors, including immigration patterns and the city's expensive housing market. As of 2021, 6.4% of Canadians lived in multi-generational households, representing a 50% increase since 2001[8] . This trend is especially pronounced in major urban centres like Toronto, where high immigration rates and soaring housing costs make multi-generational living an attractive option[9]. The influx of immigrants, many of whom come from cultures where multi-generational living is common, further reinforces this trend. Additionally, with Toronto's rental vacancy rates at record lows and home prices continuing to rise multi-generational living offers a practical solution to the affordability crisis, allowing families to pool resources and provide mutual support across generations. As the population of centenarians is projected to grow almost tenfold over the next half-century the multi-generational housing typology is likely to become even more prevalent, reflecting a significant shift in Canadian living arrangements and family dynamics.

The Goal

The goal of this thesis is to explore how architecture and urban design can actively support human well-being by learning from places where people live the longest and report the highest levels of happiness. By synthesizing key principles from longevity hotspots such as the Blue Zones and progressive urban policies found in some of the world's happiest cities, this thesis proposes a new housing typology that prioritizes quality of life over mere efficiency.

The final proposal envisions a residential development that integrates shared amenities, accessible green spaces, dedicated walking paths, and multi-generational living arrangements. These features are carefully woven together to foster social cohesion, reduce isolation, and support both physical and mental health. Beyond the architectural scale, the project addresses urban sprawl by proposing a denser, more connected form of development. Walkable access to daily necessities, proximity to public transit, and thoughtful spatial organization all contribute to creating a more human-centered urban fabric.

Ultimately, this approach challenges conventional housing models by putting people first rather than profit or cars at the center of design. It seeks to demonstrate how higher-density (as compared to suburbs) living can be achieved without sacrificing well-being, and in fact, can enhance it through deliberate and compassionate urban planning.

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[7] Brieanna Charlebois, “Canada's Oldest Age Group Is Also Its Fastest-Growing,” *CBC News*, June 26, 2024, https://www.cbc.ca/news/canada/british-columbia/canada-centenarians-fastest-growing-1.7246790.
[8] Janson Duench, “Why Multigenerational Households Have Increased by 50% in 20 Years,” *Broadview Magazine*, January 15, 2025, https://broadview.org/why-multigenerational-households-have-increased/.
[9] Len Marshall, “A Harmonious Shift: The Rising Trend of Multi-Generational Living In -,” Homeowner Info, *Smith Proulx Real Estate Team*, March 18, 2024, https://smithproulx.ca/a-harmonious-shift-the-rising-trend-of-multi-generational-living-in-toronto/.

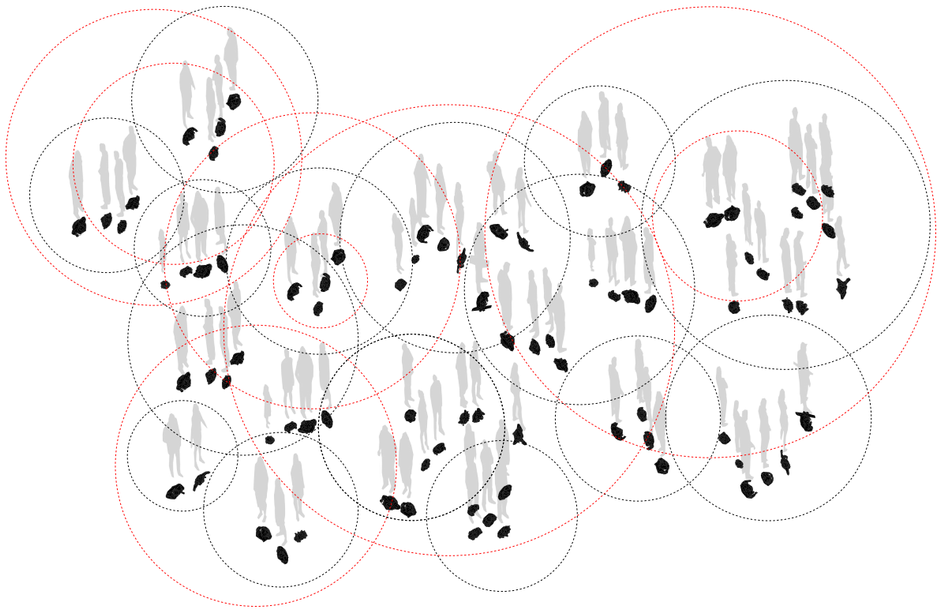


Figure 1
Abstraction of social structures

CHAPTER 1: URBAN SPRAWL

When people first moved to the residential enclaves outside the city core, these places were known as the suburbs, when suburbs began to scatter beyond the urban edge some called the exurbs. In the 1980s downtown businesses seemed to be moving en masse to freeway-fed business parks and megamalls, Washington post reporter Joel Garreau dubbed these new agglomerations 'edge cities.[10] But urban life has now been starched out to such an extent that suburbia, exurbia and edge cities together form a distinct system that has transformed the way that entire city region's function. This is the system that some have come to call the urban sprawl. The urban sprawl accomplishes several historic feats: It takes up more space per person, and they are more expensive to build and operate than any urban form ever constructed. They require more roads for every resident, and more water pipes, more sewers-more power cables, utility wiring, sidewalks, signposts, and landscaping. They cost more for municipalities to maintain. They cost more to protect with emergency services. They pollute more and pour more carbon into the atmosphere. In short, the urban sprawl is the most expensive, resource-intense, land-gobbling, polluting way of living ever built.[11]

Toronto Urban Sprawl

In the late 1940s and early 1950s, Ontario experienced a significant population boom due to the post-war baby boom and increased immigration. This demographic shift coincided with rising affluence and the widespread adoption of automobiles, leading to a surge in demand for single-family homes in suburban areas. The development of suburbs was further facilitated by government policies and investments in infrastructure. The construction of highways and expressways made it easier for people to commute from outlying areas to city centers. This period saw the emergence of comprehensively planned suburbs developed by the private sector, along with suburban industrial parks and regional shopping centers.[12] The preference for suburban living is deeply ingrained in the cultural psyche of many Ontarians. Single-detached houses with private yards became synonymous with the "Canadian dream" of homeownership. This cultural ideal, combined with the perception of more space and a quieter lifestyle, continued to drive demand for suburban developments.[13]

From the 1970s onwards, urban sprawl intensified as cities in the Central Ontario Zone experienced rapid growth. The Greater Toronto Area (GTA) saw significant expansion.

The sprawl followed two main patterns:

1. Radiated expansion: Growth from urban centers to adjoining non-urban areas in concentric circles.
2. Ribbon expansion: Development along the lakeshore of Lake Ontario, connecting several urban centers.[14]

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[10] Joel Garreau, *Edge City: Life on the New Frontier* (Knopf Doubleday Publishing Group, 2011).
[11] Charles Montgomery, *Happy City: Transforming Our Lives through Urban Design*, Anchor Canada edition (Anchor Canada, 2014), 47.
[12] G.a. Stelter, Alan F.J. Artibis, "Urbanization," *February 7, 2006*, n.d., https://www.thecanadianencyclopedia.ca/en/article/urbanization#BackgroundandInternationalContext.
[13] "Urban Sprawl Land Use and Transportation," n.d.
[14] Lanying Wang et al., "Examining Urban Expansion In The Greater Toronto Area Using Landsat Imagery From 1974–2014," *Geomatica* 69, no. 2 (2015): 161–72, https://doi.org/10.5623/cig2015-203.

Since then, Urban sprawl in Toronto and the Greater Toronto Area (GTA) has led to significant low-density development, consuming large amounts of land. Toronto's suburbs are characterized by sprawling industrial parks, generic box stores, strip malls, and bland subdivisions with identical-looking tract homes[15]. This car-dependent landscape has expanded dramatically, with the urbanized area increasing from 193 square miles in the 1950s to 656 square miles in the 1990s.[16] The expansion of the GTA has been substantial, with urban areas experiencing constant growth over the past decades. Between 1974 and 2014, regions such as Peel and Halton had the largest increase in urban area, with development taking the form of outward extension and expansion from urban centers, especially from the City of Toronto.[17]

Densification of the Urban sprawl

Ontario's government has recognized that the continuation of low-density urban sprawl poses significant threats to the province's quality farmland and vulnerable species. To address this issue and combat the environmental impacts of sprawl while avoiding the high costs associated with high-rise buildings, mid-rise housing has emerged as a preferred solution for densifying urban areas. Mid-rise housing, typically defined as buildings between 5 to 12 storeys, offers several advantages, including environmental benefits such as preserving farmland and reducing reliance on automobiles, economic efficiency by being more cost-effective than high-rises, and contributing significantly to meeting Ontario's housing supply goals. Adding mid-rise housing to urban sprawl without ensuring proximity to transit hubs or daily needs can exacerbate environmental damages. Urban sprawl already contributes to habitat destruction, increased greenhouse gas emissions, and reliance on car-dependent lifestyles, which lead to higher air and water pollution levels and loss of agricultural land. If mid-rise developments are not strategically located near public transit or essential services, they risk perpetuating car dependency, increasing commute-related carbon footprints, and further fragmenting natural habitats. Effective mid-rise housing must be transit-oriented, as highlighted in the *Mid-Rise Manual*, which emphasizes that such developments along major streets and transit corridors can reduce suburban sprawl, limit transportation emissions, and preserve green spaces. Without thoughtful placement, mid-rise buildings may fail to deliver their potential environmental benefits and instead compound the adverse impacts of urban expansion had the end-user experience of the mid-rise housing. These developments typically are very efficient, and cost driven with density carriers and provide "amenities" like gyms and communal spaces as a marketing ploy to attract residents. Often these amenities are placed in the left-over space of the building, making them under utilised spaces, a waste of space.

[15] "Sprawling Toronto - Can It Be Fixed? | Smart Cities Dive," accessed March 13, 2025, https://www.smartcitiesdive.com/ex/sustainablecitiescollective/sprawling-toronto/109066/.
[16] Michael Lewyn, "How Suburbia Happened in Toronto," *SSRN Electronic Journal*, ahead of print, 2010, https://doi.org/10.2139/ssrn.1586092.
[17] Wang et al., "Examining Urban Expansion In The Greater Toronto Area Using Landsat Imagery From 1974–2014."

A critique of Ontario mid-rise manual

The Mid-Rise Manual, commissioned by Environmental Defence, presents mid-rise apartment buildings as a sustainable solution to address both housing shortages and climate change concerns in urban areas. This approach aims to create 1.5 million new homes by 2031 while protecting farmland, preserving green spaces, and promoting more affordable and environmentally friendly housing options.[18]

The Mid-Rise Manual offers a robust framework for tackling Ontario's housing crisis by promoting mid-rise developments. While its focus on increasing housing density is commendable, the report falls short in addressing critical aspects such as accessibility to essential amenities, aging-in-place considerations, care dependency risks, and social isolation. These gaps pose significant challenges to creating sustainable, inclusive, and accessible communities. The manual prioritizes transit-oriented development but overlooks the importance of ensuring that essential services such as healthcare facilities, grocery stores, pharmacies, and community centers are within walking distance. While public transit is emphasized as a key feature, it often fails to provide efficient access to these vital services, particularly for seniors and individuals with mobility constraints. Many suburban and transitioning areas in Ontario lack a sufficient distribution of these amenities, leaving residents dependent on cars. This reliance undermines the environmental and social benefits of increased housing density. The demographic shift towards an aging population necessitates that housing policies prioritize age-friendly design and accessibility. However, the Mid-Rise Manual does not address this critical need. The report promotes multi-bedroom units but does not mandate adaptable unit designs that enable seniors to continue living independently as their needs evolve. Equally concerning is the lack of emphasis on pedestrian-friendly infrastructure. Aging populations require wider sidewalks, adequate lighting, resting areas, and barrier-free crossings to support mobility and independence.

Equally concerning is the lack of emphasis on pedestrian-friendly infrastructure. Aging populations require wider sidewalks, adequate lighting, resting areas, and barrier-free crossings to support mobility and independence. Without these considerations, mid-rise housing developments risk becoming inaccessible to older residents.

The Manual does not outline requirements for communal spaces or social infrastructure that support resident interaction and well-being. The emphasis on residential and commercial integration overlooks the importance of public gathering spaces, intergenerational housing models, and cultural hubs. Without shared spaces such as community rooms, public seating, or programmed social activities, mid-rise developments risk replicating the social isolation commonly found in suburban sprawl. A lack of such infrastructure can negatively impact mental health and overall well-being. The likes of which were experienced by me firsthand, living in one of these mid-rise housing complexes, and dive into further detail about this housing model in the following chapters.

[18] Abdul Matin Sarfraz, "Mid-Rise Apartment Buildings Touted as an Urban Climate Solution | Canada's National Observer: Climate News," November 14, 2024, https://www.nationalobserver.com/2024/11/14/news/mid-rise-apartment-buildings-touted-urban-climate-solution.

Health And Urban Spawl

Diving further into how the urban sprawl and the built environment of dwellings, in the urban sprawl have profound health implications at all stages of the circle of life. In the article "Urban Sprawl and Public Health" by Howard Frumkin, published in Public Health Reports in 2002, examines the complex relationship between urban sprawl and public health outcomes. The study explores how the expansion of metropolitan areas into low-density suburbs has contributed to various environmental and health-related challenges, including air pollution, traffic accidents, sedentary lifestyles, water quality degradation, the urban heat island effect, and social isolation. Frumkin argues that while suburbanization has been a long-standing trend, its health impacts have been underappreciated in urban planning and policymaking. The article calls for a public health perspective in urban development decisions to mitigate these health risks.

Frumkin argues that public health professionals have traditionally played a limited role in shaping urban planning policies, despite the historical connection between public health and the built environment. In the past, urban planning and public health were intertwined, particularly in addressing sanitation, waterborne diseases, and air quality in growing cities. However, as urban sprawl became the dominant form of development, public health considerations were largely overshadowed by transportation and economic factors. [19]

The 2005 Report on Public Health and Urban Sprawl in Ontario, prepared by the Environmental Health Committee of the Ontario College of Family Physicians, explores the public health consequences of urban sprawl in Ontario. It reviews existing literature on the subject and highlights the negative health and environmental impacts of suburban expansion. The report argues that low-density, car-dependent development patterns are contributing to a range of physical, mental, and environmental health issues, including air pollution, traffic accidents, obesity, social isolation, and water quality degradation. Urban sprawl is also linked to negative mental health outcomes, primarily due to social isolation, long commutes, and decreased access to services and amenities. The report identifies several ways in which suburban living contributes to mental health challenges: Long commutes are associated with higher levels of stress, fatigue, and reduced quality of life. Studies have shown that commuters who spend more than 45 minutes traveling each way experience higher rates of anxiety, depression, and sleep disturbances. Loss of social cohesion is another significant issue in sprawling communities. Low-density suburban developments often lack public gathering spaces, community centers, and walkable streets, reducing opportunities for social interaction and community engagement. Increased road rage and driver aggression have been observed in areas with heavy traffic congestion, leading to higher rates of stress-related disorders and interpersonal conflicts. Fear of crime and lack of pedestrian-friendly spaces contribute to reduced outdoor activity and greater feelings of isolation, particularly among seniors and individuals with mobility limitations. [20]

[19] Howard Frumkin, "Urban Sprawl and Public Health," *Public Health Reports* 117, no. 3 (2002): 201–17, https://doi.org/10.1016/S0033-3549(04)50155-3.
[20] "Urban Sprawl-Jan-0511," n.d.



Figure 2
Image of the urban Sprawl

CHAPTER 2: THE BLUE ZONES



Figure 3
A world map showing the original 5 Blue Zones.

Blue zones originated from the demographic research conducted by Gianni Pes and Michel Poulain, as documented in the Journal of Experimental Gerontology, which identified Sardinia, Italy, as having the highest concentration of male centenarians (people who live to 100 years).[21] Pes and Poulain marked these villages of exceptional longevity with concentric blue circles on a map, later referring to this area within the circles as the blue zone.[22] Expanding upon this demographic research, Dan Buettner and a team of scientists, often collaborating with Pes and Poulain, identified additional global longevity hotspots and labeled them blue zones.[23] Dan and his team of demographers, scientist and anthropologists were able to distill the evidence-based common denominators of these Blue Zones into 9 commonalities that they call the Power 9.

These hotspots include and are not limited to 5 regions spread all over the globe, Currently, the following regions are considered as 'Blue Zones':

- Okinawa (Japan)
- Sardinia (Italy)
- Nicoya Peninsula (Costa Rica)
- Ikaria (Greece)
- Loma Linda (USA)

Dan Buettner's research into Blue Zone communities provides the road map for this focused research. In his book "The Blue Zones"[24] and the 4-part documentary" live to 100 secrets of the blue zones" [25],Buettner identifies sub-regions and communities within the five Blue Zones where concentrations of centenarians are found. In the documentary, Dan Buettner highlights Singapore as what he calls a "manufactured Blue Zone," setting it apart from traditional Blue Zones like Okinawa or Sardinia, which developed organically through culture and tradition. Singapore's increased life expectancy is largely attributed to government policies centered on creating people-focused, health-promoting environments, rather than cultural norms alone.

[21] Michel Poulain et al., "Identification of a Geographic Area Characterized by Extreme Longevity in the Sardinia Island: The AKEA Study," *Experimental Gerontology* 39, no. 9 (2004): 1423–29, https://doi.org/10.1016/j.exger.2004.06.016.
[22] Michel Poulain et al., "The Blue Zones: Areas of Exceptional Longevity around the World," *Vienna Yearbook of Population Research* Volume 11 (2014): 87–108, https://doi.org/10.1553/populationyearbook2013s87.
[23] Buettner, Dan, and Sam Skemp. "Blue Zones: Lessons from the World's Longest Lived." *American journal of lifestyle medicine* vol. 10,5 318-321. 7 Jul. 2016
[24] Dan Buettner, *The Blue Zones: 9 Lessons for Living Longer from the People Who've Lived the Longest*, Second edition (National Geographic, 2012).
[25] *Live to 100: Secrets of the Blue Zones*, Docuseries, directed by Clay Jeter (Netflix, 2023), 4 hours, https://www.netflix.com/title/81214929.

support longer, healthier lives. Each Blue Zone offers distinct architectural and spatial characteristics that provide valuable, context-specific insights into how the built environment can promote well-being. By studying these communities, architects and urban planners can extract lessons for creating more livable, age-friendly neighborhoods. This exploration enables me to examine emerging patterns in residential density, accessibility, walkability, and housing typologies that encourage healthy, connected living.

While the Blue Zones offer compelling case studies, one limitation lies in the small number of identified regions, which limits the statistical strength of any comparative analysis. These regions vary in culture, geography, climate, and population density, making it challenging to isolate which specific environmental factors may be influencing longevity. While longevity in Blue Zones is influenced by a complex interplay of factors—such as diet, genetics, social structures, healthcare systems, and lifestyle the spatial environments in which these communities live offer a valuable entry point for exploring healthier ways of living. I believe the built environment plays a significant role in enabling longevity by fostering active lifestyles, social connection, and overall well-being. Studying these environments provides a meaningful foundation for design research focused on promoting health through spatial and urban strategies.

For each of the identified Blue Zones, data was attempted to be collected/ developed to support urban analysis looking specifically at:

Built Environment

- Architectural Patterns
- Urban + Land Use Patterns
- Circulation and Transportation

Natural Environment

- Climate
- Landscape/Ecology
- Environment

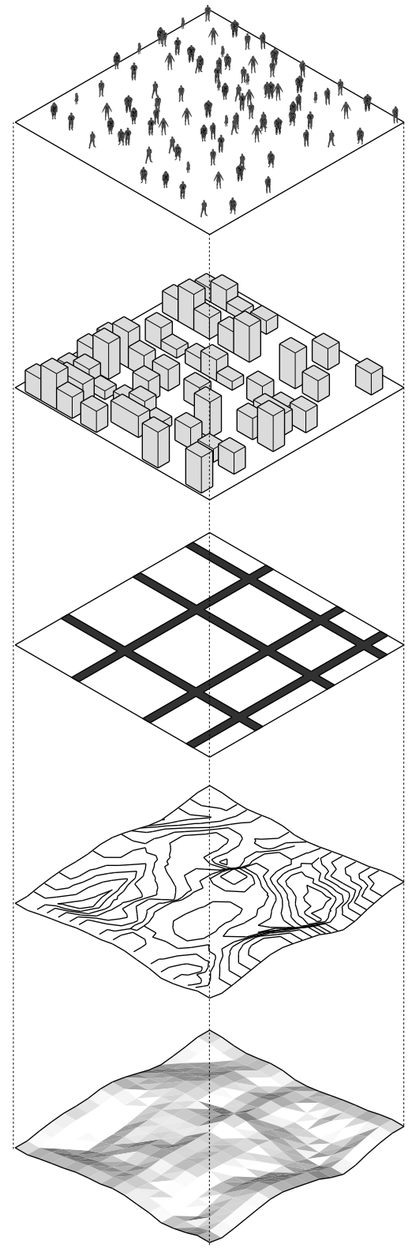
Cultural Morphology

- Values
- Social Norms
- Family Ties

SPACIAL INVESTIGATION

Gathering data for this analysis proved challenging and often relied on web-based resources such as Google Earth and OpenStreetMap. As the research progressed, it became clear that many of the standard tools and metrics used by urban designers are either insufficient or yield impractical results when applied to the predominantly rural settings of many Blue Zones. To address these limitations, a qualitative assessment of my observations was developed, incorporating observational analysis to better capture the spatial nuances of these regions. Within each Blue Zone, one village or region was selected for this study. These were chosen because they were explicitly referenced by Dan Buettner in his book and or documentary, or because they represented a range of urban scales. This selection aimed to identify spatial and urban conditions that may be consistent across each region, providing a foundation for further investigation. This investigation is also based on a similar study of the Blue zones by Perkins and Will, searching for centenarians.[26]

[26] Gavel, Andrew, and Chris Erdman. *Searching for Centenarians: Urban Analysis of the World's Longest Lived Communities.* P+W Innovation Incubator, Spring 2018. https://research.perkinswill.com/projects/searching-for-centenarians/.



CULTURAL MORPHOLOGY

The analysis will examine cultural morphology by reviewing images collected through the documentary. This will help identify how traditional landmarks, gathering spaces, and local customs are expressed in the village layout, and how these cultural elements shape the organization and identity of the area.

MASSING

The spatial analysis of the Blue Zone will begin by investigating the massing of the built environment, focusing on how building density and arrangement support walk-ability and community connections.

URBAN NETWORKS

The role of urban networks and their integration with natural systems will be examined. This includes studying street layouts, paths, and how these connect neighborhoods, aiming to understand how these connections facilitate access to nature and encourage outdoor activity.

TOPOGRAPHY

This analysis will consider the impact of topography by mapping settlement patterns in relation to natural landforms. This will help identify how elevation, slope, and landscape features influence building placement, vegetation distribution, and the overall accessibility and resilience of the area.

Figure 4
Framework for spacial Exploration

SARDINIA, ITALY

The first documentation of Sardinia as a region of notable longevity was in 1999, as reported in a study conducted by Akea [27]. The study revealed that Sardinia exhibited a higher prevalence of centenarians compared to the rest of Europe (16.6 per 100,000 versus 10.0 per 100,000 in Europe). A notable finding was the disparity in the female-to-male ratio among the centenarian population, which was 2:1. This stands in contrast to the typical female-to-male ratio observed in this age group, which is 5:1.

Sardinia is home to the world's longest-lived men. This community of shepherds walk 5 mountainous miles a day or more. This natural movement provides all the positive cardiovascular benefits you might expect and has a positive effect on muscle and bone metabolism without the point pounding of running marathons.[28] The classic Sardinian diet is plant based, consisting of whole-grain bread, beans, garden vegetables, and fruits. Meat is largely reserved for Sundays and special occasions. Sardinians drink wine moderately. Cannonau wine has 2 or 3 times the level of artery-scrubbing flavonoids as other wines. Moderate wine consumption may help explain the lower levels of stress among men.[29]

Research highlights that successful aging in Sardinia's Blue Zone is multicausal, involving lifestyle factors such as outdoor physical activity, a predominantly plant-based diet with moderate meat and dairy consumption, genetics, environment (mountainous terrain promoting physical activity), and strong psychosocial elements including religiosity and mental health. Older adults in this region demonstrate better mental health and resilience compared to peers elsewhere in Italy, linked to their sociocultural environment and traditional lifestyle. Multigenerational living supports close family bonds and social engagement, which contribute to psychological well-being and longevity[30]. A further study conducted with members of Sardinian families (i.e. grandparents, parents, and children) being born and living in the Blue Zone for at least two previous generations documented that personal satisfaction about friendships and satisfaction about family ties predicted self-reported psychological well-being [31], the preservation of traditional cultural practices and familial bonds that has been linked to enhanced mental well-being[32]

[27] Poulain et al., "Identification of a Geographic Area Characterized by Extreme Longevity in the Sardinia Island."
[28] Dan Buettner, *The Blue Zones: 9 Lessons for Living Longer from the People Who've Lived the Longest*, Second edition (National Geographic, 2012).
[29] Buettner, Dan, and Sam Skemp. "Blue Zones: Lessons from the World's Longest Lived." *American journal of lifestyle medicine* vol. 10,5 318-321. 7 Jul. 2016
[30] Maria Chiara Fastame et al., "Mental Health and Religiosity in the Sardinian Blue Zone: Life Satisfaction and Optimism for Aging Well," *Journal of Religion and Health* 60, no. 4 (2021): 2450–62, https://doi.org/10.1007/s10943-021-01261-2.
[31] Maria Chiara Fastame et al., "Mental Health and Motor Efficiency of Older Adults Living in the Sardinia's Blue Zone: A Follow-up Study," *International Psychogeriatrics* 33, no. 12 (2021): 1277–88, https://doi.org/10.1017/s1041610220001659.
[32] Paul Kenneth Hitchcott et al., "Psychological Well-Being in Italian Families: An Exploratory Approach to the Study of Mental Health across the Adult Life Span in the Blue Zone," *Europe's Journal of Psychology* 13, no. 3 (2017): 441–54, https://doi.org/10.5964/ejop.v13i3.1416.

Climate

Climate: Mediterranean
Average Annual Temperature (°C): 16–18.5
Temperature Range (°C): Winters mild (~7–12), summers hot (~24–32, often higher inland)
Average Annual Rainfall (mm): ~550–750
Relative Humidity (%): ~65–75

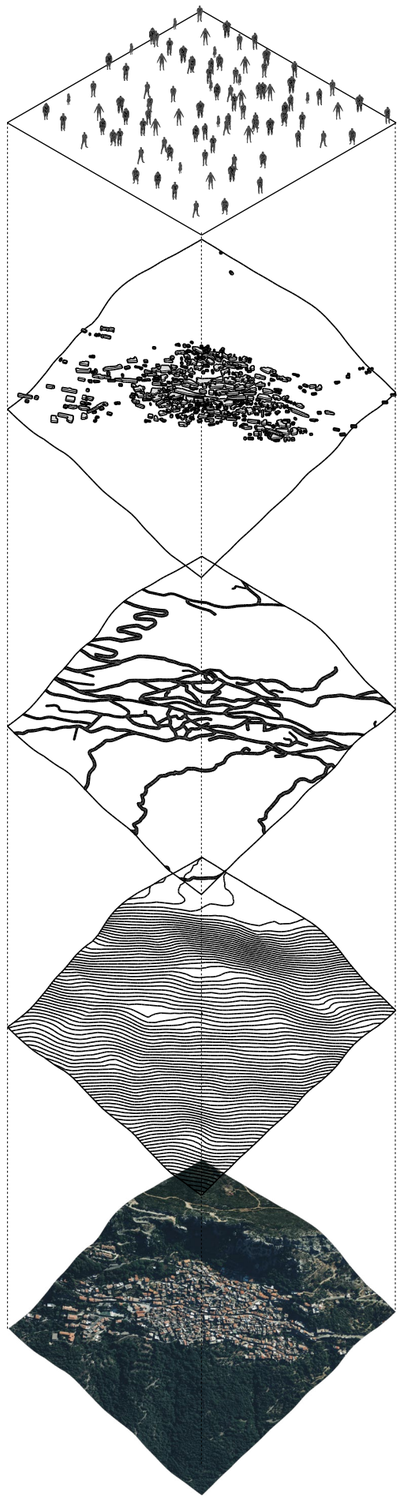
Land Characteristics

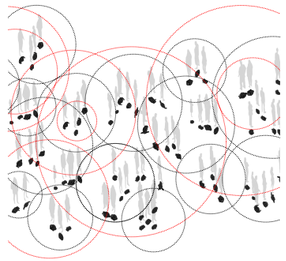
Main Geological Features: Predominantly granite, with areas of schist, limestone, and volcanic rock
Drinking Water Hardness: Generally soft to moderately hard
Forest Coverage (%): ~50%)



Sardinia, Italy, is the second-largest island in the Mediterranean Sea, located west of Italy's mainland and just south of Corsica. Its landscape is diverse, with rugged granitic mountains, rolling hills, and extensive coastal areas featuring both sandy beaches and rocky cliffs. The central-eastern region called Ogliastra is renowned for its isolation, mountainous terrain, and as one of the world's Blue Zones, where a high proportion of people live past 100 years. Sardinia's mild Mediterranean climate, rich biodiversity, and traditional rural lifestyle—especially in Ogliastra—are key contributors to exceptional longevity in this area.

▲ Figure 5
Location of Sardinia, Italy.
+ Ogliastra Region





CULTURAL MORPHOLOGY

Spatial forms reflect longstanding patterns of land use, visible in traditional gathering spaces, agricultural layouts, and circulation routes. These elements are embedded within both the built and natural landscape, shaping and responding to its physical structure.



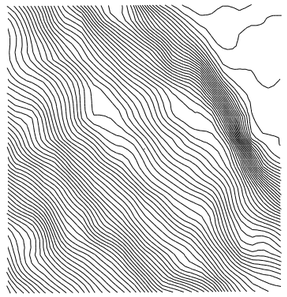
MASSING

building massing reveals a compact, clustered arrangement of 2–3 storey masonry structures aligned along narrow roads and pathways. These buildings are densely grouped along steep contours, reducing private open space while enhancing walkability and facilitating pedestrian circulation.



URBAN NETWORKS

The urban network is shaped by the relationship between streets, footpaths, public spaces, and the surrounding natural environment. Informal shared pathways and staircases weave through the built fabric, creating internal connections and linking the settlement to nearby natural features such as limestone cliffs and dense vegetation.

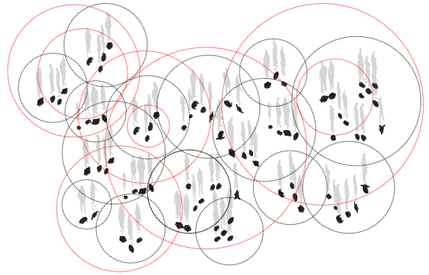


TOPOGRAPHY

The topography is characterized by steep mountain slopes descending toward valleys and the coastline, creating a dramatic and varied landscape. Elevation changes, slope gradients, and prominent landforms significantly influence spatial organization and circulation patterns.

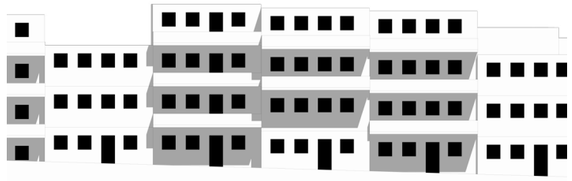
Figure 6
1km² Exploded Isometric drawing of the Village of Baunie

+ Village Observations



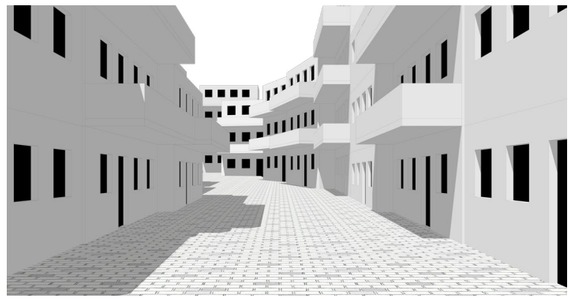
The region's communities retain close-knit family ties and intergenerational support, fostering an environment of mutual care, respect, and purpose among elderly residents. Daily life revolves around communal gatherings, religious festivities, and the perpetuation of age-old practices—such as shepherding, folk music, and local gastronomy—which provide residents with a profound sense of identity and belonging. These cultural factors not only create a supportive social network but also reinforce values conducive to well-being and healthy aging.

Figure 7
Abstract Cultural Morphology Diagram



The villages in Sardinia like Baunei display a vernacular architecture characterized by stone houses with thick walls, small windows, and wooden beams. The massing of these houses often follows the contour of the land, forming organically clustered settlements. Homes are typically oriented to maximize natural light and ventilation, mitigating the effects of the island's hot summers. Dense layouts encourage social interaction, with shared courtyards and communal spaces blurring the line between private and public realms. The architectural style, rooted in practicality and local materials, underscores resilience, sustainability, and a harmonious integration with the surrounding landscape.

Figure 8
Sardinia, Massing Sketch



Urban infrastructure in Sardinia's Blue Zone Villages is modest but highly functional, shaped by centuries of rural life and agricultural practice. Narrow, winding streets accommodate pedestrian movement and facilitate spontaneous encounters among neighbors. Access to healthcare is generally localized, with small clinics serving the community and emphasizing preventative care. The human scale of infrastructure emphasizes walkability and accessibility, reflecting an urban structure that is both people-centered and deeply embedded in local contexts.

Figure 9
Sardinia, Urban Networks
Sketch



Villages are often perched on hillsides or nestled within valleys, offering panoramic views and natural protection. The challenging topography has shaped settlement patterns and daily routines: terraced fields and stone paths encourage physical activity as residents move between elevations and tend to crops or livestock. This spatial organization not only supports agricultural resilience but also fosters a deep connection to nature. The physical demands of the landscape, coupled with its breathtaking beauty, contribute significantly to the region's distinctive quality of life and the well-being of its inhabitants.

Figure 10
Sardinia, Adaptation of the built environment.

+ Sardinia Observations

PEOPLE + PLACE



Figure 11
Multi generational family

Consolata Melis (seated, fourth from right) with her nine children, 24 grandchildren and 25 great-grandchildren in 2012, the day before her 105th birthday. Photograph: AFP/ Getty Images



Figure 12
Ground floor flexible space

A flexible ground-floor space within the public realm is shown here being used as a maker's space.



Figure 13
Front Porch

The front porch functions as an extension of the home, serving as a transitional space between private and public life. It offers a place where residents can sit, relax, and interact with neighbors, fostering a sense of connection and community.



Figure 14
Informal Gatherings

Socializing with friends is part of what makes the people in Sardinia, Italy have such long lifespans.



Figure 15
Plaza Courtyard

The homes are arranged around a carefully shaped plaza, creating a shared focal point for the community. This central space acts as a social and visual anchor



Figure 16
Home clusters Around Plaza

The plaza serves as a communal space for village events and gatherings, acting as the heart of social life. It provides a flexible setting for celebrations, markets, and everyday interactions



Figure 17
Natural and Built Environment

The built environment responds and adapts to the contours of its natural landscape, integrating architecture harmoniously with the surrounding terrain.



Figure 18
Narrow Streets

Narrow streets create shaded, intimate walking corridors that encourage pedestrian movement and social interaction. Their compact scale provides protection from the sun while fostering a sense of enclosure

OKINAWA, JAPAN

Okinawa, an archipelago in the south of Japan, has garnered global attention for the exceptional longevity of its residents. The population in this region exhibits some of the world's lowest rates of age-related diseases, with many elders living active, healthy lives well into their 90s and beyond.[33] One of the most distinctive social institutions in Okinawa is the *moai*: a lifelong circle of friends formed often in childhood, committed to supporting one another emotionally and practically throughout life.[34] Members of a moai regularly gather for conversation, shared activities, and communal support, serving as an extended family beyond blood relatives. Moai groups play several key roles, Members provide companionship and assistance during times of hardship or illness, reducing social isolation and fostering resilience. Traditionally, moai groups shared pooled resources, offering a collective safety net for unexpected challenges.[35]

Another core aspect of Okinawan culture is *ikigai*, meaning "reason for being." This concept encourages individuals to pursue meaningful activities and maintain a strong sense of purpose, which is associated with improved mental and physical health.[36] Ikigai is not limited to career achievements, but encompasses daily engagement in hobbies, family care, and community involvement.[37] Studies indicate that elders with a strong sense of ikigai experience lower rates of cognitive decline and better overall well-being.[38]

Multigenerational living is closely associated with the region's impressive health statistics. Research shows that strong family bonds, social trust, and communal living contribute to reduced rates of cognitive decline, depression, and even mortality among elders. The Okinawa Centenarian study, one of the largest investigations on longevity, credits social integration and family support as key factors in the extended health span of Okinawan elders.[39]

In Okinawan communities, aging is viewed as an active and valued stage of life. Elders contribute meaningfully through activities such as childcare, meal preparation, and participation in daily routines, which not only enhance their own well-being but also support younger family members. These dynamic fosters intergenerational learning, where children are regularly exposed to traditional knowledge, cultural stories, and core family values, reinforcing cultural continuity. The close-knit family structure also provides emotional and practical support: working parents

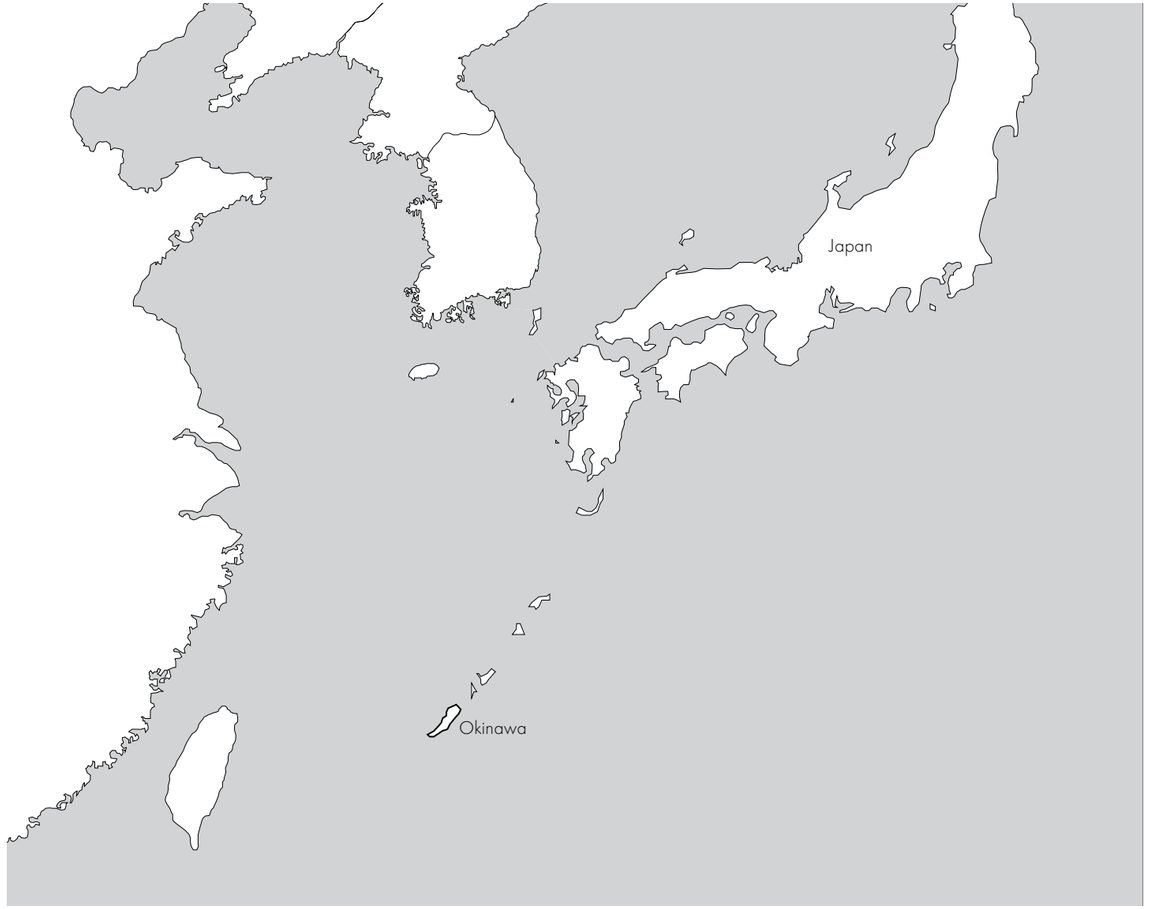
[33] Bradley J. Willcox et al., "Demographic, Phenotypic, and Genetic Characteristics of Centenarians in Okinawa and Japan: Part 1—Centenarians in Okinawa," *Mechanisms of Ageing and Development* 165 (July 2017): 75–79, https://doi.org/10.1016/j.mad.2016.11.001.
[34] "Okinawa, Japan," *Blue Zones*, n.d., accessed July 22, 2025, https://www.bluezones.com/explorations/okinawa-japan/.
[35] Magdalini Kreouzi et al., "Lessons Learned From Blue Zones, Lifestyle Medicine Pillars and Beyond: An Update on the Contributions of Behavior and Genetics to Wellbeing and Longevity," *American Journal of Lifestyle Medicine* 18, no. 6 (2024): 750–65, https://doi.org/10.1177/15598276221118494.
[36] Chippy Mohan et al., *Blue Zone – Okinawa Japan : Area of Exceptional Longevity around the World*, 11, no. 10 (2024).
[37] Mirage News, "Ikigai: The Japanese Secret to a Long and Happy Life," Mirage News, accessed July 22, 2025, https://www.miragenews.com/ikigai-the-japanese-secret-to-a-long-and-happy-1054197/.
[38] Mohan et al., *Blue Zone – Okinawa Japan : Area of Exceptional Longevity around the World*.
[39] Willcox et al., "Demographic, Phenotypic, and Genetic Characteristics of Centenarians in Okinawa and Japan."

Climate

Climate: Subtropical / Humid subtropical
Average Annual Temperature (°C): ~23
Temperature Range (°C): (winter ~16–18, summer ~28–32)
Average Annual Rainfall (mm): ~2,000
Relative Humidity (%): ~70–80

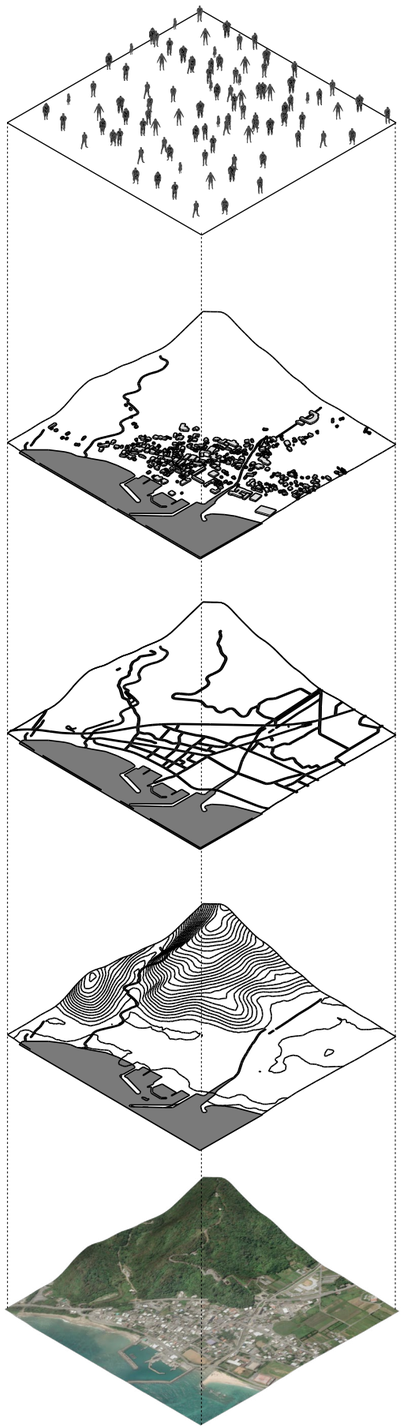
Land Characteristics

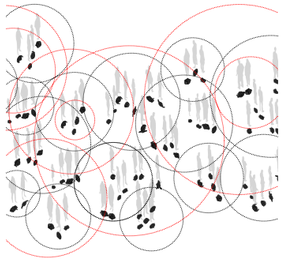
Main Geological Features: Predominantly coral limestone and Ryukyu limestone, with some uplifted reefs.
Drinking Water Hardness: Hard water
Forest Coverage (%): ~45–50%



Okinawa, Japan, is a subtropical archipelago of 160 islands in the far southwest of the country, situated between the Pacific Ocean and the East China Sea. The main island is about 106km long, with beautiful white-sand beaches, coral reefs, and subtropical forests. Okinawa's year-round warm, humid climate averages around 23°C. The region, especially its northern Yambaru area, is known for its pristine natural environment, rich biodiversity, and protected ecosystems.

▲ Figure 19
Location of Okinawa, Japan.





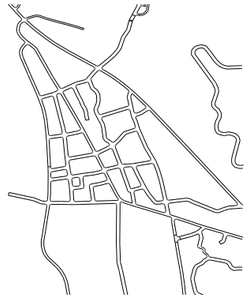
CULTURAL MORPHOLOGY

Cultural life in Kunigami is embedded within this environment. The village features spiritual sites, shrines, festivals, and communal spaces interspersed throughout the forest and along the coasts.



MASSING

In Kunigami Village, buildings are generally low-rise, typically one to two stories in height, with a local emphasis on small, dispersed clusters that blend into the subtropical landscape. Settlement patterns maintain a low profile, with modestly scaled homes and community buildings often surrounded by dense forest.



URBAN NETWORKS

The village is interlaced with a network of winding roads and footpaths that connect communities to the sea, forest, and agricultural fields. These routes follow the region's rivers, beaches, and hills, integrating seamlessly with the lush Yanbaru forest, which covers about 80–84% of the area.

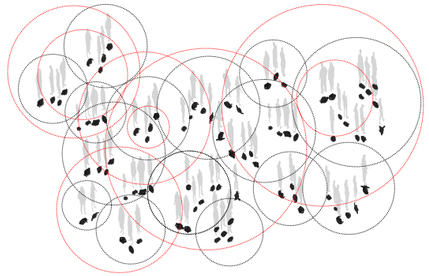


TOPOGRAPHY

Kunigami Village is defined by dramatic topography, with settlements stretching from coastal plains to mountainous interiors. The dominant landform is Mount Yonaha (Yonaha-dake), the highest peak on Okinawa's main island, rising to 503m (1,650ft) above sea level.

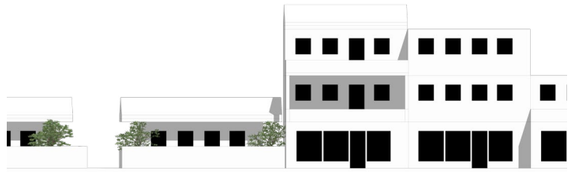
Figure 20
1 km² Exploded Isometric drawing of the Village of Kunigami

+ Village Observations



Deeply rooted traditions such as the moai—lifelong support groups—foster a tightly knit community, encouraging emotional, financial, and practical assistance among members. These networks help alleviate isolation and provide a secure social safety net throughout life. Respect for elders and the concept of ikigai ("reason for being") underpin daily life, giving residents purpose and intergenerational connections that reinforce both mental health and overall well-being. Communal activities, such as gardening, martial arts, and folk rituals, are integral to the culture, supporting an active lifestyle and strong social cohesion.

Figure 21
Abstract Cultural Morphology Diagram



Okinawan architecture is distinguished by its blend of traditional and modern styles, reflecting both historical influences and the practical realities of a subtropical environment. Stand-alone homes such as minkaand modern apartment complexes make up much of the residential landscape, often constructed from concrete or cinder blocks for durability and climate resilience. Buildings are typically compact, with multifunctional ground floors that may house both residential and commercial spaces. The design ethos is grounded in simplicity, minimal ornamentation, and a practical response to regular typhoons, yet homes frequently open onto gardens or communal areas, facilitating interaction with neighbors and integration with nature.

Figure 22
Okinawa, Massing Sketch



The urban infrastructure in Okinawa's Blue Zones supports walkability, accessibility, and social interaction. Winding narrow streets encourage pedestrian movement, often blurring the boundaries between public and private domains. An extensive network of pedestrian pathways and bike tracks facilitates daily activity and makes spontaneous social encounters common. Third places—markets, street plazas, and community centers—feature prominently, serving as gathering points for local events and fostering inclusivity.

Figure 23
Okinawa, Urban Network Sketch



Okinawa's Blue Zone is set amid subtropical islands that feature a striking mix of coastal plains, forested mountains, and mangrove swamps. The Yanbaru region, notably, has extensive forest cover and rugged terrain interspersed with rivers and dams, providing a rich habitat for endemic wildlife. Villages and towns are typically nestled within these natural landscapes, with residential clusters adapted to the slopes and valleys. The terrain not only shapes physical activity—via hiking, gardening, and daily ascents—but also encourages a profound connection with nature.

Figure 24
Okinawa, Adaptation of the built environment.

+ Okinawa Observations

PEOPLE

+

PLACE



Figure 25
Sharing meals

In Okinawa, families often gather to share meals in open communal spaces, reflecting a deep cultural emphasis on connection and togetherness. These shared dining experiences typically take place outdoors or in breezy, semi-open verandas, where extended family members and neighbors join in.



Figure 26
Front Porch

The front porch—much like those found in Sardinia—serves as a welcoming communal gathering space for neighbors, friends, and family.



Figure 27
Multi generational Family

According to Okinawans, the ultimate secret to joy and good health is ikigai, a concept that roughly translates to 'mission,' 'purpose,' or 'reason for getting out of bed each day.' As 101-year-old Umeto puts it, "If we lose it, we die." And she would know.



Figure 28
The Moai

These ladies: Mitsuko Matayoshi, 75, Tomi Ito, 82 and Mitsu Iha, 84 are part of a social community called a 'moai', a friendship group lasting well into old age, which provides emotional and financial support in times of need.



Figure 29
Homes in Okinawa

Homes in Okinawa are designed to foster a strong sense of belonging. This traditional red-brick-roof house on Taketomi Island exemplifies harmony with nature, seamlessly blending indoor and outdoor spaces.



Figure 30
Elderly Games

Elderly residents not only work in the fields and harbors but also actively participate in community life. They engage in shared activities such as traditional crafts, seasonal festivals, and sports events, fostering strong interpersonal connections.



Figure 31
Natural and Built Environment

The built environment is carefully adapted to harmonize with its natural and cultural surroundings. Traditional architecture responds to the island's subtropical climate



Figure 32
Low rise and multi use ground floor

The ground floor of buildings often serves multiple purposes, functioning at times as a small shop and at other times as a residential space. Serving as walkable places for daily needs.

IKARIA, GREECE

Ikaria, a small island in the Aegean Sea, is globally recognized as a "Blue Zone", one of five regions identified for exceptional longevity and a remarkable number of centenarians. Scientific attention has focused on Ikaria's unique social fabric and communal traditions, which play a crucial role in its inhabitants' remarkable health and lifespan. A higher life expectancy was observed in Ikaria compared to the average life expectancy of the rest of Greece. Consequently, since 2009, the population between 65 and 100 years of age has been the subject of study through the IKARIA study[42].

Ikarian society is built around strong social ties and a collective mindset, with an emphasis on community integration and mutual support. The culture is described not as a "me" place, but as an "us" place, where solidarity and cooperation are routine. Daily life in Ikaria involves frequent social contact, with 77.9% of individuals over 90 in one study reporting daily interactions with others. Participation in religious events, communal meals, and village festivals (panigiria) is widespread, reinforcing bonds and reducing isolation.[43] Older adults remain active and valued within the family and wider community. They contribute to daily activities, mentor younger generations, and take part in decision-making, which promotes a sense of purpose and continued cognitive engagement. Social activities gardening, visiting neighbors, and group games are embedded in daily routines for people across all ages. Multigenerational households are a norm in Ikaria. It is common to find three generations living under one roof grandparents, parents, and children. This arrangement ensures that elderly family members remain integrated, active, and supported. Grandparents often provide childcare and transmit cultural heritage, fostering emotional stability and mutual dependence within families[44]. A 2021 cross-sectional observational study found that people aged 90+ in Ikaria exhibit high levels of social interaction, a sense of belonging, and robust family solidarity factors associated with health and longevity[45] Reviews of Blue Zone populations consistently note that supportive social environments, frequent social contact, and multigenerational living arrangements are strongly correlated with reduced rates of chronic diseases and improved longevity metrics.[46]

Ikaria's culture, rooted in collectivism, intergenerational support, and a laid-back approach to time, plays a vital role in the island's remarkable longevity. Living in multigenerational households fosters strong family bonds and provides emotional support and a lasting sense of purpose factors essential for healthy aging. Research consistently points to these social dynamics as major reasons why so many Ikarians live well into their 90s and beyond.

[42] C I Stefanadis, *Unveiling the Secrets of Longevity: The Ikaria Study*, n.d.
[43] Romain Legrand et al., "Description of Lifestyle, Including Social Life, Diet and Physical Activity, of People ≥90 Years Living in Ikaria, a Longevity Blue Zone," *International Journal of Environmental Research and Public Health* 18, no. 12 (2021): 6602, https://doi.org/10.3390/ijerph18126602.
[44] "Exploring Ikaria, Greece's Island of Immortals," Travel, July 22, 2025, https://www.nationalgeographic.com/travel/article/exploring-ikaria-greece-island-immortals.
[45] Romain Legrand et al., "Description of Lifestyle, Including Social Life, Diet and Physical Activity, of People ≥90 Years Living in Ikaria, a Longevity Blue Zone," *International Journal of Environmental Research and Public Health* 18, no. 12 (2021): 6602, https://doi.org/10.3390/ijerph18126602.
[46] Michel Poulain and Anne Herm, "Blue Zone, a Demographic Concept and Beyond," *American Journal of Lifestyle Medicine*, ahead of print, SAGE Publications, May 28, 2025, https://doi.org/10.1177/15598276251342502.

Climate

Climate: Mediterranean
Average Annual Temperature (°C): ~17–18 (winter ~10–12, summer ~25–28)
Temperature Range (°C): Winters mild; summers warm but moderated by sea breezes in coastal areas
Average Annual Rainfall (mm): ~700–900
Relative Humidity (%): ~65–75

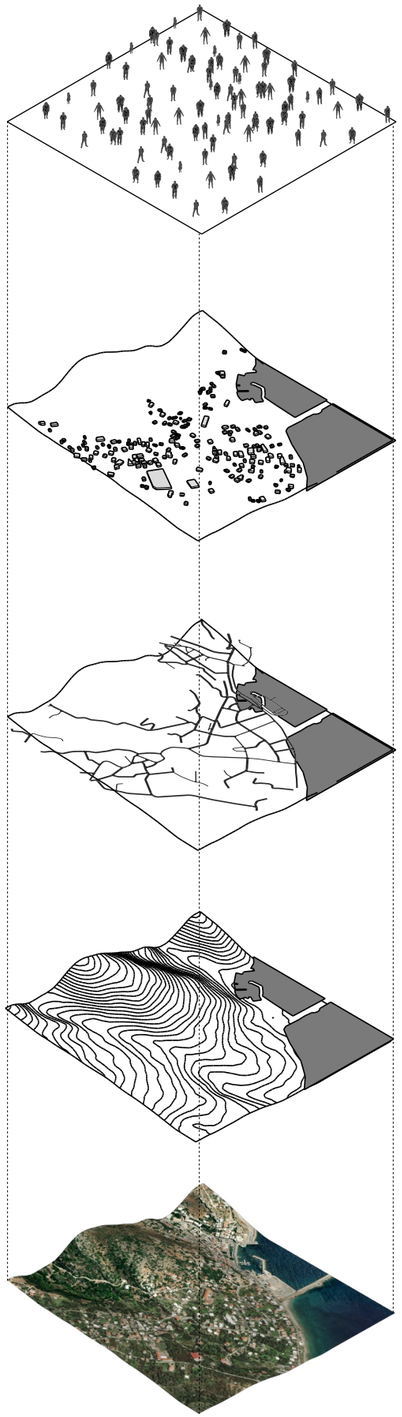
Land Characteristics

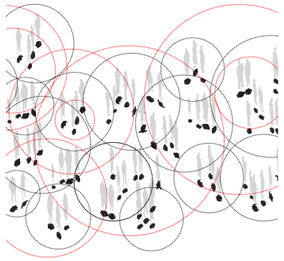
Main Geological Features: Predominantly granite and schist formations, with rugged mountainous terrain and steep valleys
Drinking Water Hardness: Generally soft to moderately hard
Forest Coverage (%): ~40–50%



Ikaria, Greece, is a rugged island in the northeastern Aegean Sea, situated between Samos and Mykonos. Spanning about 255sqkm with steep mountains, verdant slopes, rocky cliffs, and a pristine coastline, Ikaria features a mild Mediterranean climate and abundant natural springs that support lush vegetation and rare biodiversity. Villages are scattered across the landscape—often nestled within cultivated land rather than densely clustered—reflecting the island's unique rural character.

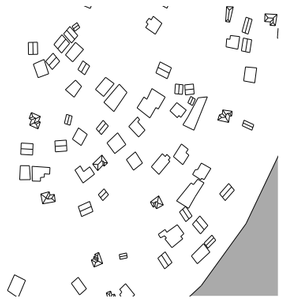
Figure 33
Location of Ikaria, Greece.





CULTURAL MORPHOLOGY

Cultural life in Agios Kirykos is deeply tied to its physical and historical setting. The village layout reflects a long tradition of communal living, with the central square hosting festivals, musical events, and social gatherings.



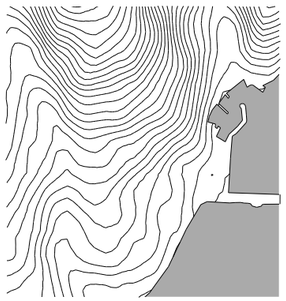
MASSING

Agios Kirykos is distinguished by its dense, amphitheatrically arranged neighborhoods of traditional island architecture. Homes are typically two or three stories tall, set close to each other along narrow cobblestone streets and stepped alleys, echoing the classic Aegean style with stone facades and flower-filled balconies.



URBAN NETWORKS

The village is interlaced with a network of winding alleys, cobbled stairs, and pedestrian pathways that connect residential quarters to the port, central square, and shops. These routes weave through the hillside, leading to key gathering places and opening to views of the harbor and the surrounding green hills.

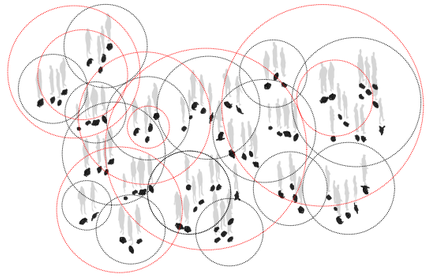


TOPOGRAPHY

Built amphitheatrically on the island's rugged south coast, Agios Kirykos adapts to steep terrain with its layered housing and terraced streets. The village sits below the imposing backbone of the Atheras mountain range, whose highest peak, Atheras (also called Pramnos), rises to 1,037m (3,402ft).

Figure 34
1km² Exploded Isometric drawing of the Village of Agios Kirykos

+ Village Observations



Ikaria's Blue Zone reflects an isolated, traditional culture shaped by centuries of geographic and historical factors. Social life centers on close family bonds, strong intergenerational ties, and communal resilience, with elders playing vital roles in families and community life. Ikarians value daily connections—sharing meals, participating in festivals, and engaging neighbors—maintaining a slow, stress-minimizing lifestyle that underpins their remarkable longevity. Life is guided by simplicity, the enjoyment of nature, and the balance between work and leisure, with traditions such as gardening, winemaking, and village gatherings serving both practical and social functions.

Figure 35
Abstract Cultural Morphology Diagram

Settlements are loosely clustered, following the contours of the rugged landscape, and often allow space for private and communal gardens. Buildings generally have 2-3 stories and relatively small floorplates, with denser clusters along the hillsides and more open spacing in flatter or greener areas. The massing accommodates both privacy and neighborly interaction, while the integration of homes with gardens and terraces further encourages daily outdoor activity and contact with nature.



Figure 36
Ikaria, Massing Sketch

The island's infrastructure is modest and reflects its rural, mountainous setting. Streets are narrow and winding, designed more for pedestrians and livestock than cars, which naturally encourages walking and physical activity. Most villages lack formal urban amenities but offer basic needs, such as local clinics, markets, communal ovens, and social spaces for gatherings. Public transportation is limited, reinforcing residents' reliance on walking or informal social networks for daily needs.

Figure 37
Ikaria, Urban Network Sketch

Ikaria's topography is a mix of steep mountains, verdant valleys, and rocky coastline—has strongly influenced settlement and everyday life. Many villages are perched on slopes or nestled in inland valleys to avoid coastal invasions, fostering both a sense of security and deep engagement with nature. Residents routinely traverse terraced fields, stone paths, and uneven terrain as part of their daily activities, making physical movement and gardening integral to the lifestyle.



Figure 38
Ikaria, Adaptation of the built environment.

+ Ikaria Observations

PEOPLE

+

PLACE



Figure 39
Neighborhood Gathering

Ikaria's residents maintain a strong tradition of communal dining, regularly sharing meals with family, friends, and neighbors. Outdoor spaces such as courtyards, village squares, and shaded terraces serve as welcoming gathering points where the entire community can come together.



Figure 40
Local gathering at village festival

Islanders on Ikaria dancing at a panegryi, or local festival, in the village of Monokampi



Figure 41
Front Porch

the front porch—similar to those in Sardinia and Okinawa—acts as an inviting communal threshold where neighbors, friends, and family come together.



Figure 42
Informal Gatherings

Just as in Sardinia, men in Ikaria often gather in communal spaces to play games and socialize. These informal gatherings typically take place in village squares, cafés, or shaded outdoor terraces.



Figure 43
Homes cluster around a courtyard

Courtyards function as semi-private spaces that mediate between the home and the surrounding community. Often enclosed by low stone walls or greenery, they provide a sheltered area for daily activities such as cooking, dining, and socializing, while still maintaining visual and social connections with neighbors.



Figure 44
Public gathering Terraces

Shared terrace spaces in Ikaria are thoughtfully adapted to the island's mild Mediterranean climate, functioning as comfortable communal areas throughout much of the year. These terraces, often shaded by pergolas, vines, or olive trees, offer residents a place to rest, dine, and socialize in the open air.



Figure 45
Natural and Built Environment

In Ikaria, the built environment is harmoniously integrated with the island's natural landscape, adapting to its contours, climate, and ecological features.



Figure 46
Narrow Streets

Narrow streets create shaded, intimate walking corridors that encourage pedestrian movement and social interaction. Their compact scale provides protection from the sun while fostering a sense of enclosure

NICOYA, COSTA RICA

Nicoya, on the Atlantic side of Costa Rica, is a city, a canton (a municipality of sorts), and an entire peninsula of Costa Rica. The Nicoya Peninsula in Costa Rica has been the subject of extensive research due to its status as one of the world's Blue Zones. Multiple demographic and health studies, particularly by Dr. Luis Rosero-Bixby and other international teams, support the claim that the Nicoya region historically featured a notably high concentration of individuals living into their 90s and beyond, especially among men born prior to 1930[47]. Early studies found that older adults in Nicoya had significantly lower mortality rates compared to the rest of Costa Rica these studies also Research from 2013 highlighted a zone-wide relative mortality rate of 0.83 (i.e., 17% lower than average for Costa Rica) for Nicoyans born before 1920. [48] One longitudinal analysis determined that Nicoya's aged 60 or over were about 29% less likely to die at that age than other Costa Ricans; men were seven times more likely to reach 100 than Japanese men, despite Japan's overall high life expectancy.[49]

In Nicoya, Costa Rica, longevity is supported by a combination of lifestyle, social structure, diet, and biological factors. A strong "plan de Vida," or sense of purpose, along with close-knit family networks, regular social interaction, and intergenerational living, are common among local centenarians. Their diet is largely plant-based, featuring beans, corn, and locally grown produce, with little reliance on processed foods. Physical activity is naturally integrated into daily routines rather than through formal exercise.[50] Researchers also point to possible genetic advantages linked to Chorotega ancestry, in addition to the benefits of Costa Rica's universal healthcare system. Ongoing studies are exploring biological markers such as longer telomeres and beneficial DNA methylation patterns that may contribute to the remarkable longevity seen in this region. [51]

Multigenerational households are a central aspect of life in Nicoya, where it is common for elders to live alongside children, grandchildren, and even great-grandchildren under one roof. These living arrangements cultivate strong intergenerational bonds and offer emotional support, security, and a deep sense of purpose for older adults. Research highlights that such setups significantly benefit longevity and well-being. Elders in Nicoya are rarely isolated; they are respected members of the household and remain actively involved in daily family and community life. This constant interaction helps reduce loneliness and stress both critical factors in promoting longer, healthier lives. Moreover, the presence of a robust familial support system minimizes the need for institutional elder care and enables older adults to maintain their independence.[52]

[47] Luis Rosero-Bixby, "The Vanishing Advantage of Longevity in Nicoya, Costa Rica: A Cohort Shift," *Demographic Research* 49 (October 2023): 723–36, https://doi.org/10.4054/demres.2023.49.27.
[48] Luis Rosero-Bixby et al., "The Nicoya Region of Costa Rica: A High Longevity Island for Elderly Males," *Vienna Yearbook of Population Research* Volume 11 (2014): 109–36, https://doi.org/10.1553/populationyearbook2013s109.
[49] Hanae Armitage, "Unlocking the Secret to Longevity in Nicoya Region Costa Rica | Stanford Medicine," *Stanford Medicine Magazine*, January 24, 2023, https://stanmed.stanford.edu/longevity-secret-costa-rica-area/.
[50] Buettner, *The Blue Zones*, Second edition (National Geographic, 2012).
[51] Armitage, "Unlocking the Secret to Longevity in Nicoya Region Costa Rica | Stanford Medicine."
[52] Elderly Home Health Care Agency, "Why Do People Live Longer in the Blue Zone of Nicoya, Costa Rica? Exploring Their Diet and Lifestyle," *Homecare Alternatives*, August 27, 2024, https://hcalternatives.com/longevity/why-do-people-live-longer-in-the-blue-zone-of-nicoya-costa-rica-exploring-their-diet-and-lifestyle/.

Climate

Climate: Tropical dry forest
Average Annual Temperature (°C): ~27 (dry season highs 30–34, rainy season lows 22–24)
Temperature Range (°C): Warm to hot year-round, with modest seasonal variation
Average Annual Rainfall (mm): ~1,500–2,000
Relative Humidity (%): ~70–80

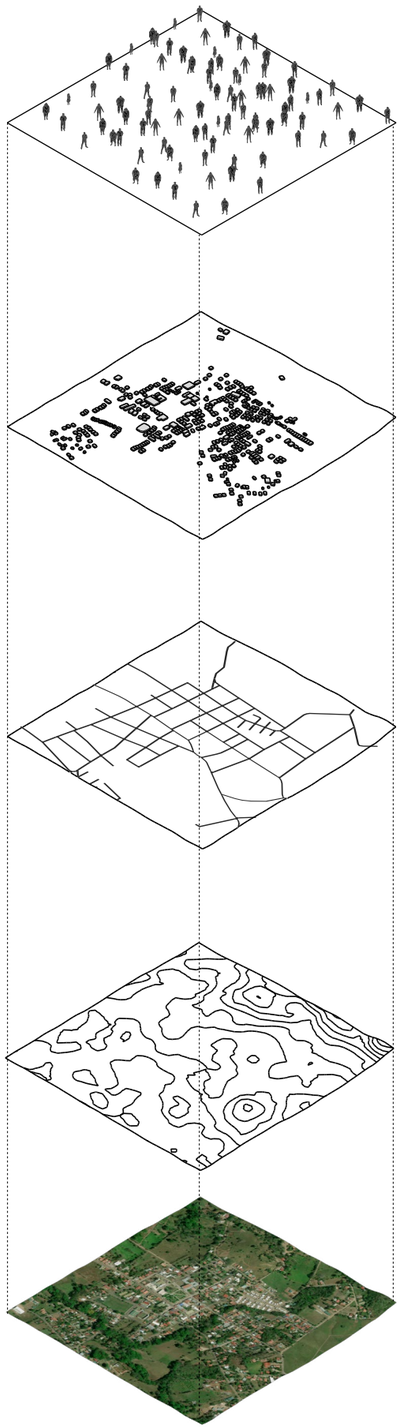
Land Characteristics

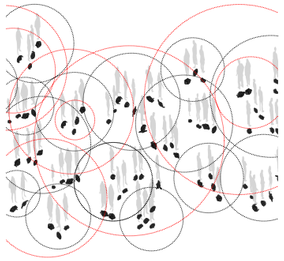
Main Geological Features: Volcanic origin with basaltic and volcanic rock formations; fertile alluvial soils in valleys
Drinking Water Hardness: High natural calcium and magnesium content
Forest Coverage (%): ~40%



Figure 47
Location of Nicoya, Costa Rica.

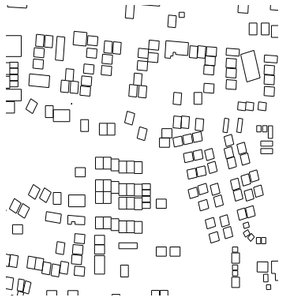
Nicoya, Costa Rica, is a rural region located in the northwestern part of the country on the Nicoya Peninsula, bordered by the Pacific Ocean. Nicoya is characterized by its warm, tropical climate, fertile soils, rolling hills, and access to natural resources, including calcium-rich water. The local population is known for leading an active lifestyle that incorporates physical labor and daily walking. Villages are spread out amidst verdant landscapes, and residents often maintain strong social connections and a deep sense of purpose, known locally as "plan de vida." Diets are built around traditional, unprocessed foods like beans, corn, squash, and fresh produce, with little meat consumption





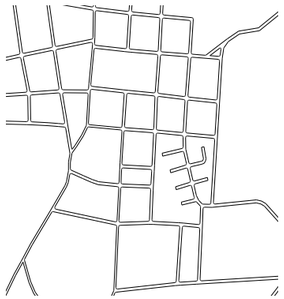
CULTURAL MORPHOLOGY

Cultural life in Agios Kirykos is deeply tied to its physical and historical setting. The village layout reflects a long tradition of communal living, with the central square hosting festivals, musical events, and social gatherings.



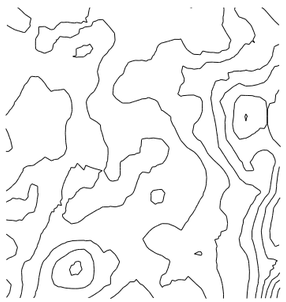
MASSING

Hojancha is a rural mountain town characterized by low-rise buildings—typically one to two stories—arranged in compact clusters along well-maintained streets. Community and civic buildings, such as the municipal offices and local school, are set close to homes, with markets and public spaces further promoting social interaction.



URBAN NETWORKS

The village is interwoven with a network of roads, paths, and public spaces that connect neighborhoods to expansive parks and farmlands. Hojancha is well-known for its clean, safe environment, with access points to reserves, rivers, and agricultural fields

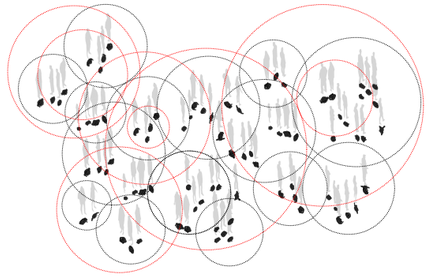


TOPOGRAPHY

Set at a mean elevation of roughly 355–389m (1,165–1,276ft) on the Nicoya Peninsula, Hojancha is perched on hills overlooking the Pacific Ocean. The terrain is gently rolling, and settlements are organized along ridges and valleys. The region's fertile soils and moderate elevation favor agriculture, especially the cultivation of beans, fruit, honey, and coffee.

Figure 48
1km²Exploded Isometric drawing of the Village of Hojancha

+ Village Observations



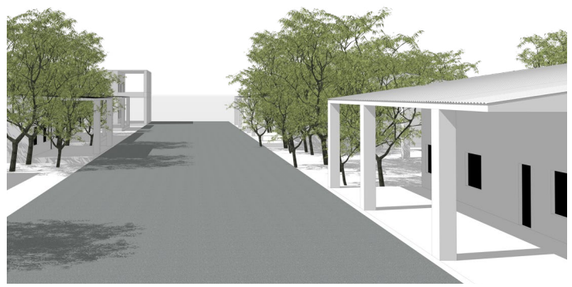
Residents maintain daily intergenerational contact, with elders integrated into family life and community activities. The Chorotega indigenous heritage, especially the collective practice of "mano vuelta" (working for the communal good), continues to shape communal values, emphasizing mutual support and cooperation. "Plan de Vida" (life purpose) is central to well-being, with purpose-driven routines and positive outlooks underpinning daily life. Communal activities like shared meals, neighborhood gatherings, and local festivals are integral, reinforcing social bonds and collective identity.

Figure 49
Abstract Cultural Morphology Diagram



The architectural character of Nicoya's towns reflects a blend of Spanish colonial patterns and adaptations to tropical climate. Settlements are typically organized in grid patterns radiating from a central plaza, with streets aligned to cardinal directions. Homes are mostly single-story, low-rise structures made from masonry, often featuring porticos, verandas, or open-air spaces for natural ventilation and socializing—a practical response to high humidity and rainfall. Site coverage is moderate, allowing for backyard gardens and urban greenery.

Figure 50
Nicoya, Massing Sketch



Urban infrastructure in the Nicoya Blue Zone is understated yet supports daily movement, walkability, and community connection. Streets are narrow and well-suited for walking, and public amenities like plazas, communal markets, and churches serve as primary gathering points. There is minimal high-rise development; the landscape favors a human scale where daily routines—walking to markets, tending crops, or visiting neighbors—involve regular physical activity. Public transportation and healthcare are available at a local scale, with a focus on accessibility and integrated primary care, often including home visits by doctors.

Figure 51
Nicoya, Urban Network Sketch



The Nicoya Peninsula offers a dramatic natural setting, characterized by rolling hills, fertile valleys, rugged mountains, and proximity to both coast and jungle. Longer-lived communities tend to be located inland, away from the coast, in areas where deforested mountains encircle cleared valleys devoted to agriculture. People traverse uneven terrain daily, whether tending to farmland or moving between dispersed settlements, integrating physical exertion into routine life. Dense tropical forests persist on steep, less accessible slopes, creating a biodiverse backdrop.

Figure 52
Nicoya, Adaptation of the built environment.

+ Nicoya Observations

PEOPLE + PLACE



Figure 53
Multi generational Family

A photo of the two brothers, Benedicto, 96, and Liborio, 95 (seated on bench), surrounded by their immediate family, including children, grandchildren, and great-grandchildren



Figure 54
In pursuit of a hobby

Liborio Matarrita Gómez, 95, in his home in Curime, in the Guanacaste province of Nicoya
A carpenter and farmer for much of his life, demonstrates his wood working skills



Figure 55
Neighborhood Gathering

In Costa Rica, multiple generations either live together in the same house or within close proximity, and are very much involved in each other's lives. There's a village mindset where neighbors are often more like extended family, and people come and go to help each other or just stop in for a visit.



Figure 56
Front Porch

Saturnino Lopez Hernandez, 94, sits outside his home in Nicoya, Costa Rica, in 2021.



Figure 57
Homes in Nicoya

In Nicoya, homes are typically single-story structures with porches that extend outward, creating a welcoming threshold between private and public space.



Figure 58
Wide Streets

the street often functions as a shared space where cars and pedestrians coexist, reflecting a slower pace of life and a strong sense of community. Rather than separating movement and social activity, these streets allow for informal encounters, children playing, and neighbors interacting.



Figure 59
Natural and Built Environment

Built forms are designed in harmony with the land and local climate, following the natural contours of the terrain and responding to prevailing temperatures.



Figure 60
Plaza

Outdoor public squares and plazas are integral components of community life, providing spaces for gatherings, celebrations, and daily social interaction. These open areas, often located near churches or markets, serve as lively communal hubs

LOMA LINDA, USA

The area now known as Loma Linda was originally home to the Tongva people, with the village of Wa'aachnga occupying what is now the city's land. Spanish missionaries, and later the Cahuilla and Serrano peoples, successively influenced the region by the early 1800s during Mission San Gabriel's expansion.[54]

In the late 1800s, the area now known as Loma Linda was initially developed as "Mound City," a failed tourist resort venture that was later purchased by a consortium with the aim of creating a health resort. In 1905, the Seventh-day Adventist Church, guided by leaders such as John Burden and Ellen G. White, established the Loma Linda Sanitarium on the former hotel grounds. This pivotal step laid the groundwork for a community culture centered on health, spirituality, and education. In the early 1900s, the founding of Loma Linda University and Medical Center further reinforced the city's commitment to healthcare and wellness, drawing professionals and families who embraced the church's holistic philosophy. The incorporation of Loma Linda as a city in 1970 marked a formal milestone in its modern development.

Dan Buettner identified Loma Linda as a Blue Zone in a 2005 National Geographic cover story. The population of Loma Linda is strongly influenced by the Seventh-day Adventist community located there. The community's members eat a predominantly vegetarian diet, do not drink alcohol, engage in moderate physical activity on a regular basis, and pay special attention to spirituality[55]

One of the most consistent findings in Blue Zone research is the importance of social ties in promoting long life. Loma Linda exemplifies this. Families tend to be close-knit, often multigenerational, and bonded by both faith and shared lifestyle. Community events especially those tied to church life serve as social glue. Weekly potlucks, volunteer programs, and Sabbath picnics provide not just food and fellowship, but continuity. These gatherings reinforce norms: moderation, generosity, compassion.[56]

Research shows that social isolation is as detrimental to longevity as smoking 15 cigarettes a day.[57] In Loma Linda, community is preventive medicine. The elderly are not marginalized; they are respected, included, and often serve as role models for the younger generation. Many of them remain active well into their 90s, teaching, gardening, and participating in community programs.[58]

[54] *Wikipedia*, "Loma Linda, California," June 25, 2025, https://en.wikipedia.org/w/index.php?title=Loma_Linda,_California&oldid=1297257292.
[55] Buettner, *The Blue Zones*, Second edition (National Geographic, 2012).
[56] Buettner, *The Blue Zones*, Second edition (National Geographic, 2012).
[57] Julianne Holt-Lunstad et al., "Advancing Social Connection as a Public Health Priority in the United States.," *American Psychologist* 72, no. 6 (2017): 517–30, https://doi.org/10.1037/amp0000103.
[58] J. F, "Loma Linda, The Blueprint of a Long Life," *Escape Artist*, May 12, 2025, https://www.escapeartist.com/blog/loma-linda-the-blueprint-of-a-long-life/.

Climate

Climate: Mediterranean semi-arid
Average Annual Temperature (°C): ~18–19 (winter ~7–10, summer ~28–32)
Temperature Range (°C): Winters mild; summers hot and dry, occasional heatwaves above 37°C
Average Annual Rainfall (mm): ~375–450
Relative Humidity (%): ~50–65

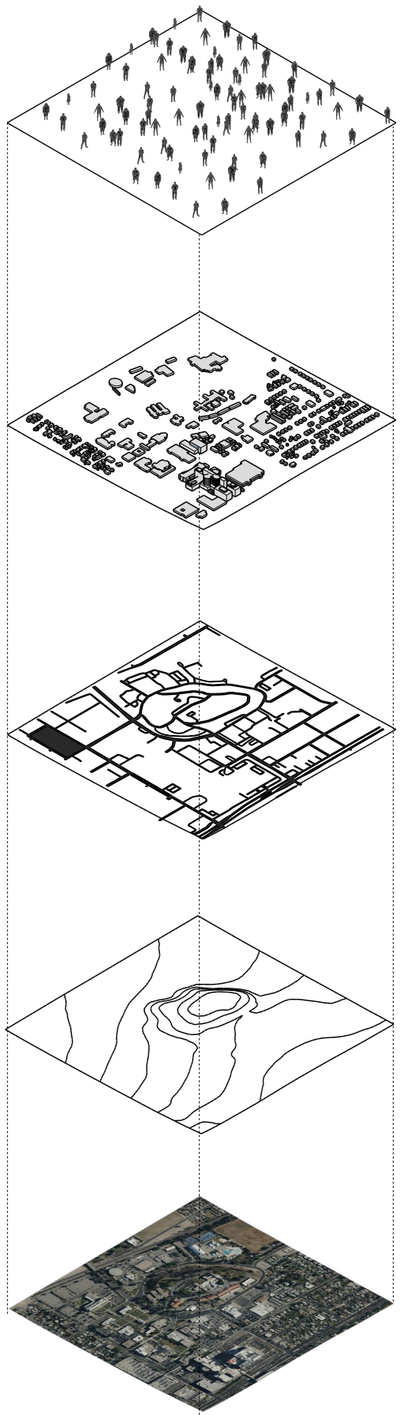
Land Characteristics

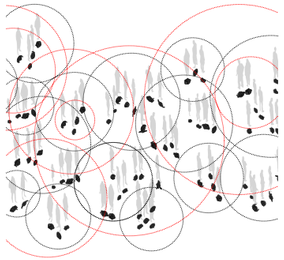
Main Geological Features: Alluvial soils from surrounding San Bernardino Mountains; sedimentary rock base with some granitic intrusions
Drinking Water Hardness: Moderately hard to hard
Forest Coverage (%): ~20–25%



Loma Linda, California, is a small city located in southwestern San Bernardino County in Southern California, about 60 miles east of Los Angeles. It sits within the Inland Empire region, bordered by San Bernardino to the north, Redlands to the east, Colton to the west, and Riverside County to the south. The city covers roughly 7.5 square miles (19.8 sq km) and features a mix of flat valley land and the rugged South Hills, a protected open-space reserve. Loma Linda's climate is characterized by warm, dry summers and mild, wetter winters.

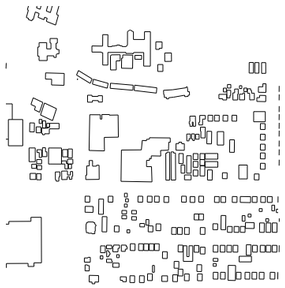
Figure 61
Location of Loma Linda, CA, U.S.A.
Loma Linda





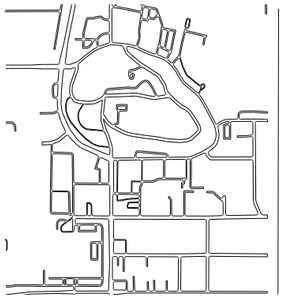
CULTURAL MORPHOLOGY

Cultural life in Loma Linda centers around the traditions and lifestyle of its large Seventh-day Adventist population, which strongly influences community priorities. Practices such as plant-based diets, Sabbath rest, volunteerism, and intergenerational activities are deeply embedded in daily life.



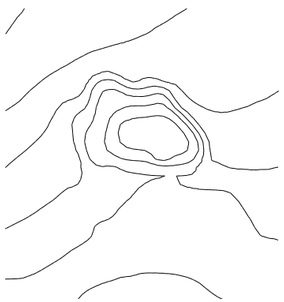
MASSING

Loma Linda features predominantly low-rise, single-family homes, civic buildings, and medical complexes, typically one to three stories in height. Residential areas are arranged in compact, walkable neighborhoods with tree-lined streets.



URBAN NETWORKS

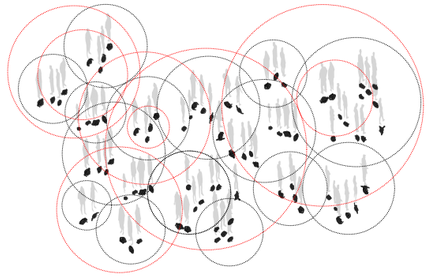
The city is interwoven with a network of roads, sidewalks, bicycle paths, and public transit routes that connect neighborhoods to schools, parks, medical centers, and shopping areas.



TOPOGRAPHY

Set in the scenic foothills of the San Bernardino Valley, Loma Linda ranges in elevation from about 1,027ft to 1,165ft (355m), with undulating terrain shaped by valleys, creeks (such as San Timoteo Creek), and the prominent backdrop of the San Bernardino and San Jacinto Mountains.

◄ Figure 62
1 km² Exploded Isometric drawing Loma Linda



Loma Linda's Blue Zone is rooted in a distinctive cultural environment shaped primarily by the Seventh-day Adventist community. The Adventist faith emphasizes holistic health, plant-based diets, regular exercise, social connection, and spiritual purpose. This faith-driven lifestyle fosters routine communal activities—like church gatherings, Sabbath observance, and volunteerism—that nurture intergenerational support and collective well-being. Strong social ties are a hallmark: family life is multigenerational, elders are respected and remain engaged, and community events reinforce norms of moderation, compassion, and respect.

◄ Figure 63
Abstract Cultural Morphology Diagram



Architecture in Loma Linda reflects both modern American suburban design and functional adaptations to health-focused lifestyles. Neighborhoods feature modest, low-rise homes, typically single-family or duplex residences, surrounded by spacious yards or small gardens. Many residents grow fruits, vegetables, or herbs at home, directly tying daily life to the Blue Zone's dietary ethos. Properties are laid out to encourage privacy while facilitating neighborly contact; front porches, sidewalks, and front yards support spontaneous interaction. Religious and educational institutions—mainly the church, school, and hospital—are central architectural anchors, serving as physical and social gathering points for the community.

◄ Figure 64
Loma Linda, Massing Sketch



Urban infrastructure in Loma Linda is designed for accessibility, walkability, and health-friendly living. Streets are laid out on a suburban grid with wide sidewalks, abundant trees, and easy access to parks and community gardens. The city prioritizes pedestrian and bicycle paths, making daily movement convenient and safe for all ages. Public amenities—such as community centers, clinics, and recreational facilities—are well distributed and often operated in partnership with the Adventist church or university.

◄ Figure 65
Loma Linda, Urban Network Sketch



Situated in the hills east of Los Angeles, Loma Linda occupies gently rolling terrain with subtle elevation changes. The landscape is characterized by residential neighborhoods interspersed with green spaces, citrus groves, and mountain views. Its location offers clean air and mild climate, supporting outdoor activity year-round. While not mountainous, Loma Linda's gentle hills and abundant parkland encourage walking, gardening, and regular outdoor engagement.

◄ Figure 66
Loma Linda, Adaptation of the built environment.

PEOPLE

+

PLACE



Figure 67
Neighborhood Gathering

Loma Linda residents, much like those in other Blue Zone regions, place a strong emphasis on community life. They regularly gather for church potluck dinners, enjoying wholesome plant-based meals while engaging in warm, social interaction.



Figure 68
Volunteering

Like many faith traditions, the Seventh-day Adventist Church actively encourages community service and creates opportunities for its members to volunteer. According to Buettner in the Live to 100 Netflix documentary, "people who volunteer tend to have sharper memories, stronger social connections, and report higher levels of happiness."



Figure 69
Elderly Engaged in sports

Bob "Mr. Pickleball" Mitchell, far right, with Mailen Kootsey, 84; John Testerman, 78; and Lucy Lett, 89. Mitchell organizes regular pickleball matches for older people in the area around Loma Linda.



Figure 70
Fitness programs

Participants take a spin on bikes at the Drayson Center Senior Triathlon in Loma Linda, California.



Figure 71
Homes

Homes in Loma Linda include a wide variety of housing types, ranging from single-family detached houses to multifamily buildings and row homes.



Figure 72
The Drayson Center.

The city of Loma Linda, first established as a health community center in the late 1800s, makes it easy for people to age well by design. And religion plays a huge role in that.



Figure 73
Natural and Built Environment

The hill in Loma Linda stands as the area's defining geological feature, shaping both its natural landscape and urban character.



Figure 74
Loma Linda University

Loma Linda University and its hospital system are the central institutions anchoring the city of Loma Linda. They serve as major employers, provide essential healthcare, and make significant contributions to the community's social and economic life.

SINGAPORE

Singapore occupies a distinctive position in global longevity research. In 2023, it was designated the world's sixth official "Blue Zone"—the first to earn this status not through centuries-old traditions or geographic isolation, but through forward-thinking, top-down governance. Unlike original Blue Zones such as Sardinia or Okinawa, where longevity stems from deeply rooted cultural practices, Singapore's exceptional health outcomes are the product of intentional planning and policy, earning it the title of a "manufactured Blue Zone" or "Blue Zone 2.0."[59]

Singapore's roots are in its time as a British colony, where healthcare was basic and a government priority only in the latter half of colonial rule. In the post-independence years (from 1959), the new government led by the People's Action Party expanded access to public health, sanitation, vaccination, and housing. These changes led to rapid improvements in population health.[60] During the 1960s–1970s, government investments brought widespread access to clinics (polyclinics), school health, and immunization. However, free healthcare systems became fiscally unsustainable with an ageing population and rising expectations.[61]

By the early 1980s, Singapore faced mounting pressures brought on by rapid modernization, including escalating healthcare costs, accelerated urbanization, and a shift in the national disease burden from infectious to chronic conditions. In response, the government introduced the National Healthcare Plan (NHP) in 1983—a comprehensive, top-down initiative that redefined public health through a preventive lens. Central to the plan was the principle that "prevention is better than cure," which became a national mantra.[62] The NHP encouraged citizens to take personal and familial responsibility for their health, while promoting active, physically fit lifestyles as a societal norm. Structurally, the plan implemented key reforms: the creation of mandatory Medisave accounts requiring workers and employers to contribute to individual medical savings; the corporatization of hospitals to boost efficiency and financial sustainability; and widespread public health campaigns targeting smoking cessation, improved nutrition, and physical activity. Together, these measures laid the foundation for Singapore's transformation into a "manufactured Blue Zone".[63]

A large national study published in the Singapore Medical Journal found that 25.4% of older Singaporeans met criteria for "successful ageing" (i.e., major disease-free, no disability, high cognitive and physical functioning, and ongoing social engagement). The researchers highlight urban design, government promotion of exercise and healthy diets, policies supporting late-life employment, and strong public housing as key to Singapore's superior outcomes. They also note that intergenerational living and family support structures, facilitated by policy, are central features unique to Singapore's model.[64]

Peer-reviewed research shows that Singapore's health gains stem from proactive government investments in sanitation, public housing, clean water, and disease prevention, starting from the 1960s. These environmental and infrastructural improvements were crucial for eradicating infectious diseases and managing chronic conditions as the population aged.[65] Scholars emphasize the advantages of Singapore's universal public housing system, which directly facilitated social interaction and informal care networks, forming the basis for successful multigenerational living.

Qualitative studies examining perceptions of successful ageing in Singapore underscore the role of both families and communities. Policies like the "Many Helping Hands" approach promote voluntary, grassroots involvement in elderly care and community programs, which help maintain strong social networks and engagement among seniors.[66] Separate analyses of intergenerational programs note positive attitudes and increased well-being among community-dwelling older adults involved in such initiatives, further linking policy interventions to healthy, active, and connected ageing.[67]

A central focus of Singapore's ageing policies has been the social integration of seniors and the promotion of intergenerational cohesion. The state continues to uphold the family as the primary support system for the elderly, emphasizing reciprocal responsibilities: while children are expected to care for their aging parents, seniors are also encouraged to contribute actively, particularly through roles such as caregiving and grandparenting. To strengthen these family ties, the government has introduced a range of pro-family workplace practices aimed at fostering better work-life balance. Additionally, several targeted policies support intergenerational living and bonding. These include the CPF Family Housing Grant,[68] which provides financial assistance to families choosing to live with or near elderly parents; priority in public housing allocation for such arrangements; tax incentives for children who care for their aging parents; and CPF top-up schemes that allow family members to support one another financially. Together, these measures form a comprehensive framework that reinforces familial interdependence, not only as a cultural value but as a structural pillar of Singapore's ageing strategy.[69]

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[59] Dan Buettner, "The World's 6th Blue Zones Region - an Engineered Longevity Hotspot," *Blue Zones*, October 16, 2023, https://www.bluezones.com/2023/10/the-worlds-6th-blue-zones-region/.
[60] M. Ramesh and Azad Singh Bali, "The Remarkable Healthcare Performance in Singapore," in *Great Policy Successes*, 1st ed., ed. Paul 'T Hart and Mallory Compton (Oxford University PressOxford, 2019), https://doi.org/10.1093/oso/9780198843719.003.0003.
[61] Ramesh and Bali, "The Remarkable Healthcare Performance in Singapore," 1st ed., ed. 'T Hart and Compton (Oxford University PressOxford, 2019).
[62] Yoke Tho Tong and Sheela Narayanan, *Caring for Our People*, ed. Pradeep Paul (MOH Holdings Pte. Ltd. for the Ministry of Health, 2015).
[63] Tong and Sheela Narayanan, *Caring for Our People*.
[64] M Subramaniam et al., "Successful Ageing in Singapore: Prevalence and Correlates from a National Survey of Older Adults," *Singapore Medical Journal* 60, no. 1 (2019): 22–30, https://doi.org/10.11622/smedj.2018050.
[65] M. Ramesh and Azad Singh Bali, "The Remarkable Healthcare Performance in Singapore," in *Great Policy Successes*, 1st ed., ed. Paul 'T Hart and Mallory Compton (Oxford University PressOxford, 2019), https://doi.org/10.1093/oso/9780198843719.003.0003.
[66] Ramesh and Bali, "The Remarkable Healthcare Performance in Singapore," 1st ed., ed. 'T Hart and Compton (Oxford University PressOxford, 2019).
[67] Kay See Leong et al., "Older Adults' Perspective of Intergenerational Programme at Senior Day Care Centre in Singapore: A Descriptive Qualitative Study," *Health & Social Care in the Community* 30, no. 1 (2022), https://doi.org/10.1111/hsc.13432.
[68] "HDB | CPF Housing Grants for Resale Flats (Families)," accessed July 28, 2025, https://www.hdb.gov.sg/residential/buying-a-flat/understanding-your-eligibility-and-housing-loan-options/flat-and-grant-eligibility/couples-and-families/cpf-housing-grants-for-resale-flats-families.
[69] "Successful Ageing – A Review of Singapore's Policy Approaches," accessed July 28, 2025, https://knowledge.csc.gov.sg/ethos-issue-01/successful-ageing-a-review-of-singapores-policy-approaches/.

Singapore's surge in life expectancy—from 65 years in the 1960s to over 86 years today—is strongly linked to its systematic longevity policies and public health interventions. [70] Scientific studies highlight how national programs, urban design, preventive healthcare, and social policy have resulted in not only longer but healthier lives for residents.[71] The World Health Organization records a rise of over 4 years in healthy life expectancy since 2000, emphasizing quality alongside lifespan.[72] Simulation modeling using Singapore's Future Elderly Model projects that lifestyle interventions aligned with "Healthier SG" could save the nation more than US$500million by 2050, moderating chronic disease and disability even as the population ages.[73] Notably, the number of centenarians in Singapore doubled between 2010 and 2020, moving life to 100 from a rarity to a fast-rising norm.[74]

However, Singapore's demographic achievements are paired with well-documented social and healthcare challenges tied to rapid aging. As more residents live into their eighties, nineties, and beyond, demand for healthcare, long-term care, and social support has intensified sharply. Recent studies project that by 2030, a quarter of Singapore's population will be aged 65 or older, dramatically increasing the strain on public health systems, eldercare infrastructure, and the broader economy. [75] Scientific research has confirmed that rising longevity is accompanied by an uptick in chronic diseases, multimorbidity, and age-related disabilities—trends that disproportionately affect women, ethnic minorities, and lower-income groups, further widening health and life expectancy disparities.[76]

Caregiving pressures are mounting as well. Nearly one in seven older adults are also caregivers, juggling employment and their own health needs while supporting elderly family members, with women shouldering the bulk of these responsibilities. These caregiving roles trigger significant financial and emotional pressures, which are compounded by gaps in workplace policies and social safety nets. [77] Moreover, with a shrinking workforce relative to the expanding elderly cohort, issues of retirement security, healthcare funding, and sustainable, inclusive support across generations are now high priority for policymakers. Studies emphasize that holistic, multi-generational policy approaches combining family, state, and community resources will be vital to meet these needs and maintain the social cohesion that has long underpinned Singapore's successful aging agenda.[78]

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[70] "The World's Sixth 'Blue Zone': Why Singapore Values Both Quantity and Quality of Life," December 24, 2024, https://www.bbc.com/travel/article/20241002-singapore-the-worlds-sixth-blue-zone.
[71] L Pelegrini et al., *GERONTOLOGY AS A CAREER: EVIDENCE FROM COGNITIVE IMPROVEMENT IN A COGNITIVE TRAINING GROUP*, n.d.
[72] "Singapore," Datadot, accessed July 28, 2025, https://data.who.int/countries/702.
[73] Xueying Guo et al., "Disease Burden, Lifetime Healthcare Cost and Long-Term Intervention Impact Projections among Older Adults in Singapore," *Nature Aging* 5, no. 7 (2025): 1358–69, https://doi.org/10.1038/s43587-025-00915-0.
[74] "Duke-NUS - In the News," DukeNUS, accessed July 28, 2025, https://www.duke-nus.edu.sg/newshub/media-coverage/reaching-100-number-of-centenarians-in-singapore-has-doubled-in-10-years-(straits-times-premium).
[75] Xueying Guo et al., "Disease Burden, Lifetime Healthcare Cost and Long-Term Intervention Impact Projections among Older Adults in Singapore," *Nature Aging* 5, no. 7 (2025): 1358–69, https://doi.org/10.1038/s43587-025-00915-0.
[76] Subramaniam et al., "Successful Ageing in Singapore."
[77] "SMU Report: Nearly 14% of Older Adults Are Caregivers – Over Half Aged 60 and Above," SMU Newsroom, April 9, 2025, https://news.smu.edu.sg/news/2025/04/09/smu-report-nearly-14-older-adults-are-caregivers-over-half-aged-60-and-above.
[78] Angela Y Chang et al., "Measuring Population Ageing: An Analysis of the Global Burden of Disease Study 2017," *The Lancet Public Health* 4, no. 3 (2019): e159–67, https://doi.org/10.1016/S2468-2667(19)30019-2.

Climate

Climate: Mediterranean semi-arid
Average Annual Temperature (°C): ~18–19 (winter ~7–10, summer ~28–32)
Temperature Range (°C): Winters mild; summers hot and dry, occasional heatwaves above 37°C
Average Annual Rainfall (mm): ~375–450
Relative Humidity (%): ~50–65

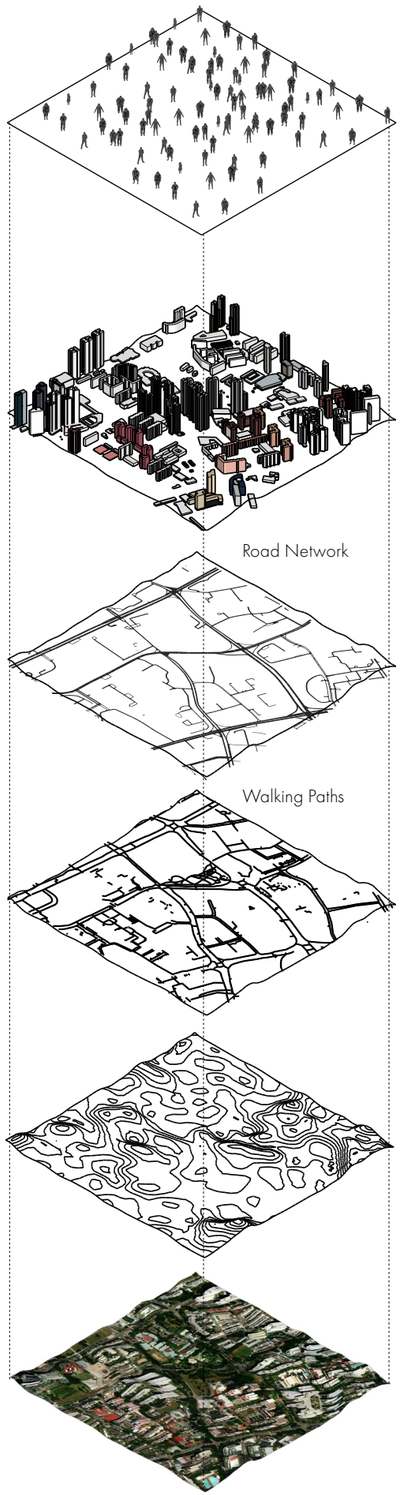
Land Characteristics

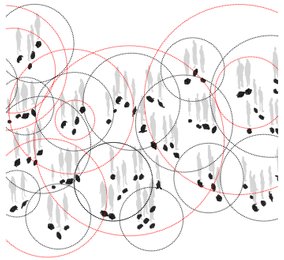
Main Geological Features: Alluvial soils from surrounding San Bernardino Mountains; sedimentary rock base with some granitic intrusions
Drinking Water Hardness: Moderately hard to hard
Forest Coverage (%): ~20–25%



Figure 75
Location of Singapore

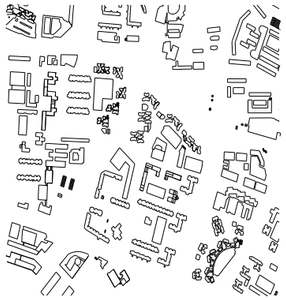
Singapore is a compact island city-state situated at the southern tip of the Malay Peninsula in Southeast Asia, just 1° north of the equator. It consists of one main island and 63 smaller islets, separated from Malaysia by the Straits of Johor and from Indonesia by the Singapore Strait. Singapore spans approximately 734sqkm and features mostly low-lying, flat terrain, with its highest natural point at Bukit Timah Hill (164m). The country has a tropical rainforest climate—uniformly hot, humid, and rainy year-round—with no distinct seasons, shaped by maritime and equatorial influences. Land reclamation has notably expanded Singapore's territory, while urban green spaces and nature reserves preserve its rich biodiversity despite intensive development.





CULTURAL MORPHOLOGY

Singapore's cultural landscape is distinctly multicultural, shaped by Malay, Chinese, Indian, and Eurasian heritage, visible in its diverse neighborhoods—like Chinatown, Little India, and Kampong Glam. Community centers, temples, mosques, churches, hawker centers, and arts venues serve as landmarks and hubs of social life.



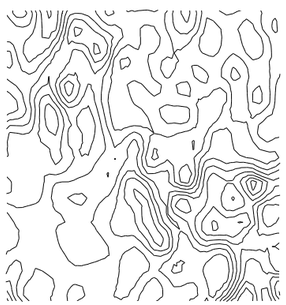
MASSING

Singapore is characterized by a striking mix of high-rise apartment blocks, public housing estates, and commercial skyscrapers, with residential buildings often reaching 30 to 50 stories. The dense, vertical massing reflects the city-state's limited land area and population density, but is thoughtfully organized around open spaces, sky gardens, and integrated amenities.



URBAN NETWORKS

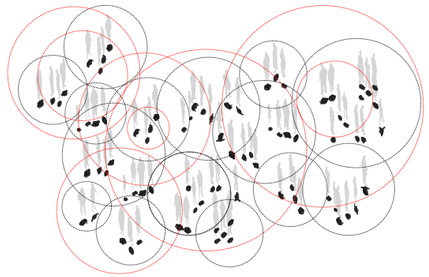
A highly interconnected web of roadways, expressways, Mass Rapid Transit (MRT) lines, and pedestrian networks links every part of Singapore, enabling efficient movement across the city. At the same time, nature reserves, parks, water catchment areas, and green corridors.



TOPOGRAPHY

Set on a low-lying, largely flat island with some hilly central regions like Bukit Timah Hill (163m—the highest natural point), Singapore's urban form adjusts to conserve water, reduce flood risk, and maximize views. New towns, commercial hubs, and industrial estates occupy the island's interior and reclaimed coastal zones, while the undulating terrain of central and northern regions hosts nature reserves and reservoirs.

Figure 76
1 km²Exploded Isometric drawing of the Tiong Bharu, Singapore



The nation's culture is shaped by an extraordinary mix of Chinese, Malay, Indian, and Western influences, all of which reinforce the importance of family, respect for elders, and communal support structures. Successful public health campaigns have fostered traditions of regular exercise, group activities, and health-conscious eating across all ages. Social ties are maintained in both family settings and through neighborhood organizations or Residents' Committees, promoting intergenerational cohesion, emotional resilience, and shared responsibility for community well-being.

Figure 77
Abstract Cultural Morphology Diagram



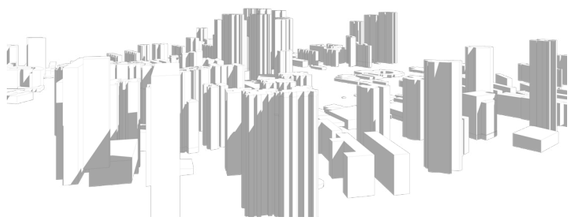
Singapore's architectural landscape is defined by high-density, high-rise residential buildings, particularly the Housing and Development Board (HDB) estates, which house the vast majority of the population. These estates are thoughtfully massed around communal courtyards, multigenerational playgrounds, and void decks—open ground-floor spaces that host social events and day-to-day encounters. Verticality is balanced with social connectivity: housing blocks typically flank green corridors and walking paths, while amenities like markets, clinics, and eldercare centers are interwoven into the built fabric.

Figure 78
Singapore, Massing Sketch



Singapore's urban infrastructure is internationally acclaimed for its integration, efficiency, and inclusivity. The city's comprehensive public transportation system (MRT, buses, taxis) ensures that residents of all ages can safely and affordably access amenities, healthcare, and leisure sites. Barrier-free walkways, covered linkways, and rich networks of park connectors encourage walking, cycling, and social interaction. Essential services—markets, clinics, sports facilities, and community spaces—are located within walking distance in every neighborhood. Strong government planning supports aging-in-place initiatives, ensuring that elder-friendly features such as ramps, elevators, and senior activity centers are standard

Figure 79
Singapore, Urban Network Sketch



Singapore is situated on a low-lying, gently undulating island landscape, with pockets of preserved rainforest, mangrove, and extensive waterways threading through the urban matrix. Despite intense urbanization, the city-state invests heavily in parkland—Botanic Gardens, Gardens by the Bay, and extensive neighborhood parks offer green respite amid the city. Hills like Bukit Timah and Mount Faber serve as recreational focal points, encouraging exercise and community connection. The sea and rivers are integral to the city's identity and leisure life, with waterfront promenades.

Figure 80
Singapore, Adaptation of the built environment.

PEOPLE

+

PLACE



Figure 81
Multi generational Family

To strengthen family ties, the government offers a Proximity Housing Grant, encouraging couples to purchase resale apartments near their parents or children.

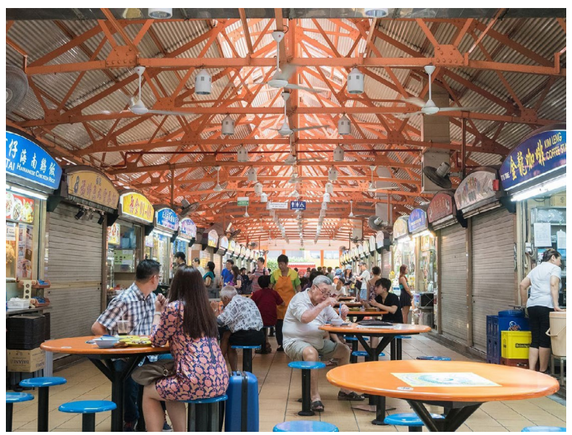


Figure 82
Hawker Centers

Hawker centers in Singapore serve as vibrant communal dining spaces, offering residents and visitors easy access to affordable meals in a welcoming social environment. Their open design and wide array of food stalls bring people together from diverse backgrounds, making them an essential part of the city's daily life and culinary heritage.



Figure 83
Government-run yoga programs

Government-run yoga programs in Singapore promote both social cohesion and healthy lifestyles by bringing residents together for accessible, group-based classes in parks and community venues.



Figure 84
Meditation Exercises

Despite its city skyline, "Government initiatives that seamlessly integrate parks, gardens, and nature reserves into the urban landscape have earned [Singapore] its reputation as a 'garden city,'"



Figure 85
Public Plaza

Green, walkable plazas are thoughtfully integrated among the high-rise HDB developments in Singapore, providing residents with lush communal spaces for relaxation, recreation, and social gatherings.



Figure 86
Walking Paths

Aerial view of sidewalk of Orchard road in Singapore.



Figure 87
Natural and Built Environment

Singapore's built environment is distinguished by high-rise buildings that have been carefully adapted to fit the city's unique context and limited land availability.



Figure 88
HDB public housing flats

In Singapore, more than 80% of residents live in high-rise public housing known as HDB (Housing Development Board) flats. These apartment complexes are carefully designed to foster social interaction and create a sense of community despite the city's urban density.

OVERALL OBSERVATIONS

Community and Social Cohesion

Every Blue Zone places tremendous value on strong social connections, multigenerational living, and regular communal activities. Elders are respected and active in family life, and traditions—religious, indigenous, or secular—reinforce healthy daily routines. Social support networks, whether formal (moai in Okinawa, faith groups in Loma Linda) or informal (village life in Sardinia and Ikaria), buffer residents against isolation and add purpose to later life.

Architecture and Massing

Blue Zone settlements balance privacy with connectivity. Homes cluster around courtyards, plazas, or communal gardens, encouraging frequent neighborly interactions. Vernacular architectural styles—ranging from Sardinia's stone houses to Singapore's high-rise HDB flats—demonstrate context-specific solutions: thick walls and compact forms for climate control, open verandas for ventilation and gathering, or vertical massing to maximize social and green space. Shared spaces, visible from residences, embed socializing into the urban fabric.

Urban Infrastructure

Infrastructure is consistently people-centered rather than car-oriented. Narrow, walkable streets, abundant public spaces, and proximity to markets, clinics, and places of worship foster daily movement and active social lives. Facilities for physical activity are ever-present—whether by design (playgrounds, bike paths in Singapore and Loma Linda) or necessity (steep paths and terraced fields in Nicoya, Sardinia, and Ikaria). Access to healthcare is embedded into neighborhoods, prioritizing preventive care and aging-in-place.

Topography and Relationship with Nature

The landscapes of the Blue Zones range from mountainous islands (Sardinia, Ikaria) to tropical hills (Nicoya), urban gardens (Singapore), and gentle Californian valleys (Loma Linda). In each, daily engagement with the natural environment—gardening, walking, farming, tending animals—integrates exercise and fosters a sense of tranquility. Settlement patterns often follow topographic contours, enhancing resilience and connection to the land.

Adaptation to Context

Blue Zones demonstrate that longevity emerges from the interplay of culture, geography, climate, and tradition. None are located north of the 40th parallel, suggesting latitude and stable temperate climates play a vital role by enabling outdoor living, consistent Vitamin D exposure, and year-round access to fresh produce. Built environments in these regions often blur indoor and outdoor spaces, reinforcing daily movement, social interaction, and connection to nature. Despite modern pressures, these communities show that place-based adaptation—rooted in environment, climate, and cultural inheritance—forms the foundation for sustained health and longevity.

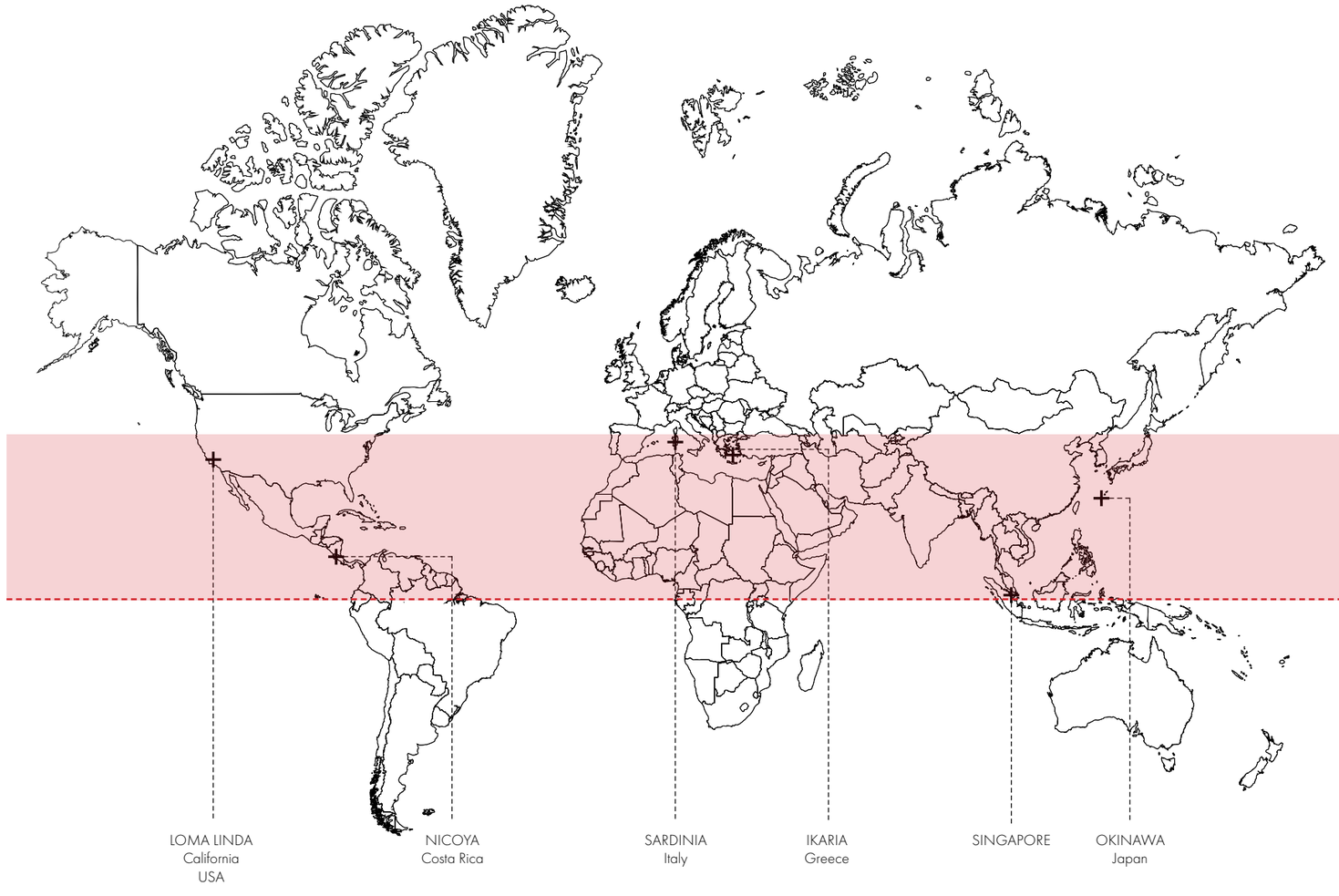


Figure 89
The Blue Zones and the Equator

THE POWER 9

According to Dan Buettner and the researcher studying the Blue Zones. The following are the 9 common denominators that has led to people in these places living longer and reaching the age of 100. [79]

1. Move Naturally

The world's longest-lived people don't lift weights, run marathons, or belong to gyms. Instead, they live in environments that naturally encourage regular movement. They tend gardens and rely on manual effort rather than mechanical tools for housework and yard tasks.[80]

2. Purpose

The Okinawans call it *Ikigai*, and the Nicoyans refer to it as *plan de vida*—both meaning "reason to wake up in the morning." Having a clear sense of purpose can add up to seven years to your life expectancy.[81]

3. Downshift

Even people in the Blue Zones experience stress, which can cause chronic inflammation linked to nearly all major age-related diseases. What sets the world's longest-lived individuals apart is their daily routines for relieving stress. Okinawans pause to honor their ancestors, Adventists pray, Ikarians take afternoon naps, and Sardinians unwind with a daily happy hour.

4. 80% Rule.

Hara hachi bu—a 2,500-year-old Confucian mantra practiced by Okinawans—is recited before meals to remind them to stop eating when they're about 80% full. That 20% difference between feeling satisfied and being completely full can determine whether a person gains or loses weight. In Blue Zones, people typically eat their smallest meal in the late afternoon or early evening—and then stop eating for the rest of the day.

5. Plant slant.

Beans, including fava, black, soy, and lentils, are the cornerstone of most centenarian diets. Meat—mostly pork—is eaten on average only 5 times per month. Serving sizes are 3 to 4 oz, about the size of a deck of cards.

6. Wine @ 5.

In all Blue Zones—except among the Adventists—people drink alcohol moderately and regularly. Studies show that moderate drinkers tend to live longer than non-drinkers.[82] The key is to enjoy 1 to 2 glasses a day, ideally of Sardinian Cannonau wine, and always with food and/or in the company of friends.

7. Belong.

[79] Buettner, *The Blue Zones*, Second edition (National Geographic, 2012).
[80] Buettner and Skemp, "Blue Zones."
[81] Patrick L. Hill and Nicholas A. Turiano, "Purpose in Life as a Predictor of Mortality Across Adulthood," *Psychological Science* 25, no. 7 (2014): 1482–86, https://doi.org/10.1177/0956797614531799.
[82] Kenneth J Mukamal et al., "Roles of Drinking Pattern and Type of Alcohol Consumed in Coronary Heart Disease in Men," *N Engl j Med*, 2003.

All but 5 of the 263 centenarians interviewed by Dan belonged to some faith-based community. Denomination does not seem to matter. Attending religious services at least once a week is associated with living, on average, 1.1 to 5.1 years longer compared to those who attend less often or never.[83]

8. Loved ones first.

Successful centenarians in the Blue Zones prioritize family above all. They keep aging parents and grandparents close, often living in the same home. They commit to lifelong partnerships, a choice that research shows can add up to three years to their life expectancy.[84]

9. Right tribe.

The world's longest-lived people either chose or were born into social circles that naturally supported healthy habits. In Okinawa, they formed *moais*—tight-knit groups of five friends who pledged lifelong support to one another. Research from the Framingham Studies shows that behaviors like smoking, obesity, happiness, and even loneliness are contagious.[85] As a result, the social networks of those in Blue Zones have played a powerful role in shaping and reinforcing positive health behaviors.

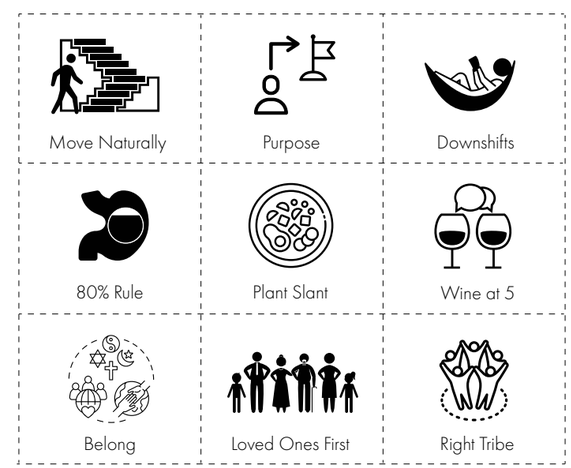


Figure 90
Illustration of the 9 Commonalities

[83] Mary Beth Ofstedal et al., "Religion, Life Expectancy, and Disability-Free Life Expectancy Among Older Women and Men in the United States," *The Journals of Gerontology: Series B* 74, no. 8 (2019): e107–18, https://doi.org/10.1093/geronb/gby098.
[84] Reuben Ng et al., "Self-Acceptance and Interdependence Promote Longevity: Evidence From a 20-Year Prospective Cohort Study," *International Journal of Environmental Research and Public Health* 17, no. 16 (2020): 5980, https://doi.org/10.3390/ijerph17165980.
[85] Nicholas A. Christakis and James H. Fowler, "Social Contagion Theory: Examining Dynamic Social Networks and Human Behavior," *Statistics in Medicine* 32, no. 4 (2013): 556–77, https://doi.org/10.1002/sim.5408.

COMMONALITIES INTO SPACE

Religious Spaces

Purpose

Belong

The principles of "Belong" and "Purpose" are closely tied to the role of religious and spiritual spaces, which not only provide settings for worship but also function as centers for community building. These spaces foster intergenerational interaction, offering both the elderly and young adults a sense of identity, belonging, and shared purpose.

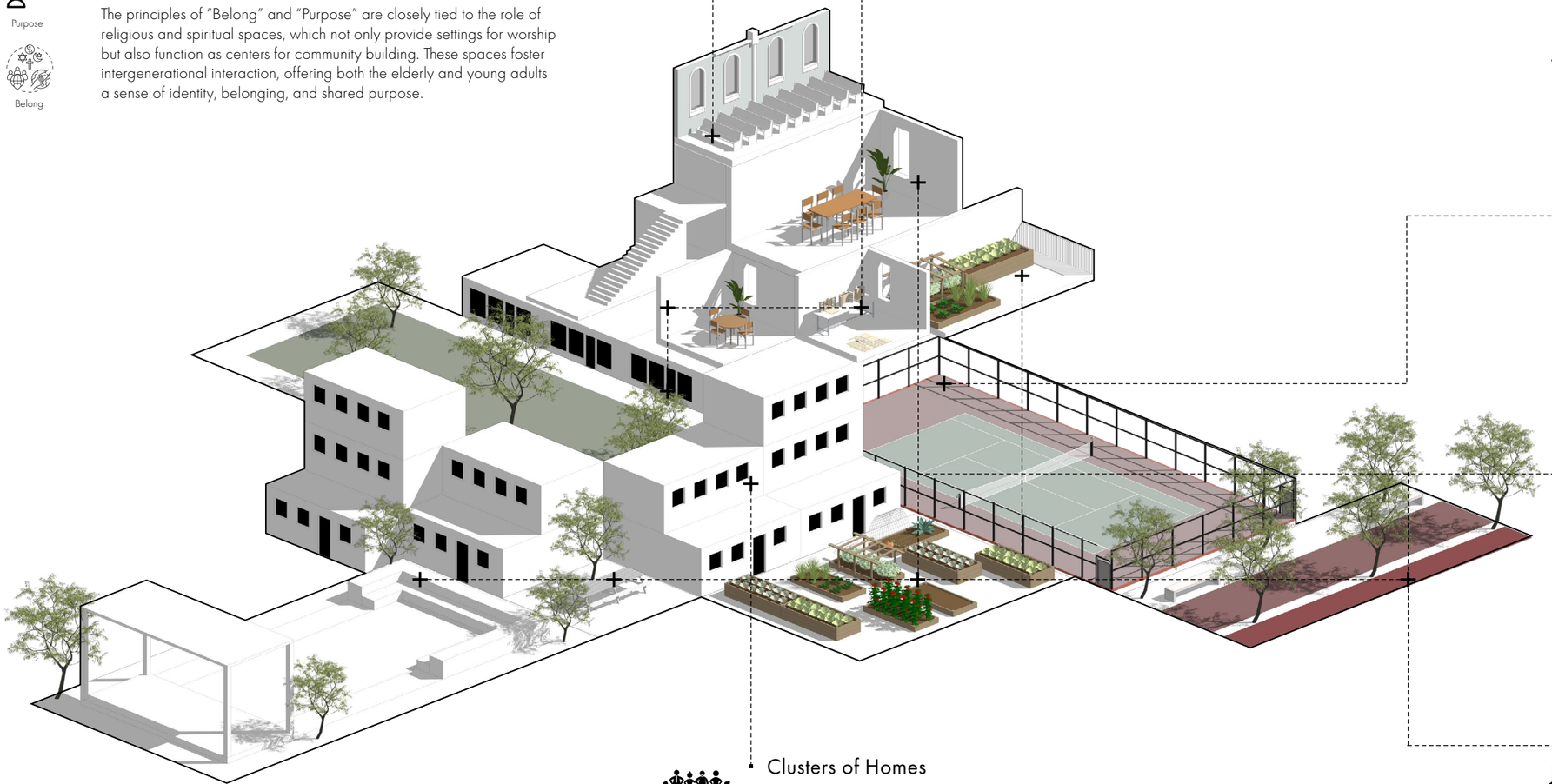


Figure 91
Abstraction of Commonalities and Spaces formed.

The abstraction explores the spaces that are observed and linked to particular spacial conditions.

Clusters of Homes

Loved Ones First

Purpose

In all Blue Zones, the prioritization of loved ones and shared purpose manifests in clustered housing arrangements that support multi generational living. These configurations enable aging in place, where grandparents interact with younger generations, thereby nurturing strong familial bonds and ensuring the transmission of wisdom, traditions, and cultural values.

Spaces of Ikigai

Purpose

Downshifts

The principle of "Purpose" is expressed through the provision of spaces dedicated to hobbies, workshops, flower shops, and community volunteering opportunities. Such environments offer the aging population meaningful engagement beyond domestic life, functioning as "third spaces" where individuals can contribute their skills, share knowledge, and maintain a sense of social value.

Sports Facilities

Move Naturally

Belong

The principles of "Belong" and "Move Naturally" converge in the design and programming of sports facilities such as tennis courts and swimming pools. When complemented with initiatives tailored to older adults, these spaces foster a sense of community while simultaneously promoting physical well-being. By enabling the elderly to engage in accessible, low-impact exercise within a socially supportive environment, such facilities strengthen communal bonds, reduce isolation, and contribute to healthier aging.

Indoor and Outdoor communal spaces

Right Tribe

Wine at 5

The Blue Zone principles of "Wine at Five," "Downshift," and "Right Tribe" collectively foster the creation and use of communal spaces, both indoors and outdoors. These practices encourage residents to gather regularly, where the act of sharing food and wine becomes a medium for relaxation, stress reduction, and social cohesion. Such spaces function not only as venues for leisure but also as cultural anchors.

Walking & Gardening

Move Naturally

Purpose

The principles of "Move Naturally" and "Purpose" are embodied in the presence of outdoor community gardens and personal household gardens, where residents engage in cultivation activities that provide low-intensity physical exercise, particularly beneficial for the elderly. These spaces simultaneously create opportunities for social interaction, reinforcing a sense of belonging and shared responsibility. Moreover, the daily practices of walking and cycling within the neighborhood further support natural movement, embedding physical activity into the rhythms of everyday life

CHAPTER 3: ADAPTATION OF THE BLUE ZONE FRAMEWORK

The Research on Blue Zones—regions such as Okinawa (Japan), Sardinia (Italy), and Nicoya (Costa Rica)—has identified several key lifestyle factors associated with longevity and well-being. These include active daily living through unstructured movement like walking and household chores, strong social connections that support mental and emotional health, intergenerational support systems where elders have defined societal roles, a predominantly plant-based diet with moderate caloric intake, and a strong sense of purpose through cultural, spiritual, and community engagement. Singapore, while not a traditional Blue Zone, has applied many of these principles through proactive policy and urban planning. Its active aging policies include age-friendly public spaces, walkways, and lifelong learning programs, while its supportive social infrastructure fosters intergenerational interaction and community volunteerism. Health promotion is further supported through subsidized preventive care and outreach initiatives. Investigating Singapore's built environment alongside that of the original five Blue Zones reveals valuable commonalities.

The critical review titled *"A Commentary on Blue Zones®: A Critical Review of Age-Friendly Environments in the 21st Century and Beyond"*, written by scholars with expertise in health, social care, public management, and informatics, argues that incorporating the WHO's Age-Friendly Cities framework provides a strong foundation for translating Blue Zone principles into practical urban strategies.[86] By aligning lifestyle factors with spatial planning in areas such as urban design, transportation, and housing, this approach supports the creation of healthier and more longevity-supportive communities.

The authors highlight that while the original Blue Zones offer valuable lessons for healthy aging, their principles are often rooted in specific cultural, climatic, and physical contexts, many of which differ significantly from those found in contemporary urban settings in Western countries. The document notes that some assumptions embedded in the Blue Zones checklists (such as access to gardens, space for home gyms, or single-family housing with multiple rooms) do not reflect the realities of dense urban environments, multifamily housing, or areas with different climatic demands.

The commentary argues that Blue Zones checklists often presuppose living in environments typical of suburban or rural settings (e.g., homes with gardens, garages, or ample indoor space), which does not align with the experience of urban residents. As urbanization grows, many people live in apartments or shared housing, often without access to private outdoor spaces or the ability to make significant modifications to their dwellings.

A critical element of the Blue Zones is "moving naturally," which often means walking as part of daily life rather than structured exercise. However, the feasibility of active transportation in modern cities is heavily influenced by the quality of urban design and transportation networks. The document critiques the Blue Zones checklist for neglecting factors such as public transportation, walkability, and safe pedestrian infrastructure, which are crucial in urban contexts to promote physical activity and connectivity, especially for older adults and those without private vehicles.

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[86] Hannah R. Marston et al., "A Commentary on Blue Zones®: A Critical Review of Age-Friendly Environments in the 21st Century and Beyond," *International Journal of Environmental Research and Public Health* 18, no. 2 (2021): 837, https://doi.org/10.3390/ijerph18020837.

The Blue Zones promote intergenerational support as a longevity factor, yet their checklists assume traditional, often nuclear or multigenerational family arrangements and homeownership. The authors critique this by pointing out the lack of consideration for diverse living arrangements common in cities, such as multigenerational households in small apartments, single-person households, shared accommodation, or seniors aging without children ("AWOC"). They note the need for housing policies that encourage age-integrated, accessible, and affordable housing typologies—such as co-housing, modular or flexible living spaces—that reflect the demographic and economic diversity of urban residents.

The document's central argument is for the integration of Blue Zones' core principles within established frameworks for modern, age-friendly environments—such as the WHO Global Age-Friendly Cities model and the SAfE (Smart Age-Friendly Ecosystem) framework. This means designing cities and communities that account for new patterns of living, the essential role of public and digital infrastructure, and the importance of inclusivity and adaptability in policy and urban design.

This critique of the Blue Zones really resonated with me and inspired me to consider how their principles might be adapted for today's urban settings. The 2007 WHO Global Age-Friendly Cities framework offers a detailed approach to designing cities that foster health, participation, and a higher quality of life for older adults. When reflecting on the critiques of Blue Zones—especially those related to city planning, transportation, and multigenerational living—the WHO framework not only recognizes these issues but also outlines practical strategies to address them within modern urban environments.

The WHO Global Age-Friendly Cities Framework

The WHO's framework offers eight interconnected domains for evaluating and improving urban environments for older adults:

1. Outdoor spaces & buildings
2. Transportation
3. Housing
4. Social participation
5. Respect & social inclusion
6. Civic participation & employment
7. Communication & information
8. Community support & health services[87]

[87] World Health Organization, *Global Age-Friendly Cities: A Guide*, secs. Iv, 76 p., (Geneva), World Health Organization, 2007, https://iris.who.int/handle/10665/43755.

The WHO framework identifies "Outdoor Spaces and Buildings" as one of its eight key domains. It recognizes that accessible, safe, and inviting public spaces are crucial for all ages, but especially older adults. The guide recommends:

- Ensuring sidewalks are wide, continuous, and well-maintained.
- Providing ample seating, good lighting, and accessible toilets throughout public spaces.
- Designing buildings with step-free entries and elevators for accessibility.
- Affordable, reliable, and well-coordinated public transport that accommodates mobility and sensory impairments.
- Safe, age-friendly crosswalks, traffic signals, and well-maintained roads and pathways.

The domains "Housing," "Social Participation," and "Respect and Social Inclusion" collectively address multigenerational living and social connectivity. The WHO framework suggests:

- A diverse mix of housing options, including adaptations for accessibility and the needs of multigenerational households.
- Encouraging the development of communal spaces, co-housing typologies, and intergenerational programs within residential complexes.
- Promoting activities that reduce social isolation and foster respect across different age groups.

The WHO Global Age-Friendly Cities framework addresses the need for proximity to necessities directly within several domains, particularly "Outdoor Spaces and Buildings," "Transportation," and "Housing." The framework recommends:

- Locating essential services (e.g., groceries, healthcare, community centers) within safe, accessible walking distances for older adults and those with limited mobility.
- Creating compact neighborhoods where everyday destinations—shops, parks, pharmacies, and public transit—are reachable without a car, thereby reducing automobile dependency, promoting natural movement, and supporting active aging.
- Enhancing walkable infrastructure, such as continuous sidewalks, safe crossings, adequate lighting, resting places, and shelter from weather, all of which are crucial in urban settings and especially important for people in colder climates like Canada.

The Blue Zones are largely rural spatial layouts where individual homes provide the setting for most longevity-promoting behaviors. In contrast, urban residents like in Singapore often rely on nearby public spaces, shared facilities, and proximity to services to support healthy, active, and socially connected lives.

the WHO framework advocates for:

- Designing age-friendly neighborhoods where basic needs can be met with minimal reliance on cars, thereby lowering barriers to participation for people of all ages and abilities.

- Prioritizing mixed-use zoning and strategic urban planning to foster multi-generational cohesion, social participation, and equitable access to resources.
- Emphasizing universal design and participatory planning to ensure that the needs of older adults and all residents are centrally considered in urban developments, reducing the necessity for private vehicle use.

After thoroughly exploring the concept of Blue Zones and evaluating their built environments—as well as considering both criticisms of Blue Zones and the World Health Organization's guidelines for Age-Friendly Cities—I have found a considerable overlap in the factors that foster healthy, long-lived communities. For me, as an aspiring architect, understanding and applying these findings has been essential in learning how to design human-centered environments. While I recognize that lifestyle choices, such as diet, smoking, and alcohol consumption, also influence the longevity of Blue Zone residents, this thesis specifically focuses on the built environment and its potential to impact both physical and mental health. The built environment influences people's physical health, psychological well-being, and social interactions. Numerous scholarly sources demonstrate that the design of neighborhoods like —such as walkability, access to green spaces, opportunities for social engagement, and proximity to amenities—affects residents' activity levels, stress, and overall health outcomes. Scholarly sources, including systematic reviews, highlight that features such as walkability, access to public spaces, quality housing, green environments, and proximity to amenities are directly linked to increased physical activity, greater social engagement, and lower rates of obesity and chronic illness.[88] Elements of the built environment—such as access to daylight, low noise levels, reduced residential crowding, and supportive community infrastructure—are associated with reduced stress, improved psychological well-being, and stronger social networks.[89] Recent data also confirms that adults living in highly walkable neighborhoods are more likely to be physically active, have lower BMIs, and enjoy better overall health than those in less walkable areas.[90]

This research has inspired me to approach architecture not just as a visual or technical discipline, but as a medium for shaping environments that keep people physically active, socially connected, and able to age in place within their communities. By integrating principles from the Blue Zones and aligning with WHO age-friendly guidelines, architects and planners can create built environments that promote physical activity, nurture social connections, lessen car dependency, and enhance mental well-being. As outlined in Chapter One of this thesis, issues stemming from urban sprawl and increasing suburban density—such as heightened car use, social isolation, and elevated stress, I believe, thoughtfully applying these principles to the design of densifying suburbs, while accounting for the challenges presented by colder climates, presents a promising strategy for building healthier, more inclusive communities. Emphasizing walkability, mixed-use developments, accessible public spaces, and strong social

[88] Janet Ige-Elegbede et al., "Designing Healthier Neighbourhoods: A Systematic Review of the Impact of the Neighbourhood Design on Health and Wellbeing," *Cities & Health* 6, no. 5 (2022): 1004–19, https://doi.org/10.1080/23748834.2020.1799173.
[89] Gary W. Evans, "The Built Environment and Mental Health," *Journal of Urban Health : Bulletin of the New York Academy of Medicine* 80, no. 4 (2003): 536–55, https://doi.org/10.1093/jurban/jtg063.
[90] Monica L. Wang et al., "Higher Walkability Associated with Increased Physical Activity and Reduced Obesity among U.S. Adults," *Obesity (Silver Spring, Md.)* 31, no. 2 (2023): 553–64, https://doi.org/10.1002/oby.23634.

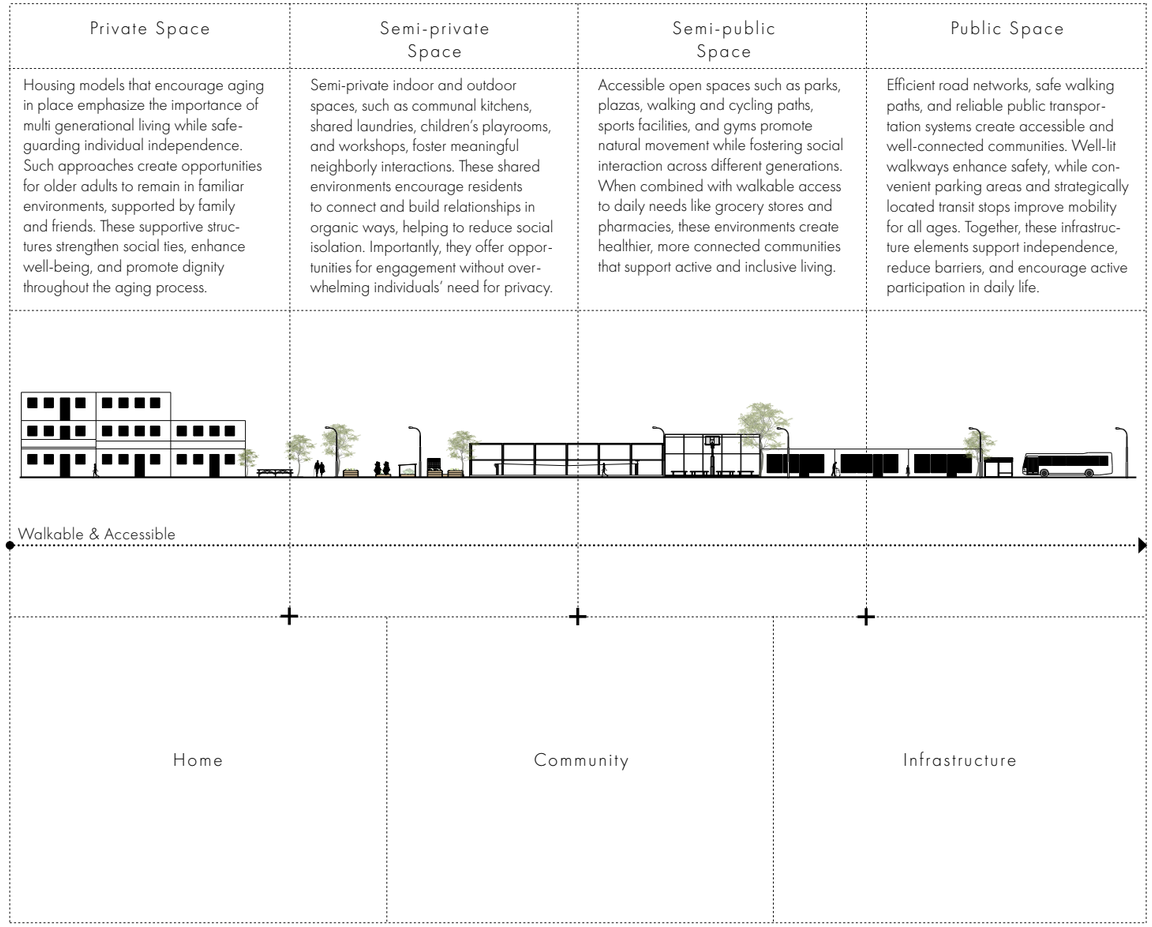


Figure 92
Aging in place framework

CHAPTER 4: FOCUSED ITERATION

This chapter explores how the insights and frame works centered on long life, community, and social connection can be implemented in places challenged by colder weather, with particular focus on Canadian settings and Nordic precedents.

Canadians display a remarkable record of longevity, ranking among the world's leading nations for life expectancy. As of 2009, Canadian men had a life expectancy at birth of 78.7 years and women 83.3 years, with British Columbia leading national statistics—BC men at 80 years and women at 84 years.[91] Across the population, life expectancy has risen, growing by five years for women and seven years for men between the 1930 and 1964 birth cohorts.[92] Nationally, according to a comparative review of OECD countries, Canada had over 6,000 centenarians as of the last major sector-wide data update, placing it among the countries with the highest number of centenarians worldwide.[93] Demographic research indicates that these centenarians are often found within major urban centers as well as certain rural communities, with Quebec maintaining a consistently high proportion relative to population size.[94]

Multigenerational Households in Canada

The most recent data from Statistics Canada shows that as of 2021, approximately 7% of Canadians live in multigenerational households. This proportion has been steadily rising over the past decade, largely due to factors such as increasing housing costs, cultural preferences, and the benefits of mutual support among family members. This trend reflects a broader societal shift, with multigenerational and intergenerational living arrangements becoming more prevalent in Canada's major urban centers and across the country.[95]

Urban Canadians, like their global counterparts, express growing interest in non-traditional living arrangements that foster social connection and mutual support. Recent Statistics Canada data indicate a significant and rising portion of Canadians living in multigenerational or shared households, partially in response to housing costs and partially as a matter of cultural preference for social support networks.[96] Projects like Toronto HomeShare, now Canada HomeShare, have showcased tangible benefits including reducing social isolation, increasing financial security,

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[91] Li Rita Zhang and Drona Rasali, "Life Expectancy Ranking of Canadians among the Populations in Selected OECD Countries and Its Disparities among British Columbians," *Archives of Public Health* 73, no. 1 (2015): 17, https://doi.org/10.1186/s13690-015-0065-0.
[92] Kevin Milligan, "Innis Lecture: The Time of Your Life: The Mortality and Longevity of Canadians," *Canadian Journal of Economics/Revue Canadienne d'économique* 57, no. 4 (2024): 1088–108, https://doi.org/10.1111/caje.12738.
[93] Jong In Kim, "Correction: Social Factors Associated with Centenarian Rate (CR) in 32 OECD Countries," *BMC International Health and Human Rights* 13 (August 2013): 26, https://doi.org/10.1186/1472-698X-13-26.
[94] Mélissa Beaudry-Godin et al., "Extreme Longevity in Quebec: Factors and Characteristics," in *Exceptional Lifespans*, ed. Heiner Maier et al. (Springer International Publishing, 2021), https://doi.org/10.1007/978-3-030-49970-9_12.
[95] Zoë Mohan et al., "What's Old Is New Again: Affordable, Community-based Housing Options for Older Women," *Journal of the American Geriatrics Society* 73, no. 3 (2025): 982–85, https://doi.org/10.1111/jgs.19230.
[96] Sebastian A. Srugo et al., "At-a-Glance - Living Arrangements and Health Status of Seniors in the 2018 Canadian Community Health Survey," *Health Promotion and Chronic Disease Prevention in Canada : Research, Policy and Practice* 40, no. 1 (2020): 18–22, https://doi.org/10.24095/hpcdp.40.1.03.

and enhancing general well-being for all age cohorts involved.[97] National surveys and pilot programs in major cities highlight residents' positive appraisal of intergenerational collaboration and the benefits it brings, such as enhanced companionship, increased security, and shared care responsibilities.[98]

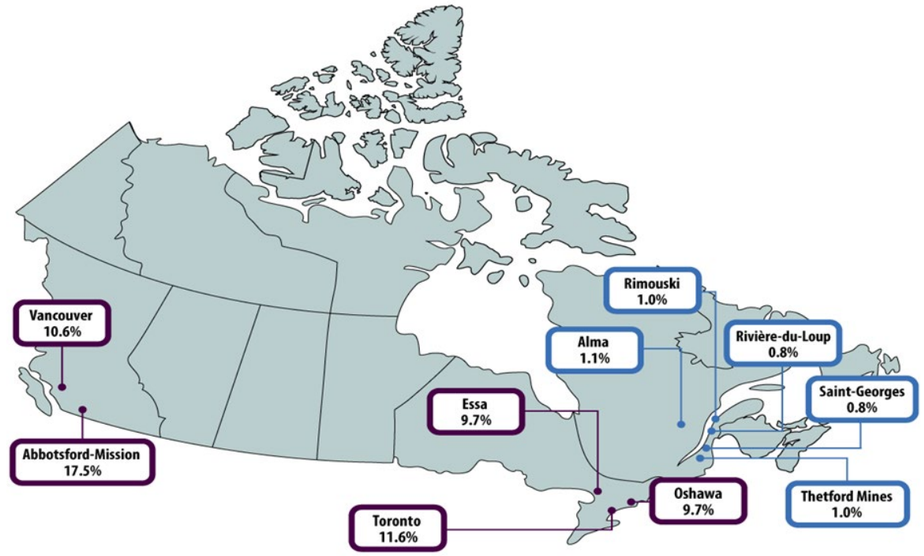
Vancouver: Happiness, Cohousing, and Community

Vancouver's position as one of the world's happiest and most liveable cities is strongly linked to its innovative social architecture and community models.[99] Studies of Canadian neighbourhood-level satisfaction show robust variation across regions, yet Vancouver consistently ranks near the top in urban happiness, driven by access to nature, strong community ties, and a culture of inclusion.[100] Vancouver also exhibits an exceptional abundance of co-housing and collaborative living models. Local architecture utilizes strategies from Nordic and Blue Zone-inspired precedents: passive solar design, communal gardens, shared courtyards, and flexible social spaces for all generations. Case studies, such as Coal Harbour, illustrate how deliberate urban design can support both physical health and subjective well-being through social connectedness, safety, and integration with green space.

Lessons from Nordic Regions: Cold-Climate Examples

Colder Nordic countries provide compelling examples of successful co-housing and multigenerational living models in climates comparable to much of Canada. Across Scandinavia, architectural and policy frameworks actively support communal living—known as *bofællesskab* in Denmark and *kollektiv* in Sweden and Norway—where people of different ages live in close-knit communities. These arrangements often consist of private dwellings clustered around shared spaces such as kitchens, gardens, and communal lounges, fostering social interaction, mutual support, and resilience, particularly during long, dark winters. In Finland, the resurgence of *yhteisöasuminen* (community living) reflects a growing response to the isolation associated with urban living.[101] Norway and Sweden also offer a range of village and urban co-housing models that encourage daily intergenerational interaction through thoughtful design that prioritizes natural light, warmth, and accessibility. Some of these examples of co-housing will be looked at further as how they have adapted to older climates.

[97] Raza Mirza et al., "Thriving-in-Place: Examining the Impact of Intergenerational Living in the Toronto HomeShare Program," *Innovation in Aging* 5, no. Suppl 1 (2021): 1059, https://doi.org/10.1093/geroni/igab046.3743.
[98] Janet Fast et al., "Trajectories of Family Care over the Lifecourse: Evidence from Canada," *Ageing and Society* 41, no. 5 (2021): 1145–62, https://doi.org/10.1017/S0144686X19001806.
[99] Marichela Sepe, "LIVEABLE AND HEALTHY CITY DESIGN," September 4, 2018, 177–89, https://doi.org/10.2495/SDP180171.
[100] John F. Helliwell et al., "How Happy Are Your Neighbours? Variation in Life Satisfaction among 1200 Canadian Neighbourhoods and Communities," *PLoS ONE* 14, no. 1 (2019): e0210091, https://doi.org/10.1371/journal.pone.0210091.
[101] Anna Heinonen, "Commitments beyond Coupledom: Negotiating Relational Futures in Finnish Small-Scale Communes," *Time & Society* 33, no. 2 (2024): 149–69, https://doi.org/10.1177/0961463X231191613.



Notes: This map shows the census metropolitan areas (CMAs) and census agglomerations (CAs) with the highest and lowest proportions of individuals living in multigenerational households in 2021.
A census metropolitan area (CMA) or a census agglomeration (CA) is formed by one or more adjacent municipalities centred on a population centre (known as the core). A CMA must have a total population of at least 100,000, based on data from the current Census of Population Program, of which 50,000 or more must live in the core based on adjusted data from the previous Census of Population Program. A CA must have a core population of at least 10,000 also based on data from the previous Census of Population Program. To be included in the CMA or CA, other adjacent municipalities must have a high degree of integration with the core, as measured by commuting flows derived from data on place of work from the previous Census Program.
Source: Statistics Canada, Census of Population, 2021 (3901).

Figure 93
Proportion of persons in private households who live in multi generational households, selected regions, Canada, 2021.

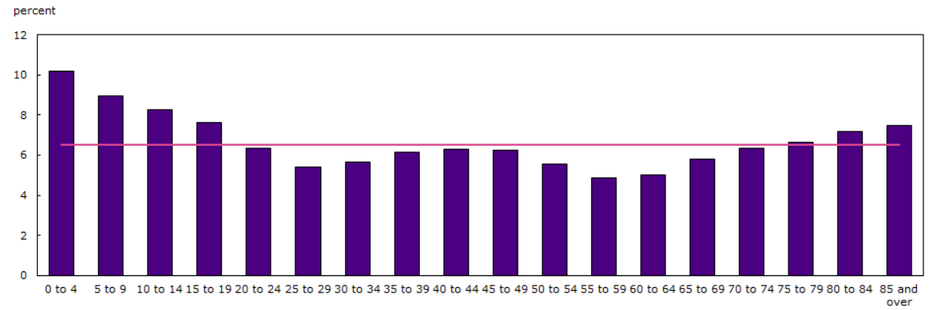


Figure 94
Proportion of persons in private households who live in multi generational households, by age group, Canada, 2021.

CHAPTER 5: CASE STUDIES

The selected projects were distinguished by their innovative approaches to creating interior environments that remain functional and engaging throughout the year. These designs prioritize mobility and social interaction even during harsh winter conditions, ensuring that communities can remain active and connected regardless of the season. Rooted in principles of climate-responsive design, the projects demonstrate how resilient architecture can sustain year-round community life despite external environmental challenges. Lessons from the Blue Zones reveal how built environments adapt seamlessly to diverse natural terrains—from the rugged mountainous landscapes of Sardinia to the flat forested grounds of Nicoya. This thesis extends that understanding by examining how Canadian architectural strategies can respond to severe winter conditions, where temperatures can drop as low as –30°C.

WIND SONG CO HOUSING

The Windsong Cohousing Community, located in Langley, British Columbia, is a pioneering example of a modern cohousing development in Canada. The project was designed to foster a strong sense of community and encourage interactions among residents while maintaining private living spaces.

Location: 20543 96 Avenue, Langley Township, British Columbia. The community is situated on 5.8 acres, approximately 45 minutes east of Vancouver, and is bordered by a salmon-bearing creek.

The Windsong community occupies 5.8 acres of land, with the housing carefully arranged to maintain generous green space and protect the natural creek system. The development comprises 34 privately owned, strata-titled homes, offering a range of typologies from one-bedroom flats to four-bedroom, three-story townhouses. Central to the community is a 5,000-square-foot common house, providing shared amenities that foster resident interaction. The project emerged from a collaborative and participatory design process, guided by Charles Durrett—a pioneer of cohousing in North America—and David Simpson of dys architecture, who served as the local architect. A defining feature of the project is its interior walkway, which became a key inspiration for my proposed year-round communal space. This expansive structure is enclosed by over 10,000 square feet of laminated glass, spanning across two wings of the building and converging in a large common area. With a steep roof pitch of 15/12—possibly among the steepest ever used—it physically connects to the second floor on one side and the third floor on the other. Due to fire code requirements for pass-through ventilation, the ridge of the roof is left unenclosed, topped instead with a custom "hat ridge" detail that ensures airflow while maintaining the striking architectural profile.

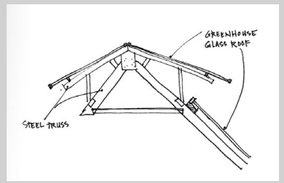


Figure 95
Wind song Housing
Hat Ridge detail

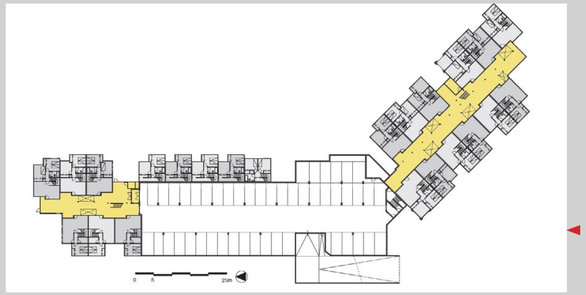


Figure 96
Windsong Housing
Ground Floor plan

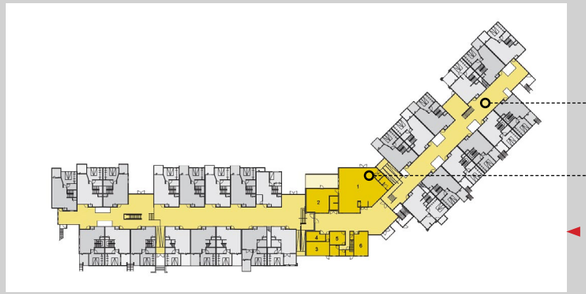


Figure 97
Windsong Housing
Second Floor plan



Figure 98
Windsong Housing Interior Walkway\
Image 1

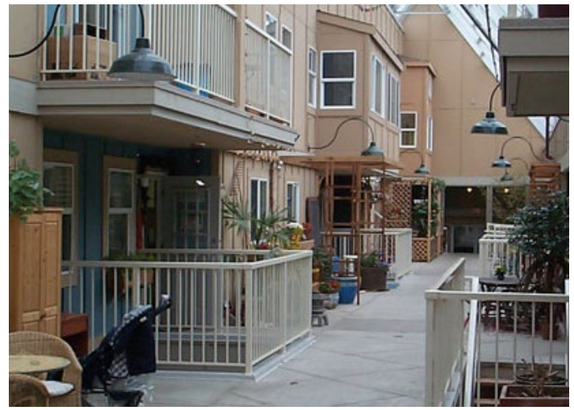


Figure 99
Windsong Housing Interior Walkway
Image 2



Figure 100
Windsong Housing Interior Walkway
Image 3

EVA'S PHOENIX

Eva's Phoenix is a transitional housing facility and skills training centre for homeless and at-risk youth in Toronto, Canada. The project is a prime example of adaptive reuse, transforming a heritage-designated industrial building into a community-oriented living space.

Location: 60 Brant Street, Toronto, Ontario. The facility is part of a larger redevelopment of a former municipal waterworks building in a rapidly gentrifying downtown area.

The EVAS Phoenix project in Toronto occupies approximately 41,200 square feet (3,828 square meters) within two heritage-designated brick warehouses, thoughtfully adapted to serve as transitional housing for 50 residents. Designed by LGA Architectural Partners, with project architects Christie Pearson and Drew Adams, the facility reflects the firm's longstanding commitment to socially conscious architecture for non-profit organizations.

The interior is organized into ten townhouse-style units, each accommodating up to five residents. Every unit contains private bedrooms, a shared kitchen, and communal living areas, fostering both privacy and collective engagement. These residences open onto a central interior "street"—a tall, light-filled atrium that serves as the project's social heart This atrium is a spatially rich environment characterized by its generous height, exposed heritage brickwork, and overhead glazing that allows daylight to cascade deep into the building. Visual connections between levels are maintained through open walkways, while seating areas, planting beds, and informal gathering zones punctuate the linear space. The transparent roof structure moderates seasonal light conditions, creating a temperate environment all year, and its acoustic softness encourages conversation without excessive echo. The atrium not only supports circulation but functions as a shared public realm for residents, enabling chance encounters, community events, and daily social life, while visually linking the refurbished warehouse architecture with new interventions.

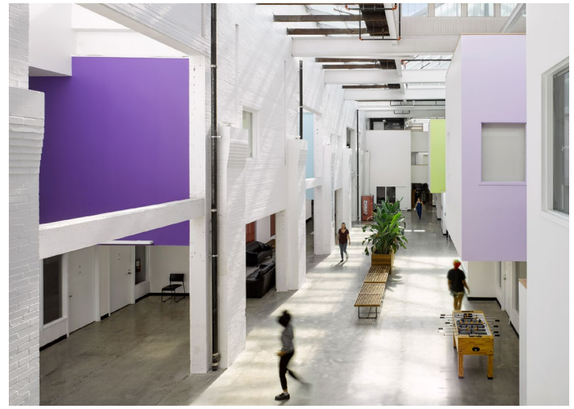


Figure 101
Eva's Phoenix Atrium
Image 1

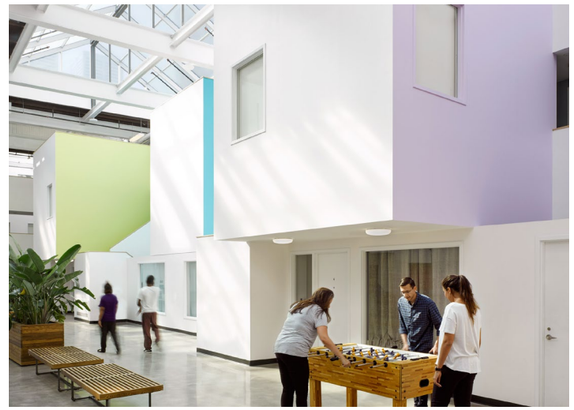


Figure 102
Eva's Phoenix Atrium
Image 2

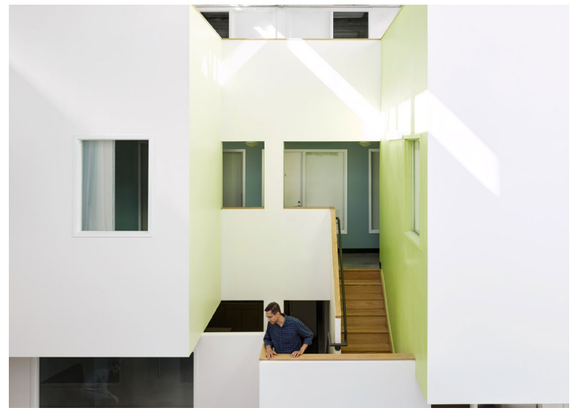


Figure 103
Eva's Phoenix Atrium
Image 3

AGORA GARDENS

The Ibjerghaven project, also known by the concept name “Agorahaverne” (Agora Gardens), is a co-living community for senior citizens in Slagelse, Denmark. The design is centered around a large, covered communal courtyard, creating a sustainable and community-focused living environment. The building’s design draws inspiration from a Greek agora, or town square.

Location: Slagelse, Denmark.

The Agora Gardens development in Slagelse, Denmark, is a senior housing project comprising 76 prefabricated apartments organized around a central, covered atrium that functions as the social and spatial core of the complex. The residential units range in size from approximately 55 square meters for single occupancy to 77 square meters for couples, accommodating diverse living arrangements while maintaining a consistent modular framework. Each dwelling is constructed from cross-laminated timber (CLT), integrating a private kitchen and bathroom to ensure autonomy, accessibility, and ease of maintenance. The project emerged from a collaboration between the Danish developer Tetris and the Copenhagen-based architectural practice Sangberg, reflecting a wider national interest in sustainable construction and aging-friendly housing typologies.

The 1,000-square-meter atrium constitutes the defining spatial element of the project, functioning as both an environmental buffer and a social gathering space. Its generous proportions, high transparency, and controlled microclimate establish a tempered interior courtyard that remains active throughout the year, mediating between public and private realms. The atrium’s spatial configuration encourages spontaneous social interaction by visually and physically connecting circulation routes, apartment entrances, and semi-public seating areas. The layering of greenery, daylight, and timber surfaces further contributes to a sense of warmth and biophilic comfort—qualities that are particularly significant in a senior living context. Through its combination of modular timber construction and a shared atrium typology, Agora Gardens demonstrates how architectural form can foster community, wellbeing, and environmental responsiveness within contemporary Danish senior housing.



Figure 104
Agora Gardens Atrium
Image 1



Figure 105
Agora Gardens Atrium
Image 2



Figure 106
Agora Gardens Atrium
Image 3

VINDMØLLEBAKKEN

The Vindmøllebakken project is a modern co-housing community in Stavanger, Norway, based on the "Gaining by Sharing" model. This model is designed to promote a more sustainable way of life by encouraging residents to share communal resources and spaces, thereby reducing their private living areas and overall environmental footprint.

Location: Stavanger, Norway.

The Vindmøllebakken project in Stavanger, Norway, encompasses a total usable floor area of 4,950 m² and embodies a forward-thinking approach to communal urban living. The development consists of 54 residential units—40 co-living apartments, 4 townhouses, and 10 separate apartments—arranged around a generous central courtyard and series of shared interior spaces. Approximately 500 m² of the total area is dedicated to shared amenities, collectively owned by all residents, facilitating a strong sense of community engagement and co-responsibility. The project was realized through a collaboration between the Norwegian architecture firm Helen & Hard and the developer Kruse Smith Real Estate.

The spatial organization centers around a large, light-filled atrium that functions as the social heart of the development. This multi-level interior courtyard serves as both a circulation core and a gathering space, visually connecting the different floors through open walkways, vertical voids, and wooden structural elements. Natural light cascades from overhead skylights, creating a warm and inviting atmosphere that emphasizes visual transparency and spatial continuity between private and communal zones. The atrium's layered balconies, planted niches, and semi-public seating areas encourage informal encounters and foster a sense of shared belonging—qualities that make the building feel more like a vertical neighborhood than a typical housing block.

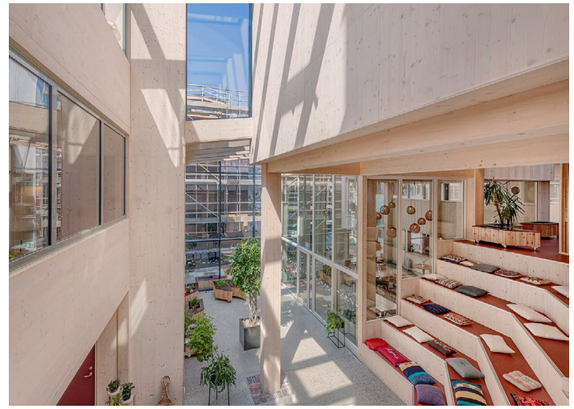


Figure 107
Vindmøllebakken Atrium
Image 1



Figure 108
Vindmøllebakken Atrium
Image 2

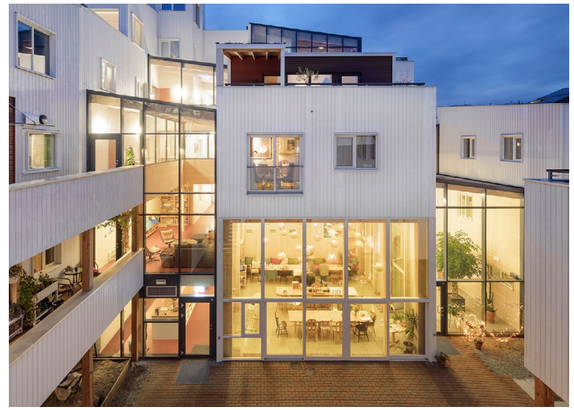


Figure 109
Vindmøllebakken Exterior
Image 3

PROPOSAL

Drawing from the commonalities observed in the world's Blue Zones and aligning these commonalities with the World Health Organization's Age-Friendly Cities framework, this proposal articulates a holistic model for multi-generational living. The proposal builds upon the three overarching principles of the framework—home, community, and infrastructure, emphasizing walkable access to daily necessities, reliable public transportation, and spaces that foster meaningful social interaction, all integrated within a cohesive neighborhood fabric.

The study then examines low-rise housing typologies, such as co-housing communities, as tangible expressions of this framework. These developments illustrate how architectural design can adapt to fluctuating and often harsh climatic conditions, particularly the severe winters, while expressing social values seen in Blue Zones, including intergenerational connection, community cohesion, and a shared sense of purpose. Through the series of case studies, the research highlights how co-housing models promote adaptability, collective responsibility, and mutual care. They enable environments that support aging in place, encourage intergenerational caregiving, and strengthen long-term social and familial networks. Architectural elements such as shared kitchens, communal gardens, and flexible gathering areas become catalysts for interaction and shared ownership. However, co-housing developments often operate at a lower density and provide fewer housing units than conventional urban typologies, posing challenges for their integration into broader metropolitan contexts.

This thesis proposal therefore explores how increased density can be achieved without compromising spatial generosity or environmental responsiveness. It proposes an alternative approach to suburban densification through a flexible housing typology that accommodates a spectrum of living arrangements, from smaller households to large, multigenerational families. The design integrates shared communal spaces, including atriums that function as climatic adaptations for cold regions, and interior walkways inspired by precedents such as the Windsong Cohousing Community. These spatial strategies aim to cultivate active, sociable environments that remain vibrant year-round, even in harsh weather conditions, reinforcing everyday community life.

Within the broader discourse of urban strategies, the proposed typology positions itself between co-housing developments and higher-density formats such as low- to mid-rise apartment buildings. Rather than prescribing a singular model, the intent is to expand the spectrum of suburban housing options to promote more adaptable, inclusive, and socially connected forms of living. Situated in Burlington, Ontario, the proposal leverages the city's existing public transport infrastructure as a foundation for development within an established suburban framework. The project envisions a compact, mixed-use neighborhood that integrates retail to strengthen local infrastructure, incorporates multigenerational housing, and prioritizes communal and recreational spaces. By emphasizing walkability to amenities, sports facilities, and transit, the development aspires to create a socially vibrant, health-oriented environment that meaningfully engages with its surroundings.

CHAPTER 6 :CONTEMPORARY URBAN VILLAGE
(DESIGN PROPOSAL)



Figure 110
Site Location: Burlington, Ontario, Canada.

Site Location

SITE

The selection of this site was informed by its strategic location within the exurban region of Toronto, proximate to Burlington, Ontario. The site's adjacency to established public transit rail infrastructure facilitates enhanced accessibility, while direct connections to major highways serve to further support regional connectivity. Importantly, the area has been identified within future municipal and provincial planning frameworks as a candidate for increased densification.

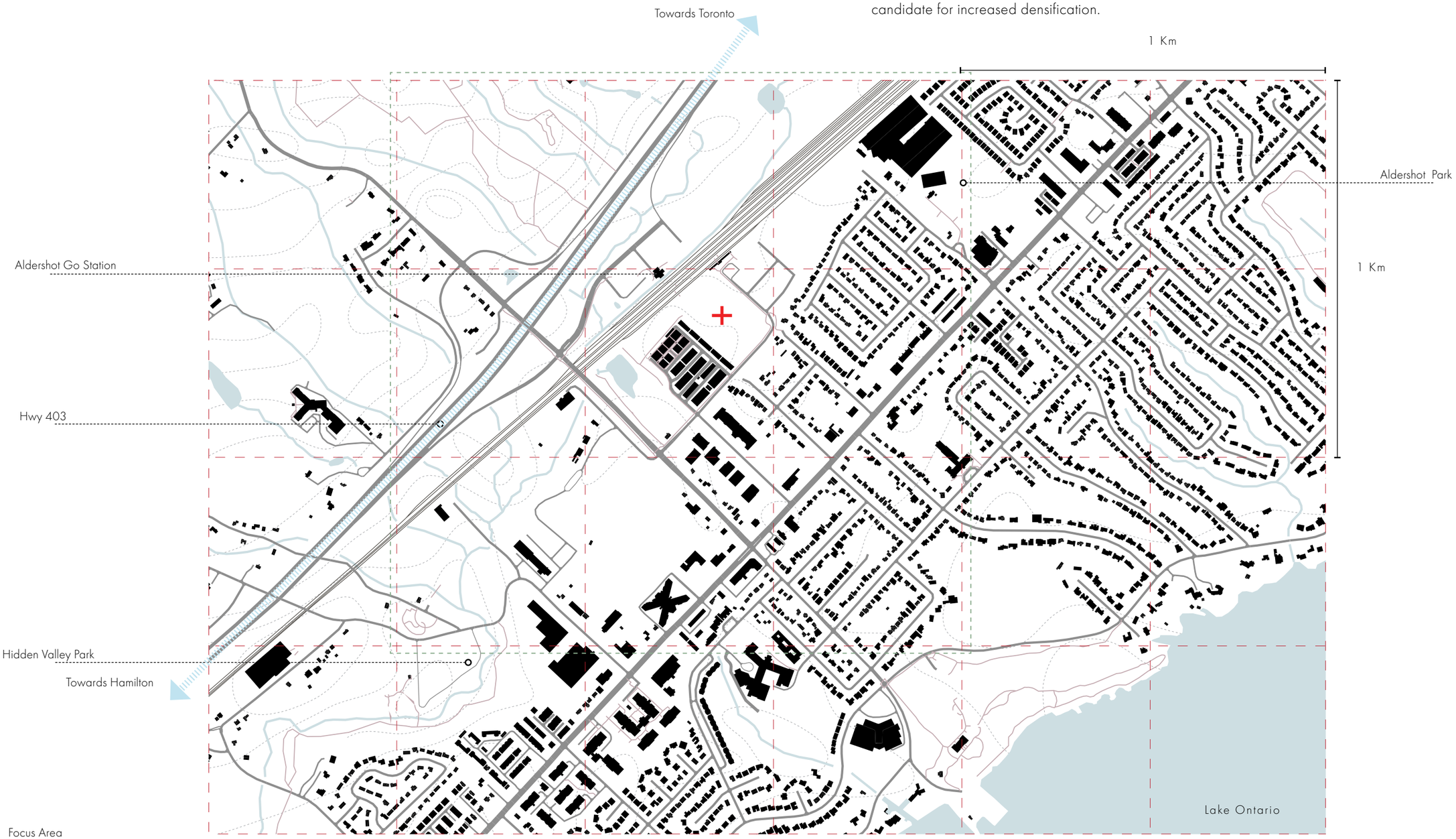


Figure 111
Site location in Burlington Ontario Drawing

SITE ANALYSIS 1.5Km²

A review of the existing neighborhood indicates a notable deficiency in communal sports facilities and daily amenities within the studied 1.5 km² area. The landscape is predominantly composed of single-family residences, which contribute to limited public infrastructure. Existing pedestrian pathways are primarily found along major roads, with minimal provision for walk-ability along minor streets, thereby restricting active transportation and access to local services and daily needs.

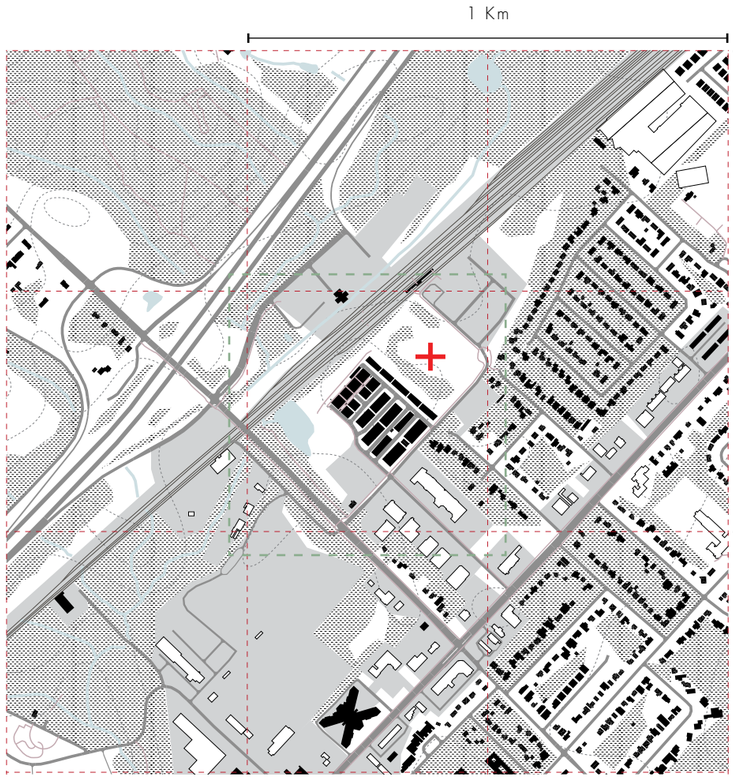


Figure 112
Neibourhood Analysis Drawing

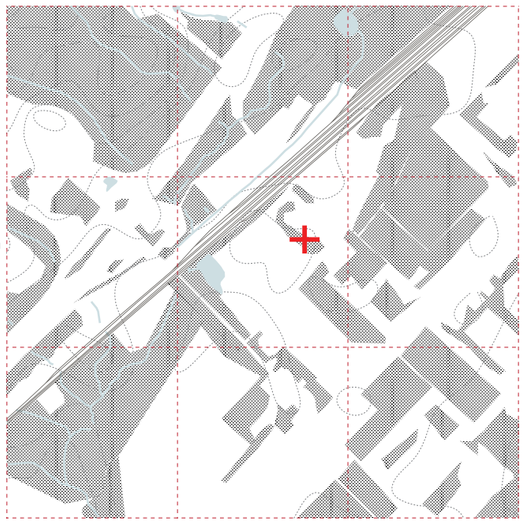


Figure 113
Topograpgy

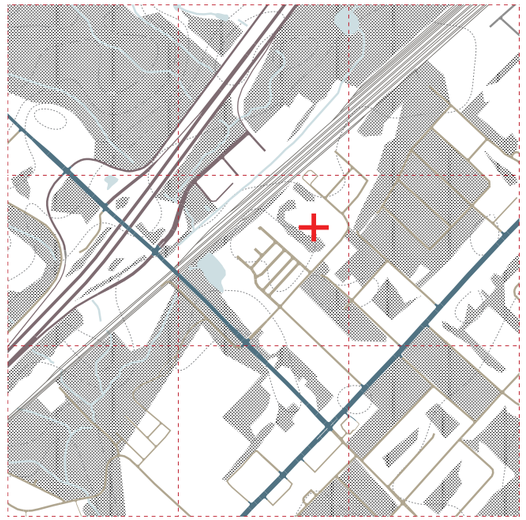


Figure 114
Road Networks

- Highway - 403
- Major Roads
- Minor Roads

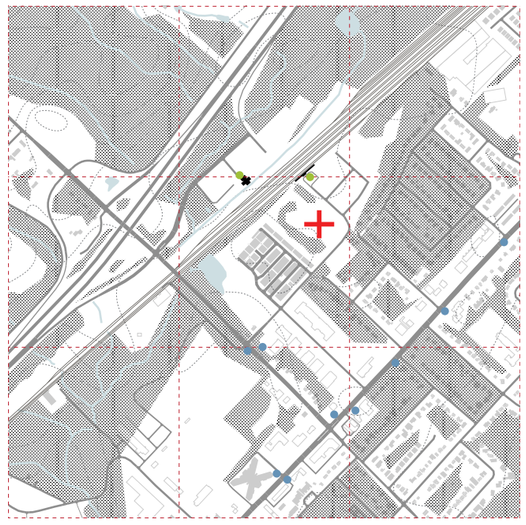


Figure 115
Public Transport

- Go Train Station
- Bus Stops

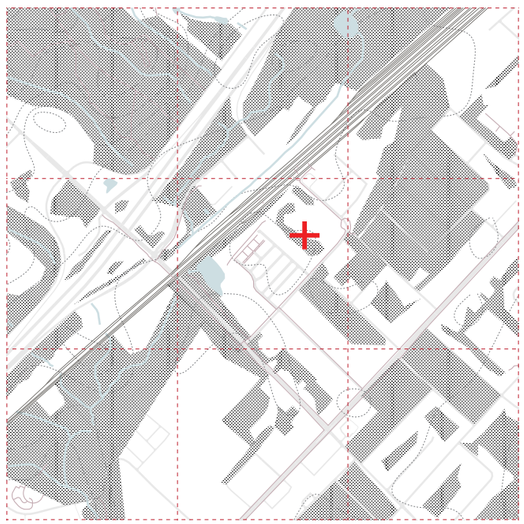


Figure 116
Walking Paths

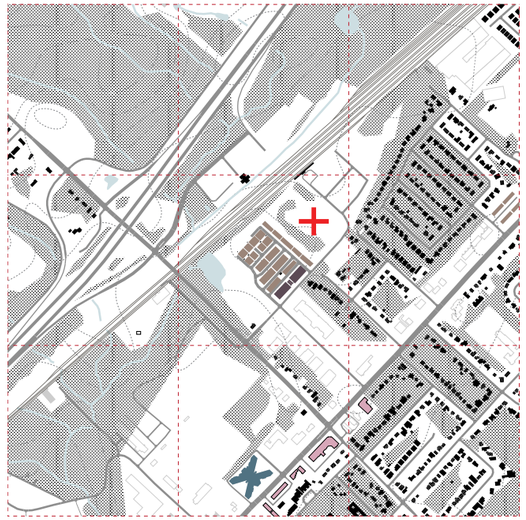


Figure 117
Residential Typologies

- Townhouse
- Residential
- Single family Homes
- Mixed Use Residential
- Retirement Community

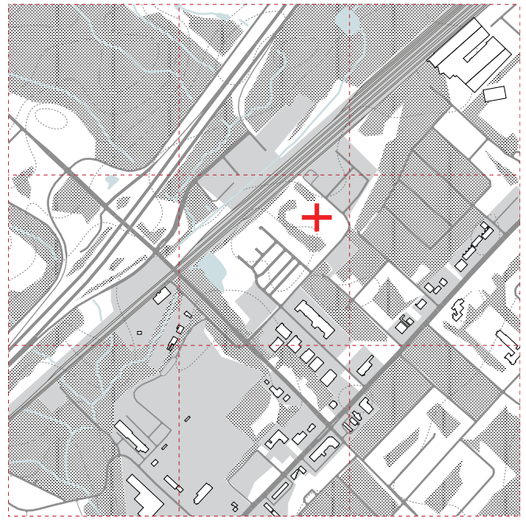


Figure 118
Retail and Parking

- Retail + Commercial
- Parking

- Focus Area
- Site Location

SITE ANALYSIS 500m²

A walkable radius of 500 meters was established as the design parameter, ensuring that daily amenities, community facilities, and public transit are accessible within this distance. This scale of walkability supports the principle of aging in place, enabling older adults to maintain access to essential services and social networks even when no longer dependent on a car.

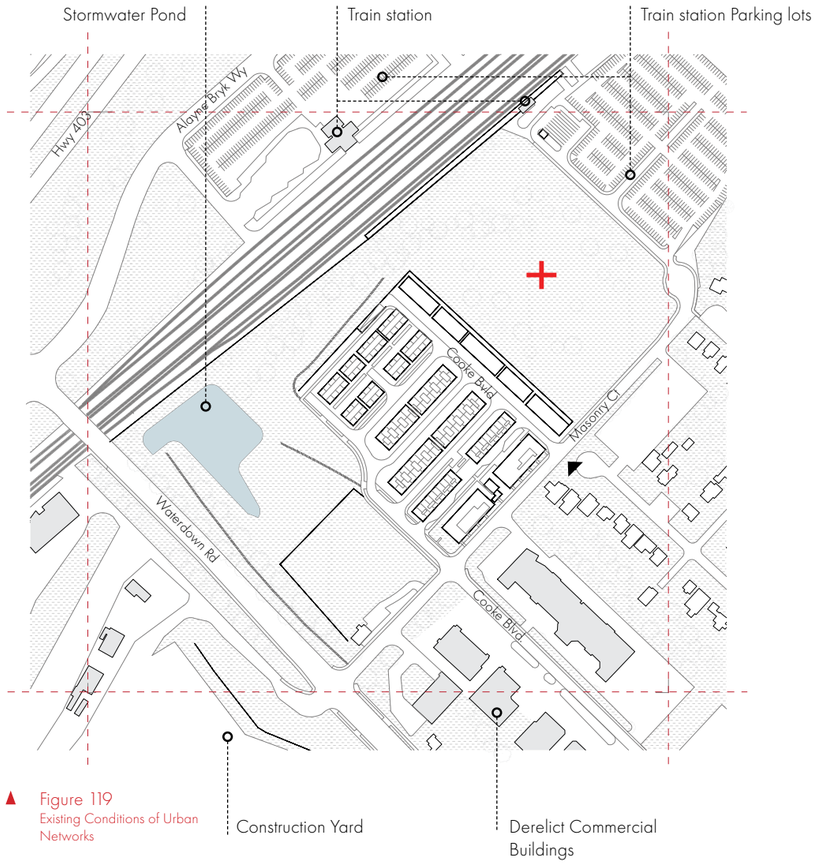


Figure 119
Existing Conditions of Urban Networks

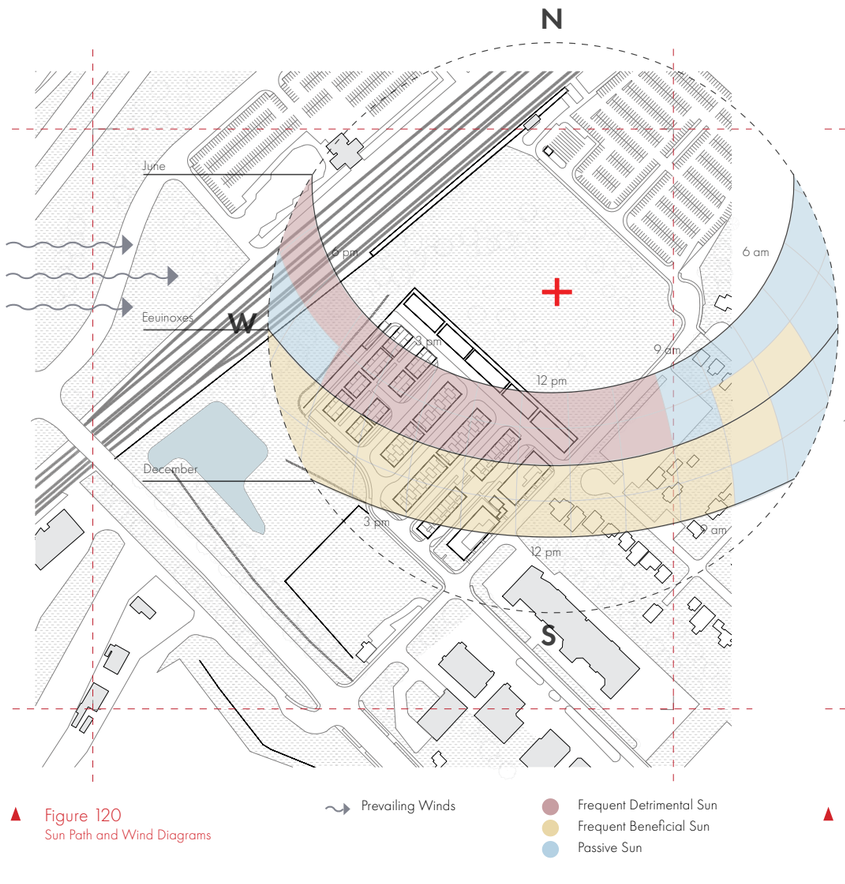


Figure 120
Sun Path and Wind Diagrams

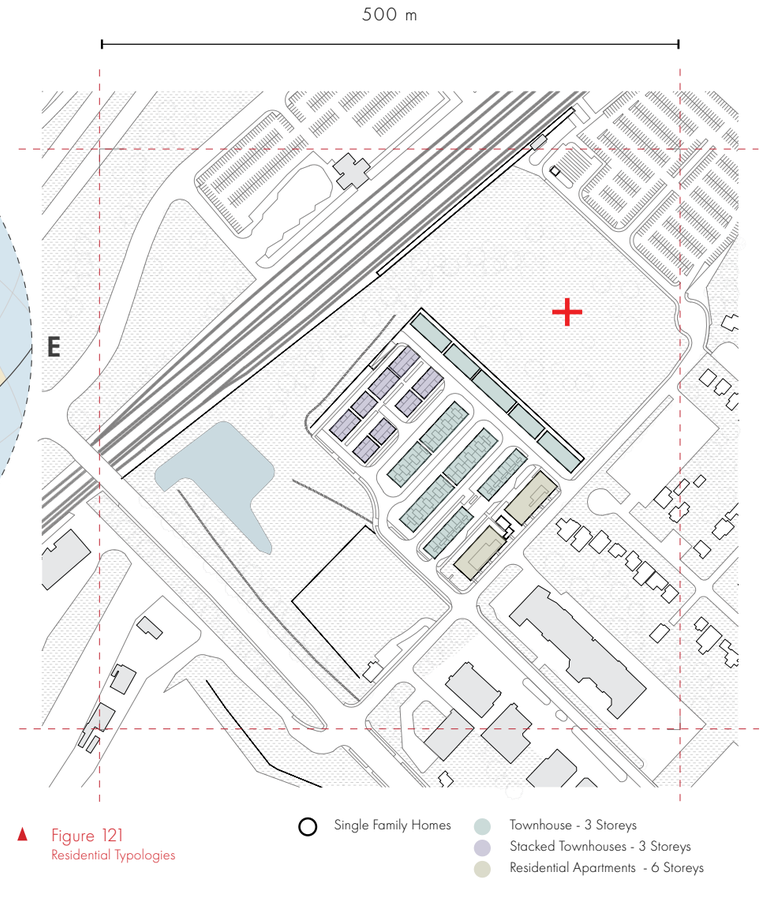


Figure 121
Residential Typologies

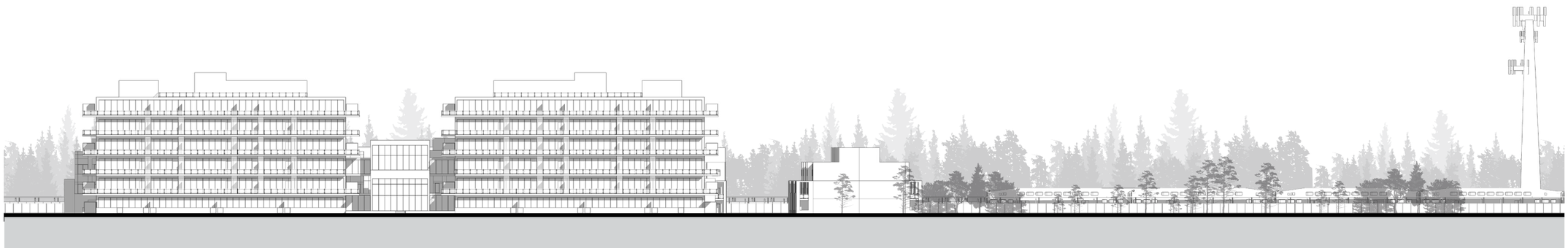
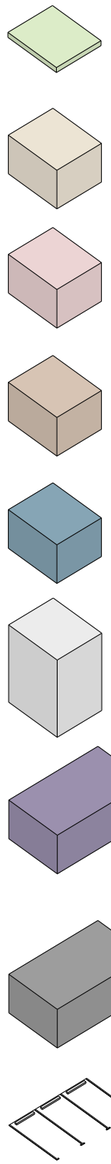


Figure 122
Existing conditions Elevation

TOWNHOUSE CLUSTER 1

Townhouse Cluster 1 is designed to support a variety of family living arrangements through flexible spatial organization. The second level features a dedicated grandparents' suite, internally connected to the third floor via stairs, giving families options for proximity and interaction. On the fourth level, a stand-alone one-bedroom unit offers additional possibilities for independent living suitable for young adults and couples. The layout of every space is informed by a consistent 6 x 9 meter grid, which organizes spatial relationships both within the home and in the surrounding areas.

◄ Figure 123
Townhouse Cluster 1



Terrace

An outdoor terrace functions as a extension of the home, offering a space for relaxation, social gatherings and gardening.

Study

A study room provides a dedicated, focused environment within the home for reading, learning, research, and work tasks.

Bedroom

The bedroom serves as a private retreat within the home, providing a focused space for rest, relaxation, and personal renewal.

Kitchen

The Kitchen acts as the heart of the home, providing a dedicated space for meal preparation, cooking, and informal gatherings.

Living Area

A central area within the home that also includes the dining space functions as a multi-purpose hub where family members gather for meals and social activities.

Vertical Circulation

Units with inner stairs can provide a level of privacy and efficient circulation.

Flexible space

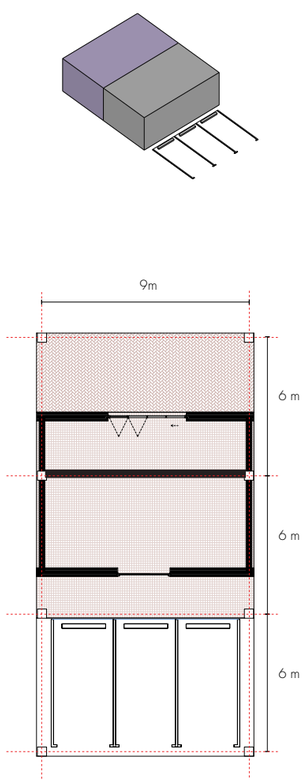
This space is located on the ground floor, as it can serve multiple functions, can be converted in to a Studio apartment, a hobby room or a small shop.

Utility Zone

This Area consists of all the mechanical, and plumbing fixtures, so all the toilets and kitchen spaces ca be cluster together. Also contains rooms like closets and storage.

Parking

Covered Parking is important, as it can avoid snow build up.



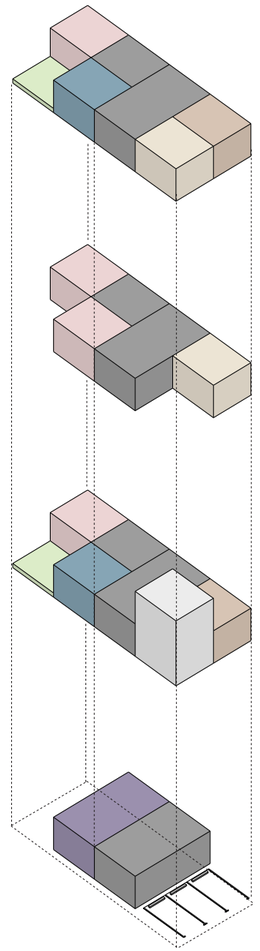
Ground Floor

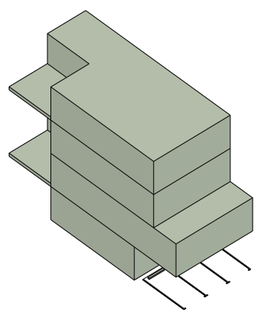


Level 2 | Level 3 | Level 4

3 Bedroom Unit

1 Bedroom
Stand Alone Unit

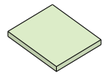




SPACE | FUNCTION | SPACIAL ORGANIZATION | STACKING | MASSING

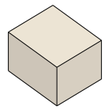
TOWNHOUSE CLUSTER 2

Townhouse Cluster 2 is structured for flexible family living intended for larger families, featuring a stand-alone two-bedroom unit on the second level, which offers privacy and independent living for a segment of the household suitable for a retired couple. The third and fourth floors are internally connected, enabling versatile multi-generational arrangements that support shared living and interaction between different age groups. This integrated spatial approach accommodates evolving family.



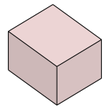
Terrace

An outdoor terrace functions as a extension of the home, offering a space for relaxation, social gatherings and gardening.



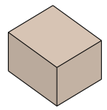
Study

A study room provides a dedicated, focused environment within the home for reading, learning, research, and work tasks.



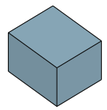
Bedroom

The bedroom serves as a private retreat within the home, providing a focused space for rest, relaxation, and personal renewal.



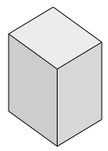
Kitchen

The Kitchen acts as the heart of the home, providing a dedicated space for meal preparation, cooking, and informal gatherings.



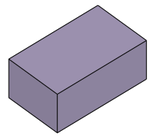
Living Area

A central area within the home that also includes the dining space functions as a multi-purpose hub where family members gather for meals and social activities.



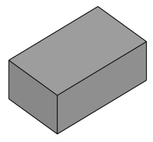
Vertical Circulation

Units with inner stairs can provide a level of privacy and efficient circulation.



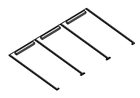
Flexible space

This space is located on the ground floor, as it can serve multiple functions, can be converted in to a Studio apartment, a hobby room or a small shop.



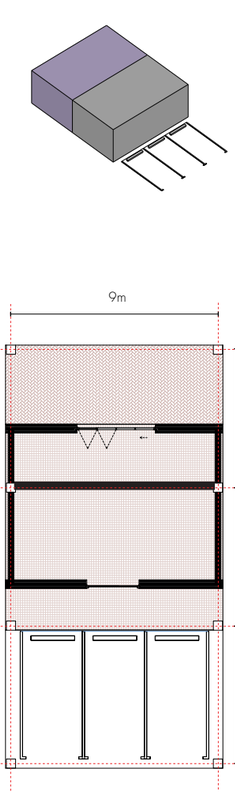
Utility Zone

This Area consists of all the mechanical, and plumbing fixtures, so all the toilets and kitchen spaces ca be cluster together. Also contains rooms like closets and storage.

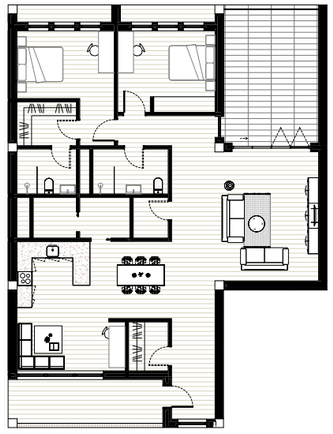


Parking

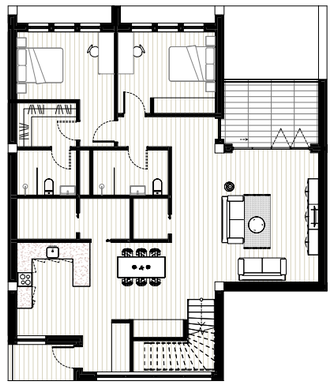
Covered Parking is important, as it can avoid snow build up.



Ground Floor



Level 2



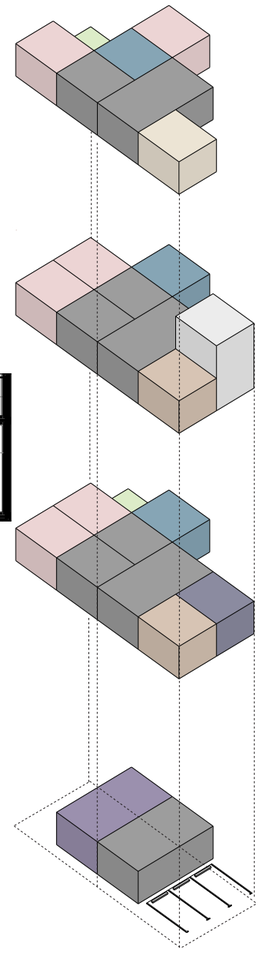
Level 3

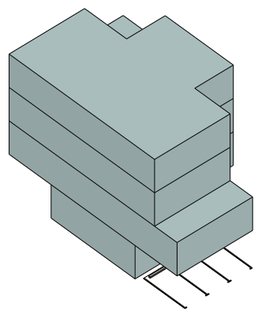


Level 4

2 Bedroom
Stand Alone Unit

4 Bedroom Unit





SPACE

FUNCTION

SPACIAL ORGANIZATION

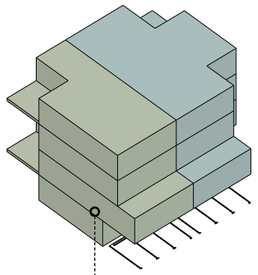
STACKING

MASSING

Figure 124
Townhouse Cluster 2

THE HOUSING BLOCK

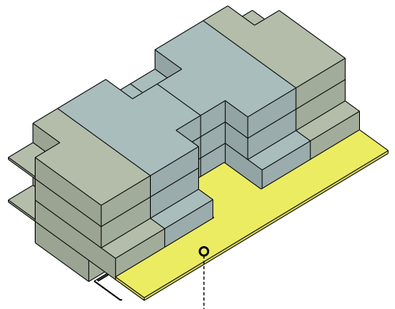
Organized around a consistent 9 x 6 meter grid, the housing blocks are interlinked on the second level by a spacious 6-meter-wide interior walkway, enhancing both circulation and communal living opportunities. At the ground level, a thoughtfully integrated road network provides covered parking, ensuring convenience and weather protection for residents. Each housing block consists of eight townhouse clusters, collectively shaping a rhythm of built and open space that balances privacy with sociability.



◄ Figure 125
Townhouse Cluster Diagram and Level 2 plan

Townhouse cluster 1 and 2

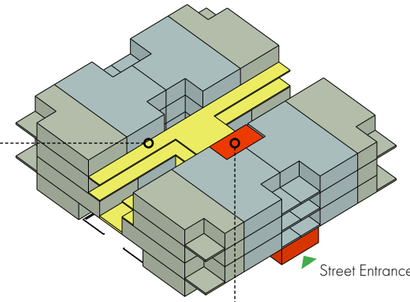
Through careful spatial planning, the integration of these two typologies generates a hierarchy of private and semi-private communal spaces.



◄ Figure 126
Townhouse Cluster Group Diagram and Level 2 plan

Interior Walkway

A 6m wide interior walkway connects the typologies. This walkway runs through out the project. This walk-way leads to and provides many scales of communal spaces



◄ Figure 127
Typical Housing Block Diagram and Level 2 plan

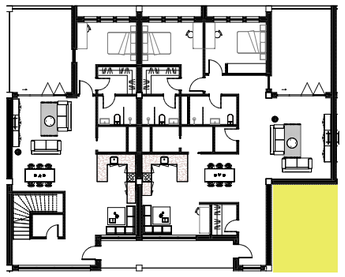
All levels Connect

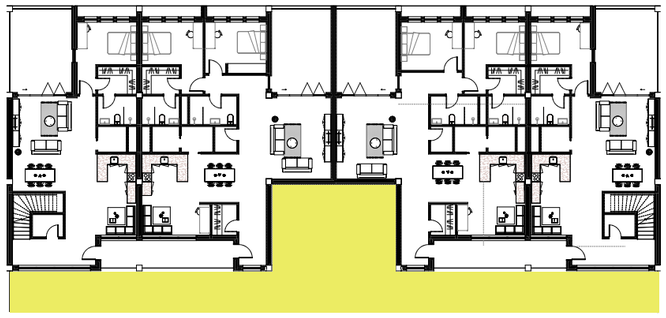
With the interior walkway on the second floor serving as the main spine of the housing block connecting to all levels above and other housing blocks in the development.

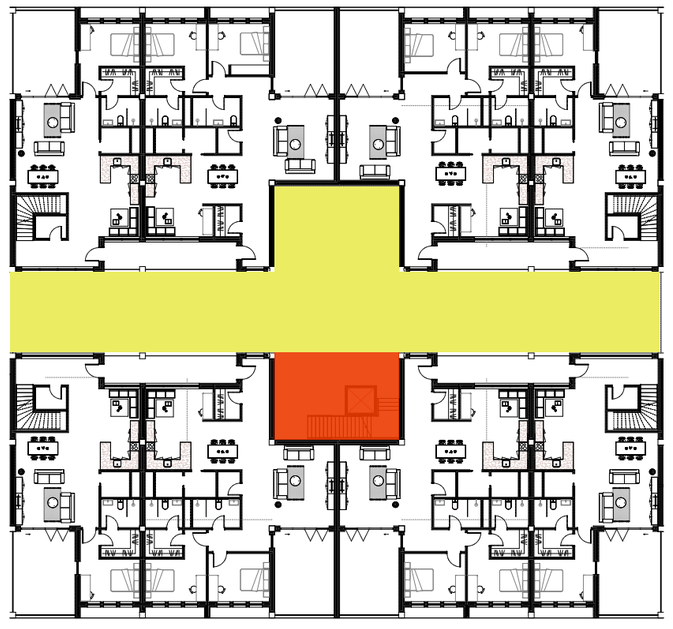
Street Entrance

Housing Block Core

The housing block core consists of an elevator and stairs connecting all levels from ground to level 4, making all the levels of the accessible.

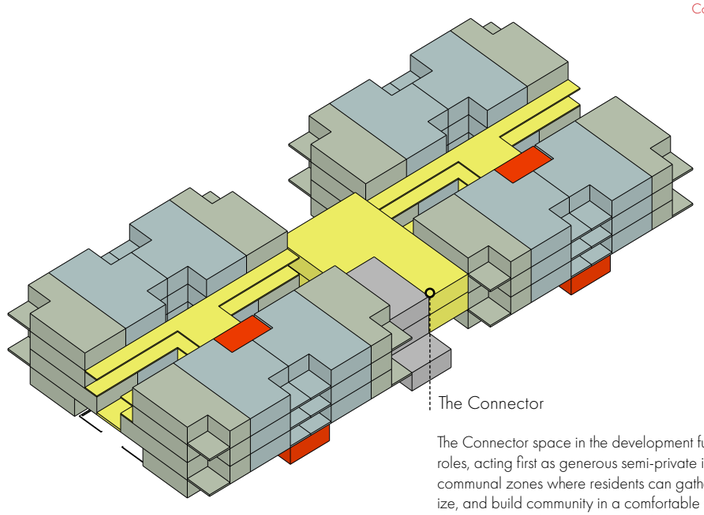






CONNECTING THE HOUSING BLOCKS

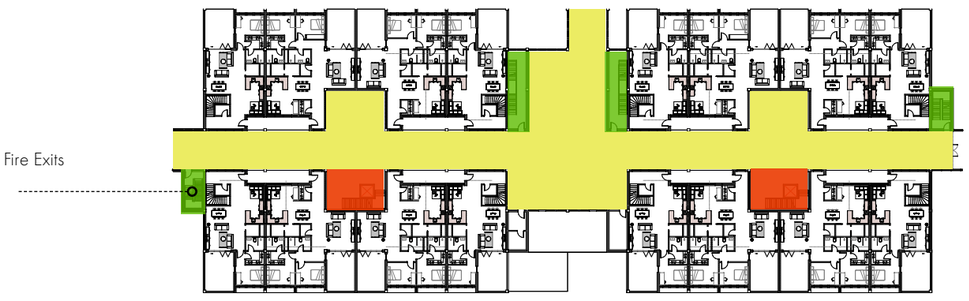
◄ Figure 128
Connecting the Housing Block



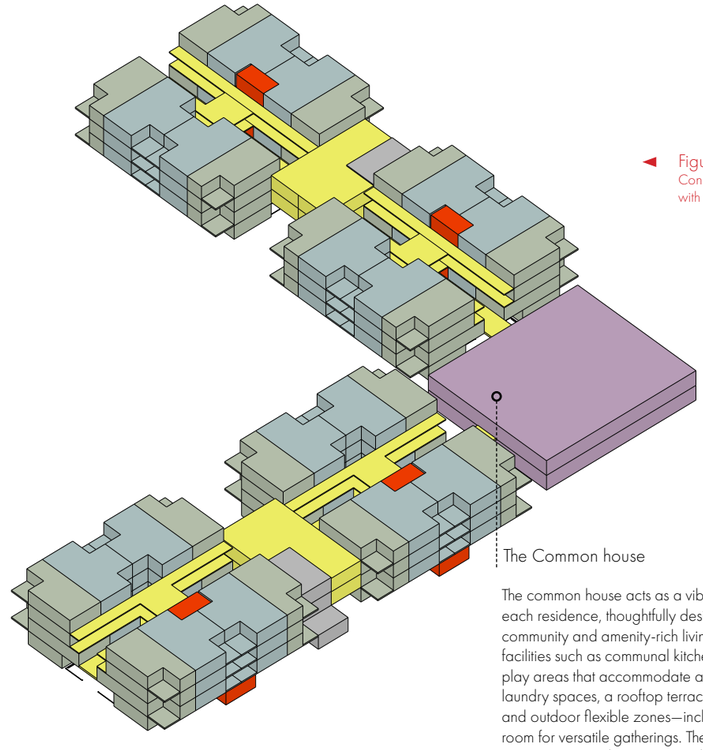
The Connector

The Connector space in the development fulfill dual roles, acting first as generous semi-private informal communal zones where residents can gather, socialize, and build community in a comfortable setting. These transitional spaces seamlessly link housing blocks, communal areas, and serve as the primary internal connection point to the apartment unit building, creating an integrated circulation system that enhances movement throughout the development.

Additionally, these connector spaces accommodate essential building services, including mechanical equipment rooms, trash collection areas, and supplemental storage units on the ground floor. By clustering such functions centrally, these spaces not only promote social interaction and connectivity but also support operational efficiency and convenience for all residents.



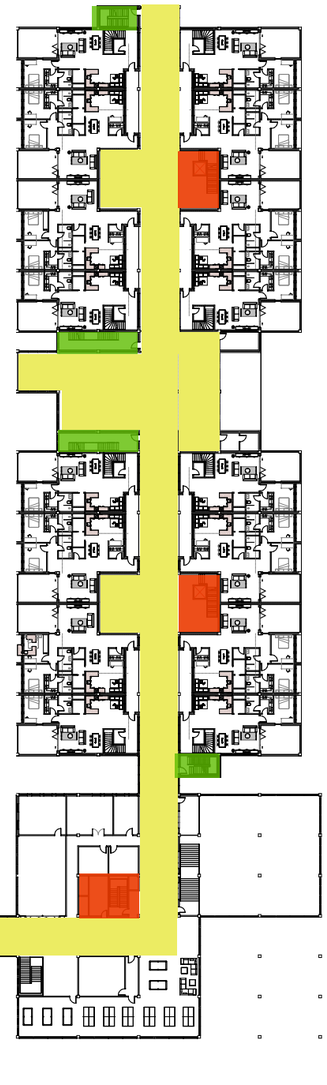
◄ Figure 129
Connecting the Housing Block
with the common house



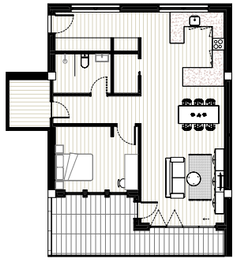
The Common house

The common house acts as a vibrant extension of each residence, thoughtfully designed to foster community and amenity-rich living. It features shared facilities such as communal kitchens for group meals, play areas that accommodate all age groups, laundry spaces, a rooftop terrace, and both indoor and outdoor flexible zones—including a screened room for versatile gatherings. These shared amenities encourage social interaction, relaxation, and collaborative activities among residents, enhancing the sense of belonging within the community.

On the ground floor, the common house accommodates specialized spaces including workshops for crafts, dance and music studios, and double-height indoor areas adaptable for sports and fitness activities.



APARTMENT BLOCK UNIT TYPOLOGY



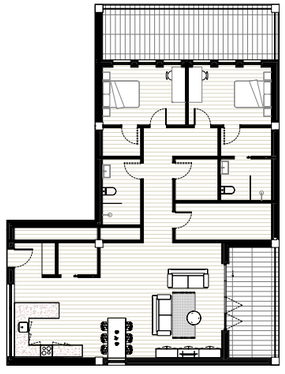
1 Bedroom
Type 1



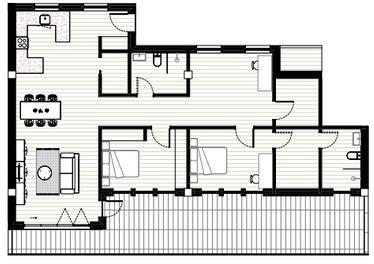
1 Bedroom
Type 2



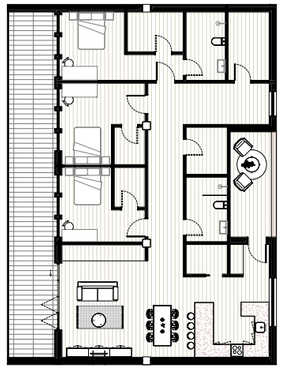
2 Bedroom
Type 1



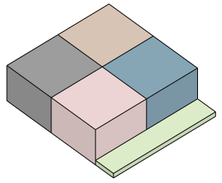
2 Bedroom
Type 2

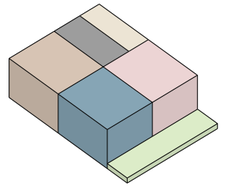


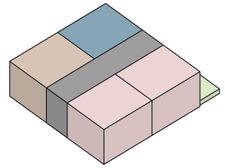
2 Bedroom
Type 3

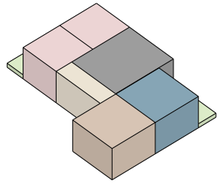


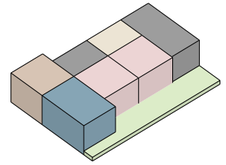
3 Bedroom

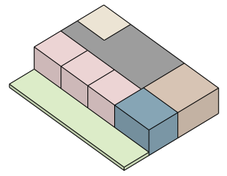




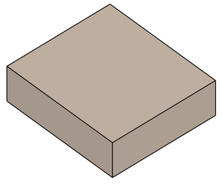


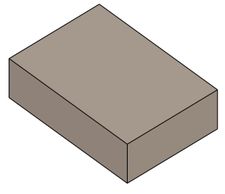


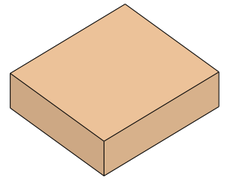


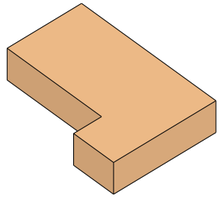


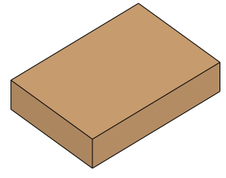
SPACIAL ORGANIZATION

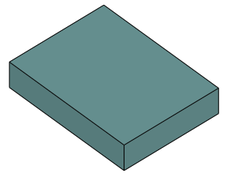




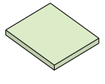






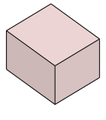


MASSING



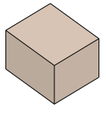
Terrace

An outdoor terrace functions as a extension of the home, offering a space for relaxation, social gatherings and gardening.



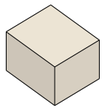
Bedroom

The bedroom serves as a private retreat within the home, providing a focused space for rest, relaxation, and personal renewal.



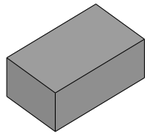
Kitchen

The Kitchen acts as the heart of the home, providing a dedicated space for meal preparation, cooking, and informal gatherings.



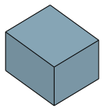
Study

A study room provides a dedicated, focused environment within the home for reading, learning, research, and work tasks.



Utility Zone

This Area consists of all the mechanical, and plumbing fixtures, so all the toilets and kitchen spaces ca be cluster together. Also contains rooms like closets and storage.

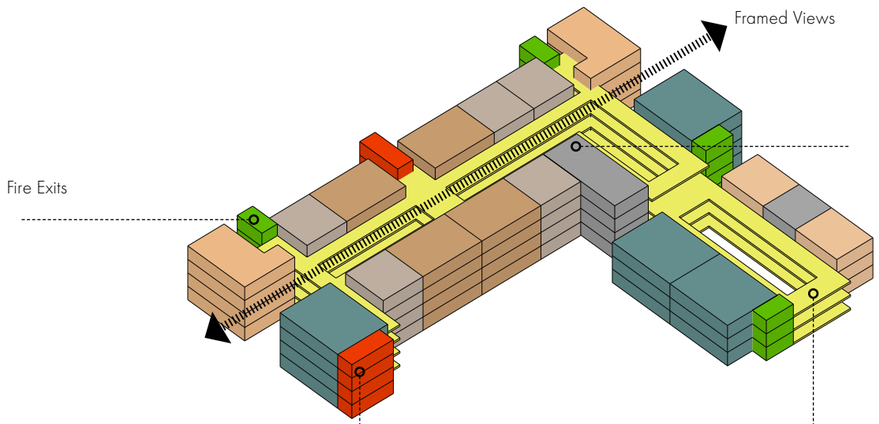


Living Area

A central area within the home that also includes the dining space functions as a multi-purpose hub where family members gather for meals and social activities.

◄ Figure 130
Apartment Block Unit typologies

APARTMENT BLOCK



◄ Figure 131
Apartment Block Massing

Main Building Core

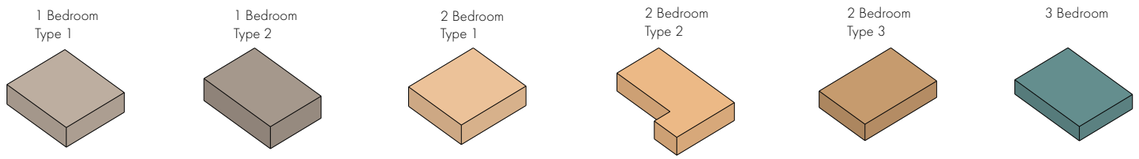
The main building core houses service elevators, mechanical rooms, and a garbage chute. Additionally, the core includes dedicated storage rooms to support the building's operational needs and resident convenience.

Elevators and Stairs Core

Multiple elevator and stair cores are strategically positioned throughout the apartment block to provide convenient entry and exit points on the ground floor while ensuring seamless vertical access to all building levels. Each core is located in response to the site's circulation needs and layout, supporting efficient movement and flexible connectivity for residents at every level.

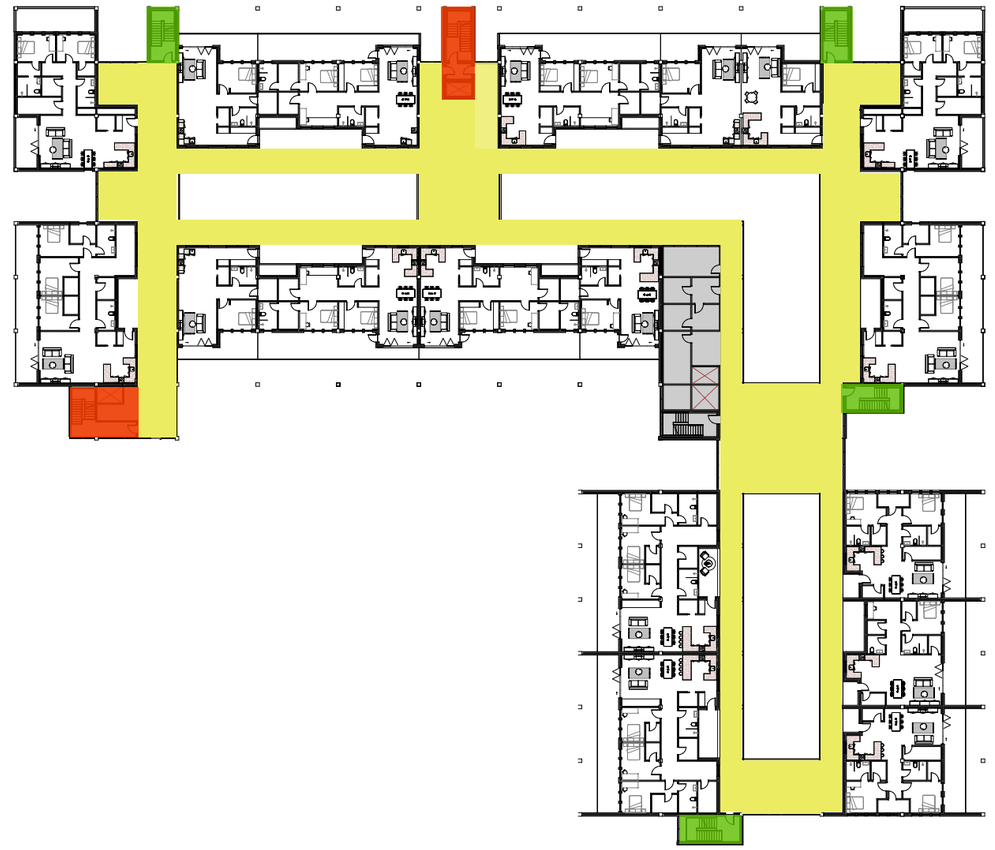
Interior Walkways

Wide corridors are designed to accommodate internal-facing porches and informal communal spaces, helping to foster everyday social interaction and a sense of community among residents. These generous circulation zones link seamlessly to a continuous 6-meter-wide interior walkway, creating a unified pathway that interconnects all housing typologies within the development. This integrated circulation network enhances accessibility and connection between homes, shared areas, and key amenities, while promoting vibrant social encounters in the heart of the living environment.



Mirroring the organizational principles of the townhouse clusters, the apartment blocks are also arranged around a central walkway located on the second level, seamlessly connecting the townhouses and apartments to enable a range of communal spaces as well as options for multi-generational living arrangements. Both housing typologies are unified by a continuous interior corridor system, which anchors private residences and shared social areas to a single circulation spine.

The apartment block's spatial organization is further defined by the same 6 x 9 meter grid used in the townhouses, ensuring coherence and efficiency in the layout of apartments and communal amenities. This grid-based approach supports clarity in the design, facilitates flexible planning for a variety of unit scales, and fosters integration between private dwellings and vibrant social spaces across the entire development.



▲ Figure 132
Apartment Block Typical Floor Plan

MASSING ON SITE

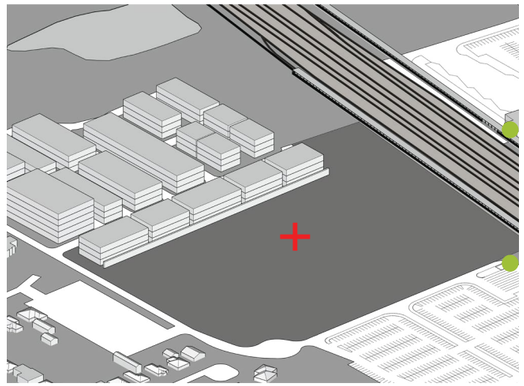


Figure 133
Site Location

Go Train Station
Site

The site was chosen because of its access to reliable public transport, via the Alder shot GO station.

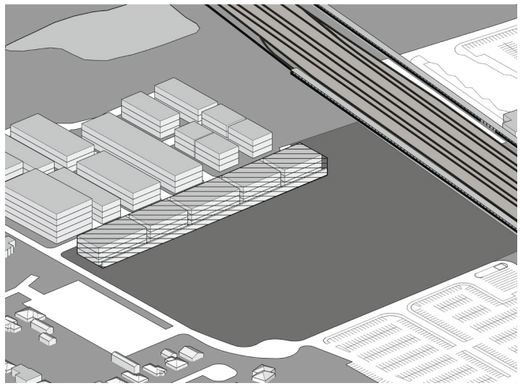


Figure 134
Existing Conditions

The existing row of townhomes is removed to open the site, enhancing permeability and establishing pedestrian connections to the train station while fostering engagement with the adjacent housing block.

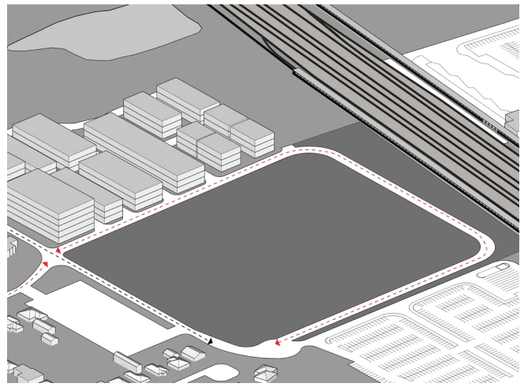


Figure 135
Vehicle Circulation

Vehicle Access
Masonry Crt Road

Vehicle circulation is arranged in a perimeter loop around the site rather than cutting through it, thereby reserving the interior for pedestrian-oriented spaces, landscaped courtyards, and shared public amenities.

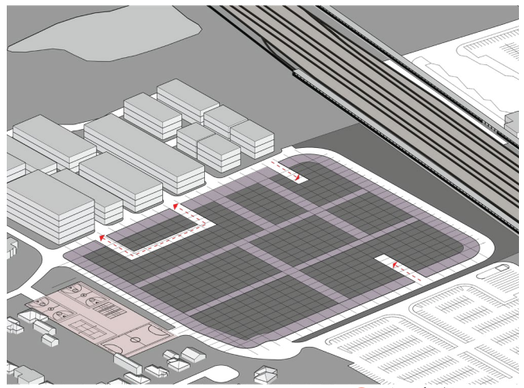


Figure 136
Walking Paths

Sport facilities
Walking Paths

The site is connected on all sides through a consistent 6 × 9 m grid of walking paths. These corridors create a central plaza, children's playgrounds, and communal gardens, while the sports facilities act as a focal point that brings the surrounding community together.

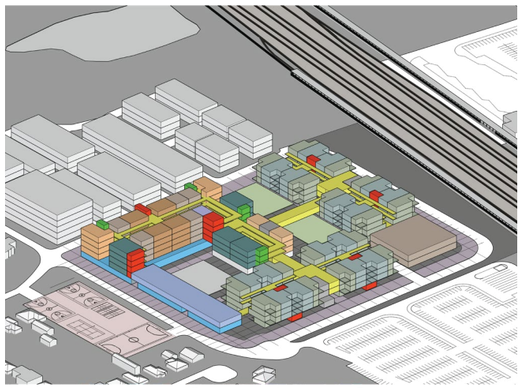


Figure 137
Massing on site

Courtyards
Retail
Plaza

Apartment and townhouse typologies are integrated with ground-floor retail, ensuring that daily needs are accessible within walking distance. Through careful design, the walking paths transform the ground level into an active public realm, featuring an outdoor courtyard, children's play area, and community gardens.

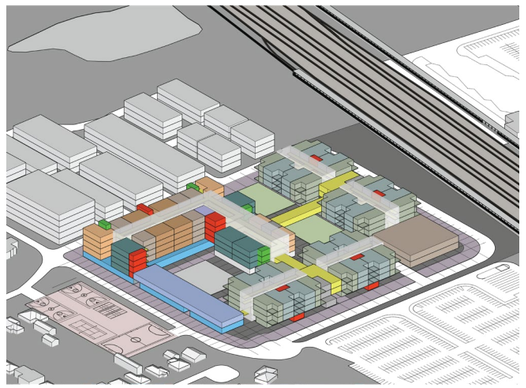


Figure 138
Addition of Atrium

Given the region's harsh climate, an interior atrium is proposed within the apartment and townhouse typologies. This design maintains year-round connectivity and ensures that communal spaces remain accessible and usable throughout the seasons in Canada.

This section examines how the different housing typologies are integrated on the site discussed earlier. The accompanying diagrams illustrate the arrangement of clustered townhomes and apartment blocks, highlighting their spatial relationships within the site. Together, these housing types are woven into a cohesive whole that incorporates housing, community spaces, and critical infrastructure—such as access to daily amenities, public transportation, and a walkable neighborhood fabric. Through this purposeful design, the development not only supports the diverse needs of its residents, but also acts as an active community hub for neighboring areas. By engaging with the wider urban context, these spaces foster social connection and inclusivity while reinforcing the development's role as an anchor within the broader city, both for occupants and the surrounding community

GROUND FLOOR PLAN

The ground floor is thoughtfully designed to prioritize walking and public interaction over vehicle access, offering a variety of public courtyards, communal spaces, retail options, and sports facilities. The site is organized around a 6 × 9 meter grid of walking paths, which ensures strong connectivity on all sides and creates central features like plazas, playgrounds, and communal gardens. Sports facilities serve as a focal point for the community, while the children's playground is situated adjacent to the community garden, promoting vibrant intergenerational connections between younger and older residents.

Retail

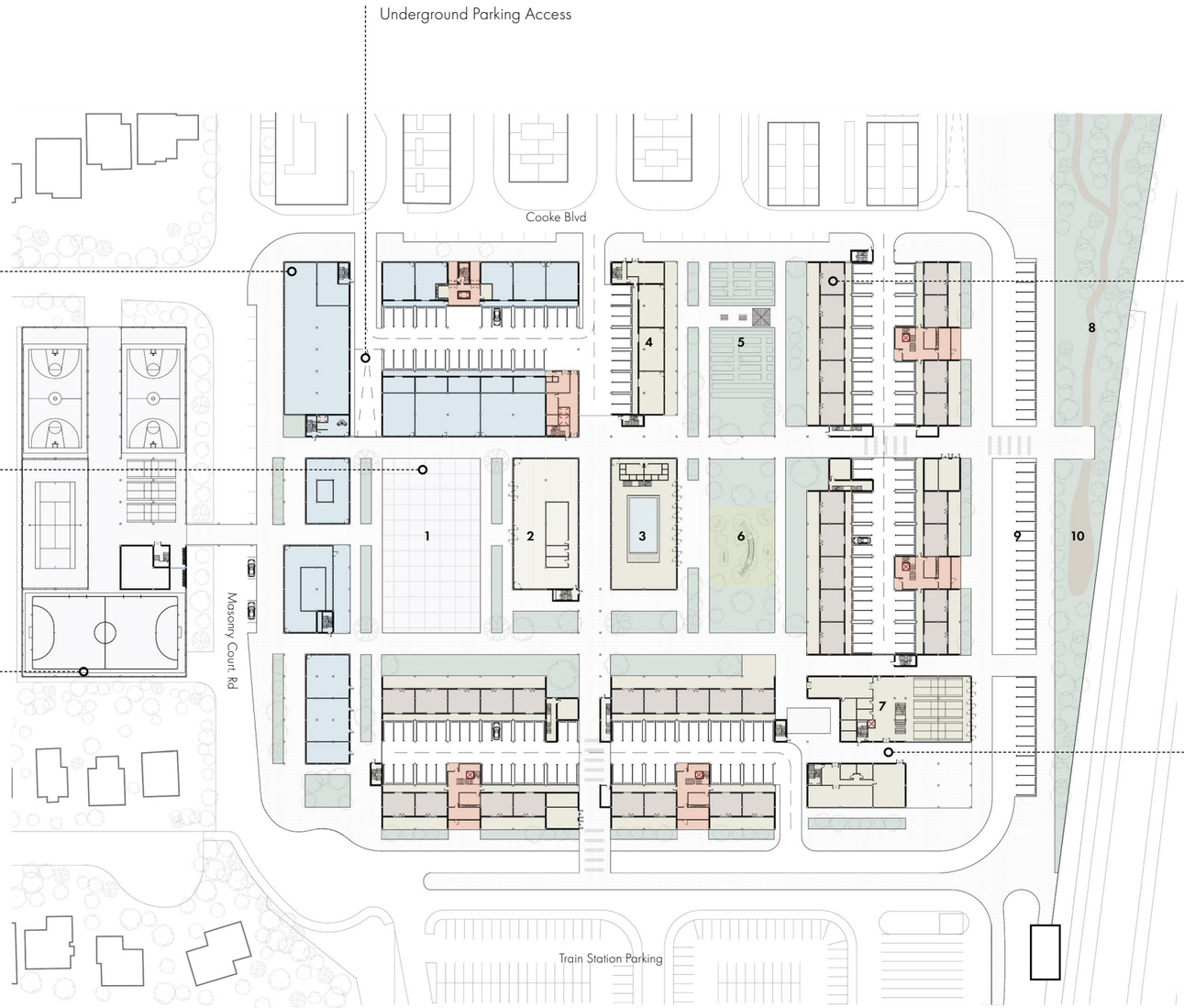
The envisioned retail shops will offer a diverse array of services, including a grocery store, café, hair-dresser, salon, daycare, and pharmacy. Additional retail options may include a bakery, restaurant, a florist, pet care services, and dry cleaners. This mix of amenities is designed to meet everyday needs, foster social interaction.

Plaza

The plaza is envisioned as a vibrant, flexible space that supports a wide range of community activities. It serves as an open gathering spot where events can be hosted. On weekends, the plaza can be transformed into a bustling farmers market, and in winter, it can become an ice rink or a festive winter market—evoking the warm, social atmosphere of a village square.

Sports Facilities

The sports complex features courts and fields for bas-ketball, tennis, badminton, and mini-soccer, providing opportunities for both competitive and casual play. These amenities foster intergenerational connections, promote healthy lifestyles, and create a welcoming environment for active engagement from the entire neighborhood.

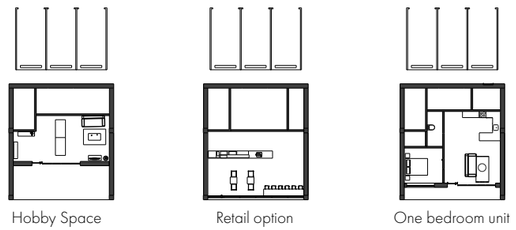


1. Plaza
2. Multi purpose Hall
3. Community Pool
4. Community Clinic
5. Community Garden
6. Children's Play Area
7. Common House
8. Walking Trail
9. Additional Parking
10. Dog Park

Figure 139
Detailed Ground Floor Plan

Flex Spaces

The ground floor flex spaces are designed to adapt to a variety of needs. Units facing the road can be converted into small retail shops, while those oriented toward the courtyard have the potential to become compact one-bedroom apartments or dedicated spaces for hobbies.



Common house

The Common House offers a range of semi-public spaces tailored for community activities, including dance studios, workshops, and a variety of flexible indoor areas designed to support older residents. The ground floor also provides direct access to the train station from within the site.

SECOND FLOOR PLAN

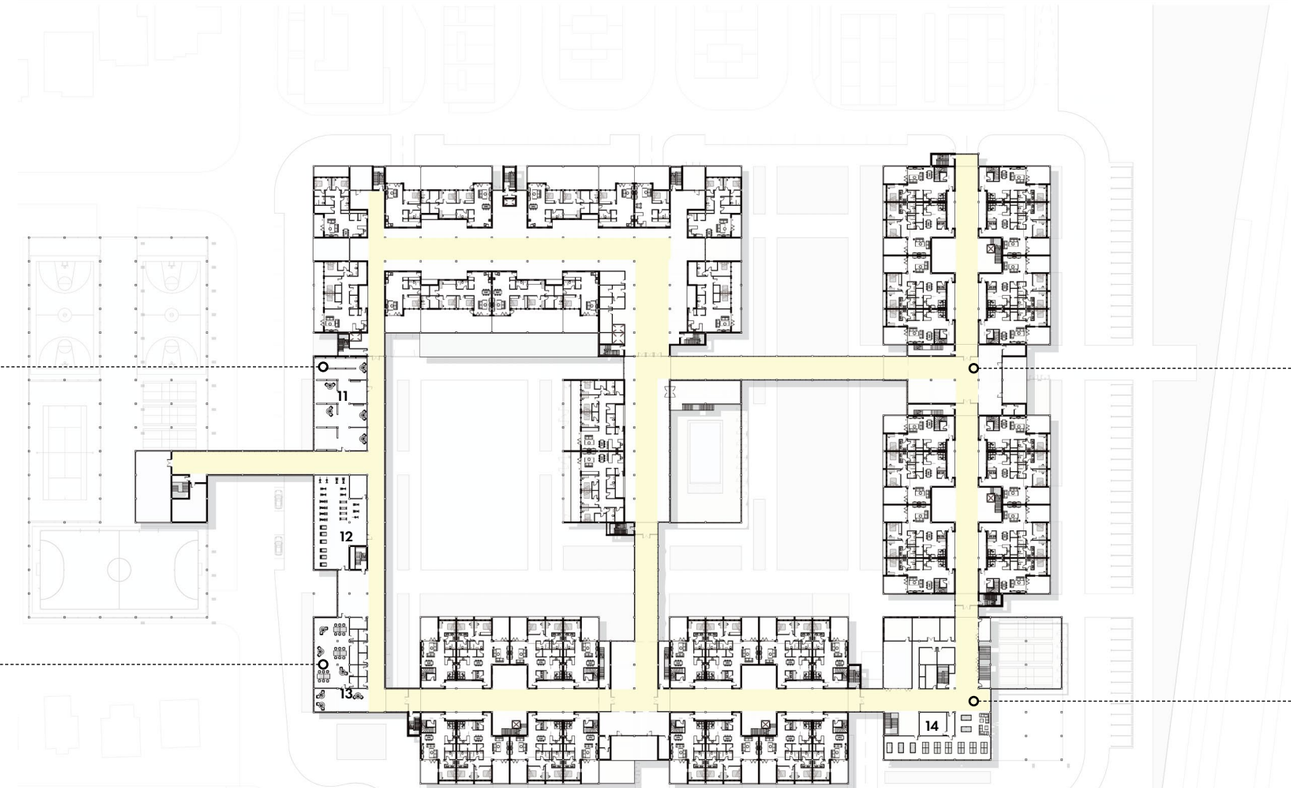
On the second floor—regarded as the heart of the proposal—an interior walkway forms a vital connection between the townhouse cluster and the apartment block. Branching from this central passage are a range of formal communal spaces, including a common house, library, gym, learning center, community pool, and various sports facilities. Alongside these are more informal communal zones, such as the connector spaces linking the townhouse clusters to the apartment block. These areas are intentionally designed to support everyday interactions and year-round communal activities, accommodating everything from Sunday potlucks and occasional large gatherings to indoor markets organized by the community itself.

Community Library

Envisioned as a quiet haven within the development, the library serves as a vital third place for residents, offering opportunities for relaxation, community connection, and volunteer involvement beyond the home and workplace.

Learning center

The space is conceived as an intergenerational setting where older adults can impart knowledge to younger generations while also learning from them. Additionally, it functions as a shared workspace, offering opportunities to work outside the home and providing a degree of privacy.



11. Library
12. Gym
13. Learning Center
14. Common House

Figure 140
Detailed Second Floor Plan

Interior Walkway

The interior walkway links all housing typologies through a sequence of formal and informal communal spaces. It functions as an indoor circulation platform, providing areas for children's play while fostering interaction among residents. By connecting all units, the walkway enables multigenerational families to occupy different homes within the block while maintaining social ties and a sense of community. Moreover, it safeguards opportunities for physical activity and social interaction throughout the year, despite the region's harsh climate.

Common house

The second level of the common house accommodates a communal kitchen, shared laundry facilities, storage areas, an office, playrooms, and screening rooms. These amenities serve as an extension of individual households, offering residents access to shared resources that reduce the duplication of private spaces. By encouraging routine encounters and collective activities such as cooking, childcare, and leisure, the common house strengthens community bonds, fosters social cohesion, and cultivates a sense of belonging among residents.

THIRD FLOOR PLAN

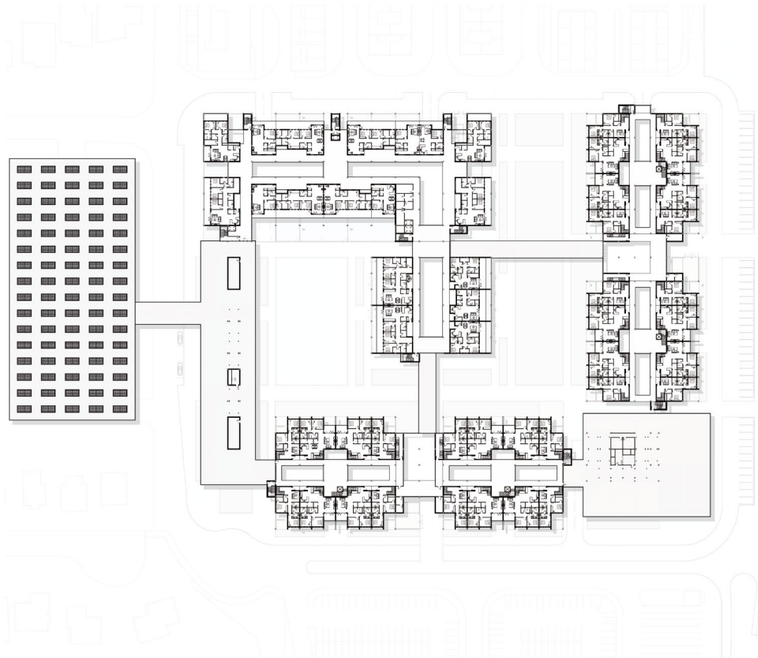


Figure 141
Third Floor Plan

FOURTH FLOOR PLAN

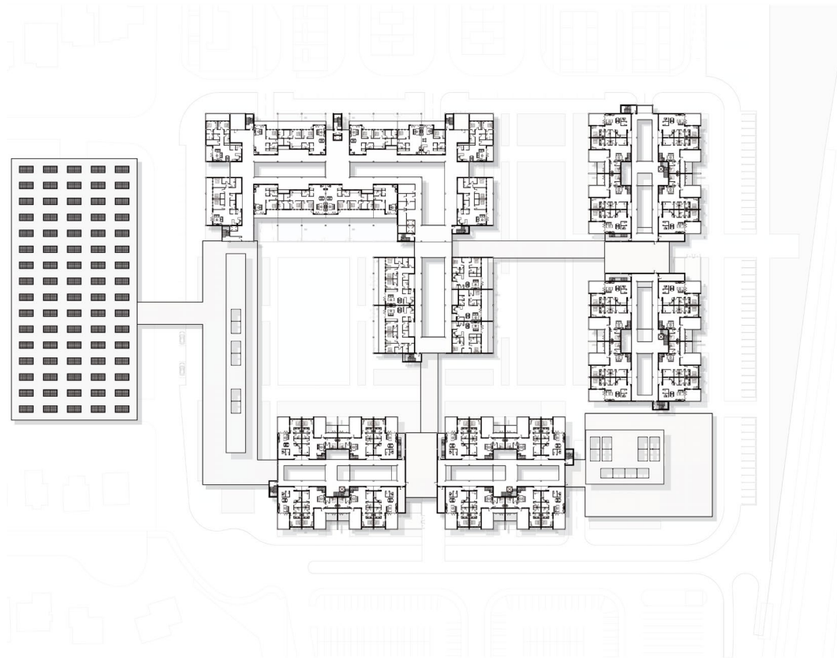


Figure 142
Fourth Floor Plan

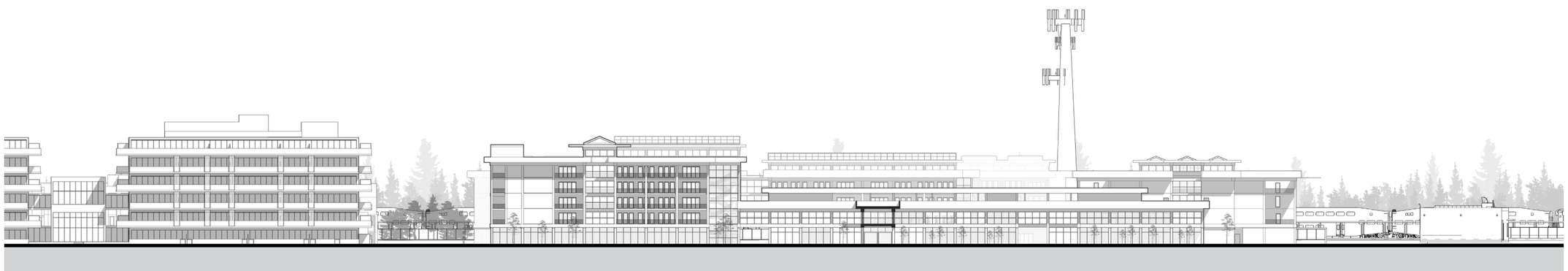
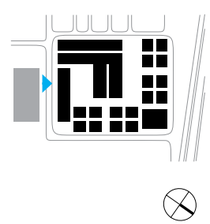


Figure 143
Elevation Drawing : Proposed
From Masonry Crt Road



FIFTH FLOOR PLAN

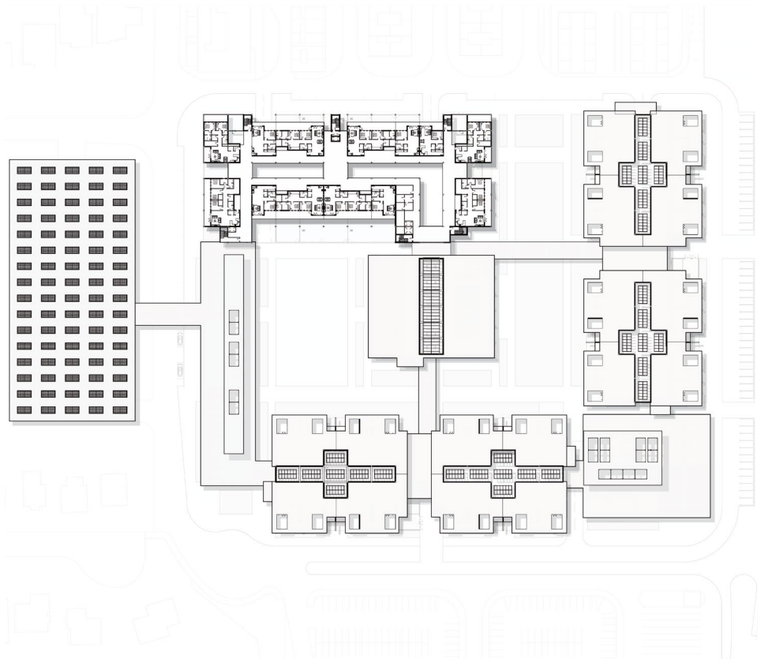


Figure 144
Fifth Floor Plan

ROOF PLAN

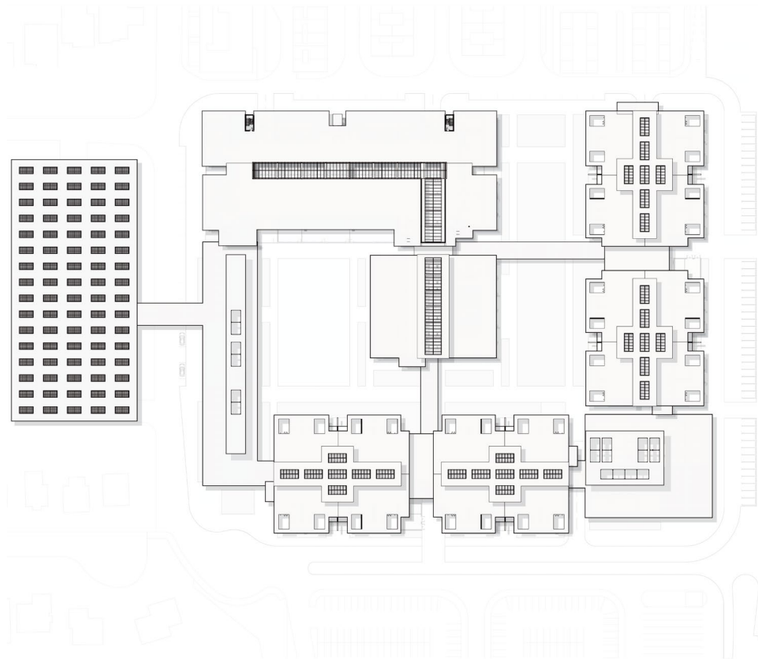
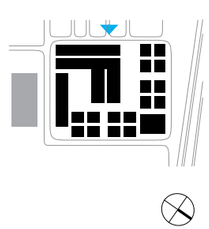


Figure 145
Sixth Floor Plan



Figure 146
Elevation Drawing : Proposed
From Cookes Blvd



EXPLODED AXONOMETRIC

The exploded axonometric drawing reveals the building's spatial organization, emphasizing the second-level walkway as a transitional layer that generates semi-private communal zones for residents within the interior circulation network. At grade, the design establishes a porous interface with the neighborhood, anchored by an outdoor central plaza and reinforced by active frontages including retail spaces, the sports center, communal gardens, and a children's play area. The deliberate layering of indoor and outdoor communal programs creates a continuum of interaction, enabling seasonal adaptability while accommodating diverse age groups and reinforcing the building's role as a social and spatial connector within the community fabric.

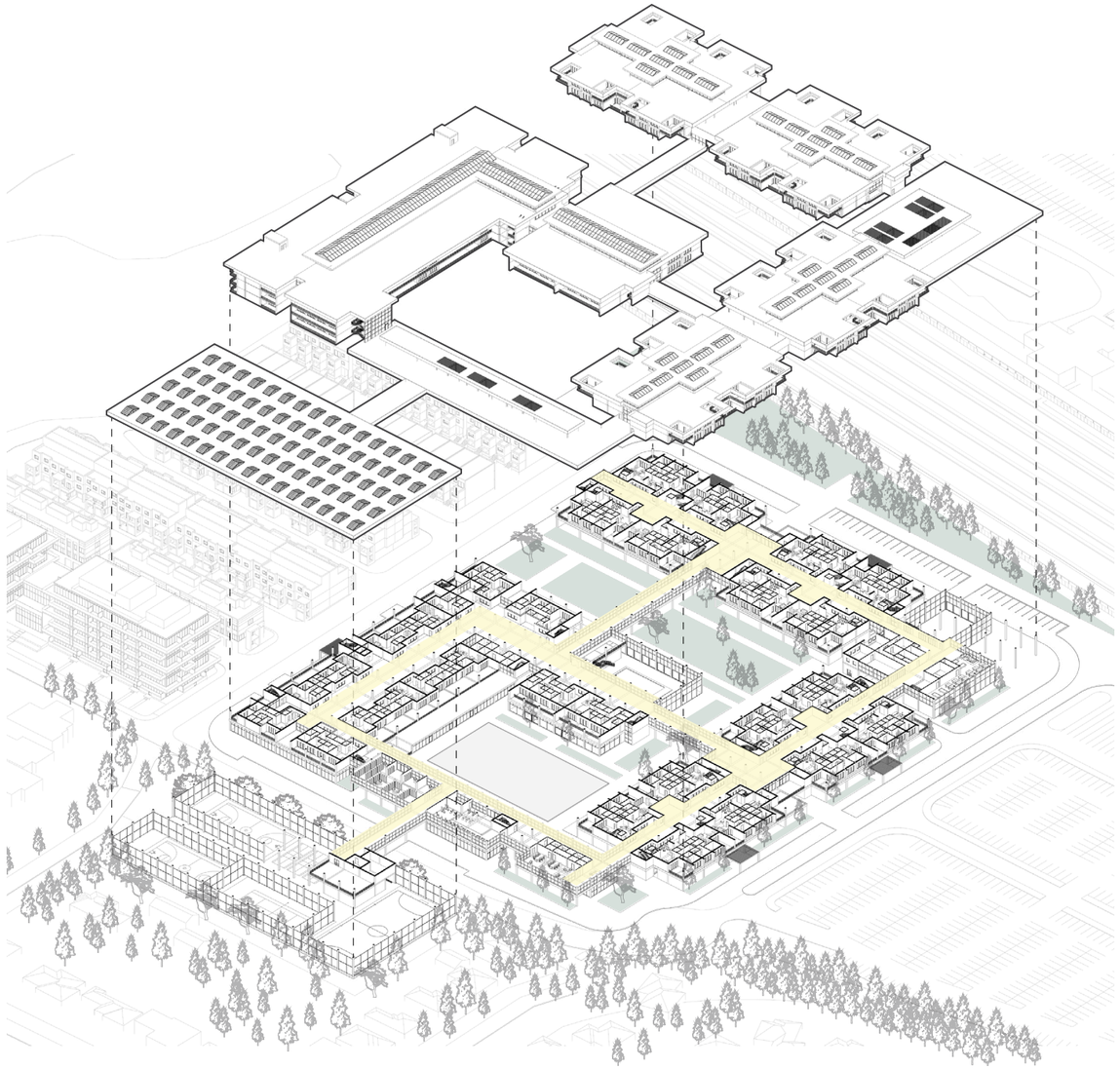
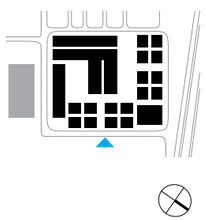


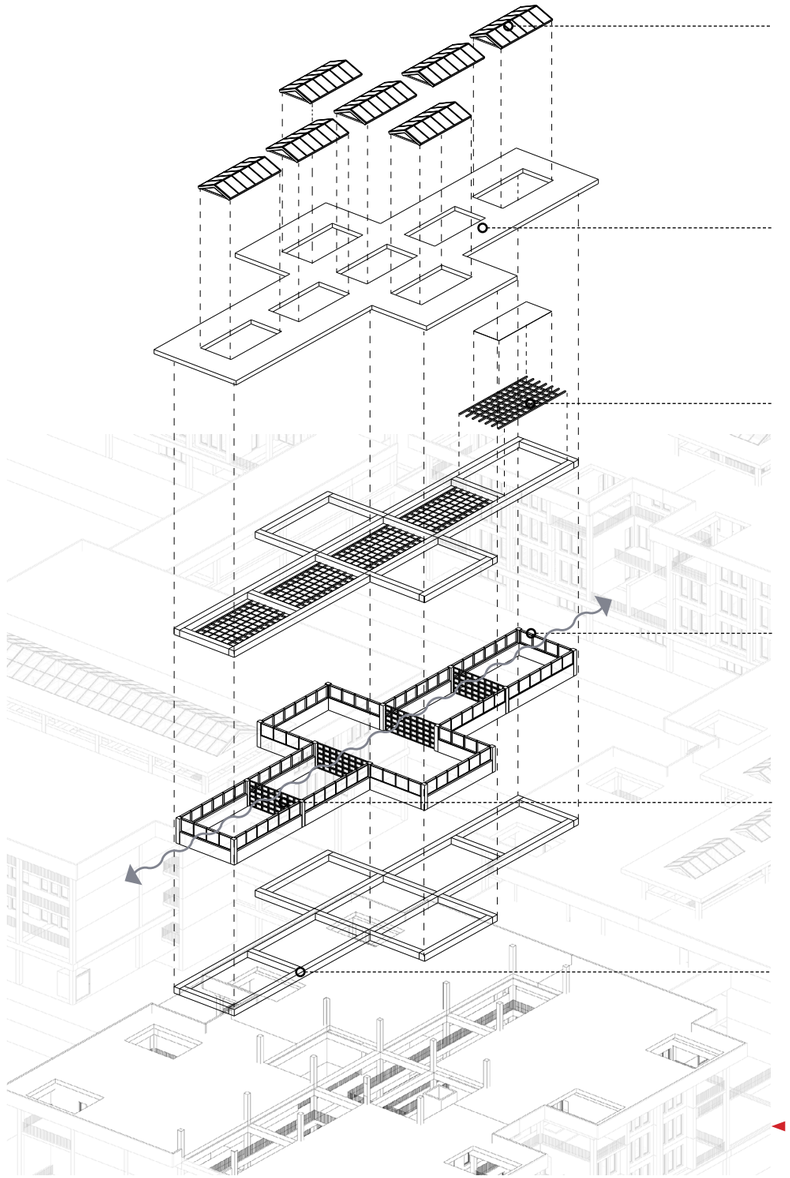
Figure 147
Exploded Axonometric



Figure 148
Elevation Drawing : Proposed
From Parking lot



ATRIUM DESIGN



Roof Lights

The design incorporates natural light to illuminate the interior atrium, creating a bright and welcoming central space.

Controlled Aperture

Allowing natural light to illuminate the interior atrium, while controlling the size of the openings, ensures a balanced atmosphere that enhances comfort and energy efficiency.

Light diffusers

A permeable panel with frosted glass infill allows light to softly diffuse through the space while maintaining passive airflow, creating both natural illumination and ventilation.

Side Lighting Windows

Sidelight windows enhance natural lighting and support passive air circulation within the atrium, improving both comfort and spatial quality.

Sound absorbing panels

A permeable panel infilled with sound-absorbing material diffuses light while maintaining air circulation, enhancing both acoustic comfort and ventilation.

Supporting Structure

The supporting structure, composed of reinforced concrete, is engineered to bear the load of the roof lights as well as the side lighting windows.

Figure 149
Exploded Axonometric of the Atrium Design

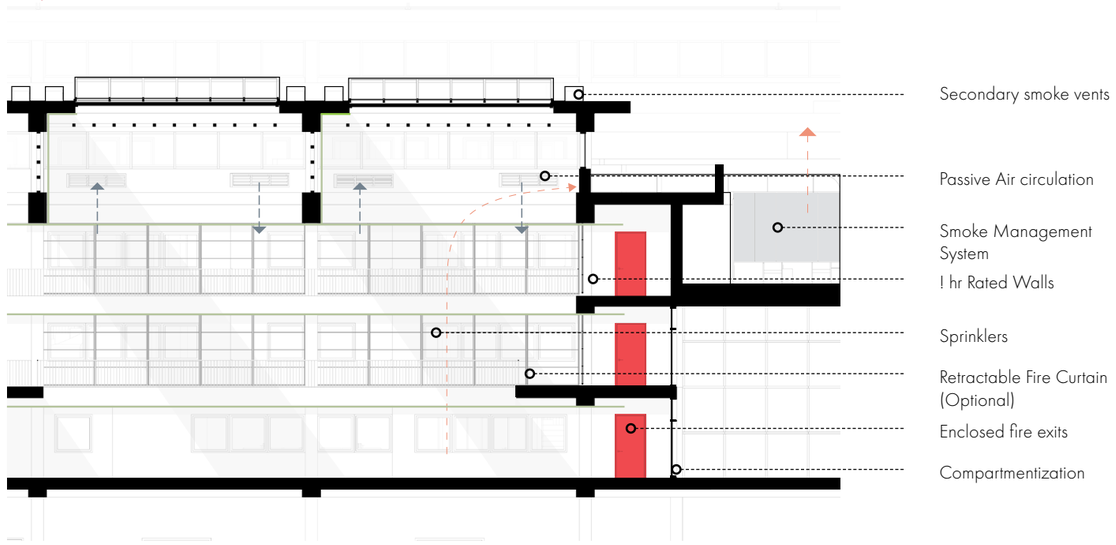
ATRIUM FIRE SAFETY SYSTEMS

The atrium is protected through a coordinated fire management system designed to control the spread of fire and smoke while maintaining safe evacuation routes. A series of fire safety measures are integrated into the space:

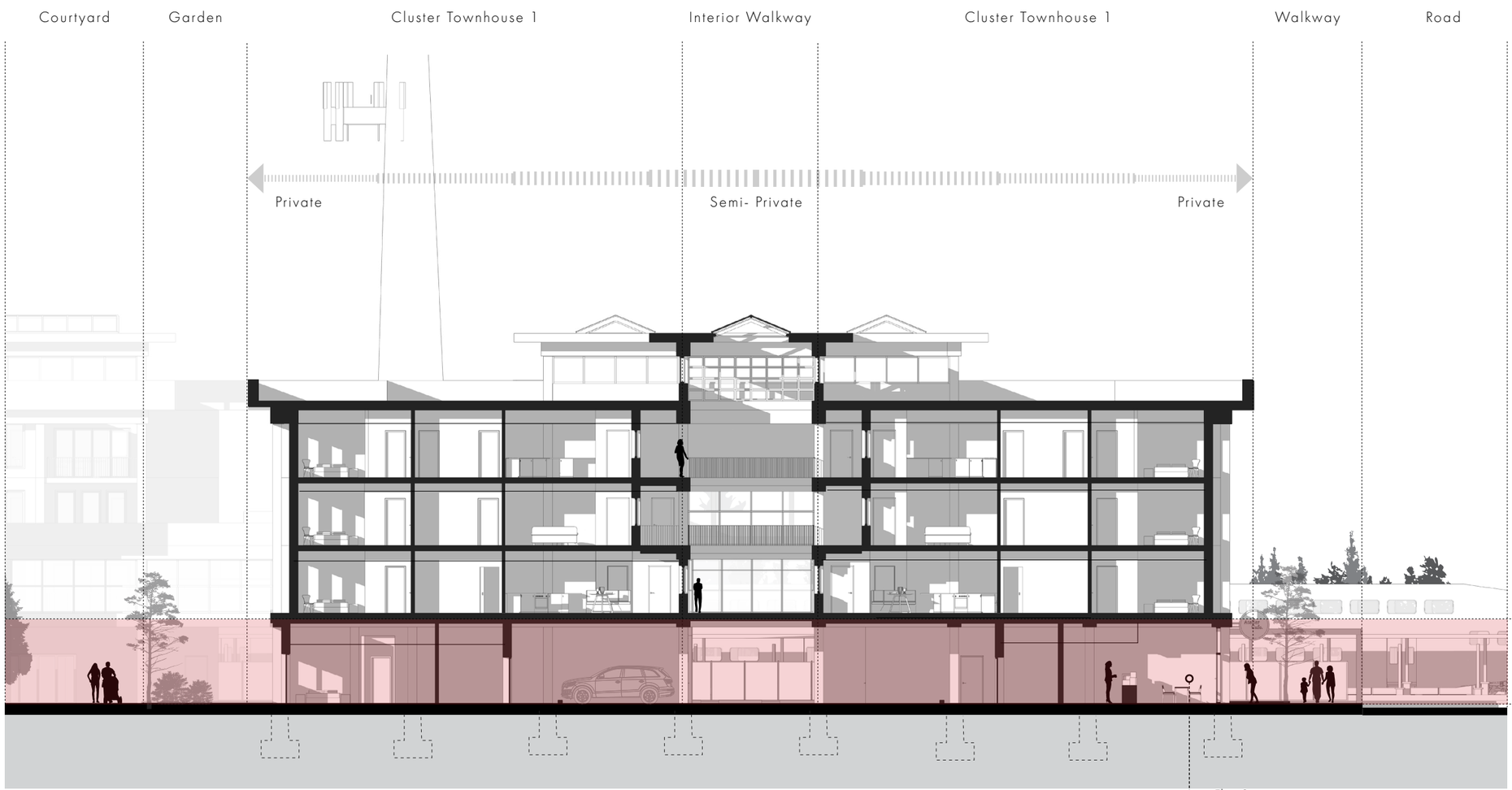
- Fire-rated separations: The atrium is enclosed by 1-hour fire-rated walls, with self-closing fire-rated doors leading into corridors or vestibule spaces to reduce the transfer of smoke and flames.
- Protected exit stairs: At both ends of the atrium, enclosed and fire-rated stairwells provide safeguarded vertical egress routes independent of the open atrium volume.
- Sprinkler protection: A full sprinkler system is installed throughout the atrium to suppress fire development and limit heat release.
- Smoke control systems: Mechanical smoke management systems are used to prevent smoke from spreading between
  levels, ensuring that visibility and breathable air remain in evacuation zones.
- Smoke exhaust strategy: In many atriums today, a mechanical exhaust system removes smoke and maintains a smoke layer above the highest occupied egress routes, keeping them tenable for evacuation.
- Natural smoke venting: Where suitable, roof vent openings can also be incorporated to support the mechanical exhaust system, providing passive relief for rising smoke during an emergency.

Together, these systems form a layered approach to fire safety in atrium environments, maintaining safe evacuation conditions and limiting smoke and heat accumulation.

Figure 150
Section Drawing : Fire Safety Systems

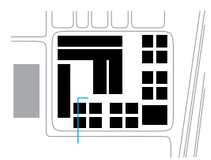


TOWNHOUSE CLUSTER SECTION



A flexible space transformed into a small café provides an opportunity to pursue a hobby or small business, fostering a sense of purpose and personal fulfillment.

Figure 151
Section Drawing : Proposed Townhouse Cluster 1





Home

Interaction among neighbors within the townhouse cluster is facilitated by a permeable layout, where residential units are oriented around interior walkways. These shared circulation paths serve as active social corridors, fostering spontaneous encounters and enhancing neighborly interactions, while allowing seamless movement throughout the housing block.

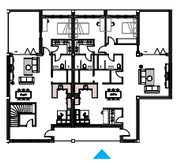


Figure 152
Visual : Townhouse Cluster



Neighborhood

Neighboring residents and adjoining households frequently gather for communal meals in a dedicated space adjoining the interior walkway. These branching multipurpose areas extend from the main circulation route, allowing for flexible use as social and dining venues.

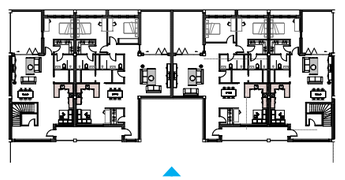


Figure 153
Visual : Townhouse Cluster
Communal space



The Front Porch

Both the townhouses and apartment blocks are designed with front porches that open directly onto the atrium, establishing an immediate relationship between the private threshold of the home and the shared communal space. By facing one another across the atrium, these porches become more than transitional zones—they act as social extensions of the dwelling where residents can pause, sit, and casually interact. This orientation encourages spontaneous encounters, from a passing greeting to longer conversations, which over time cultivate familiarity and trust among neighbors.

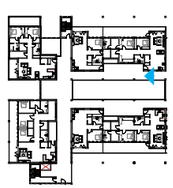


Figure 154
Visual : Apartment front porch



The Connector

The connector space, which links multiple townhouse clusters, is conceived as a double-height volume that functions as a vibrant communal hub. Designed to accommodate indoor activity regardless of season, this zone can serve as an area for children's play and active engagement. Its spatial configuration intentionally encourages more energetic uses, providing a welcoming environment for noise, movement, and social gathering among residents of all ages.

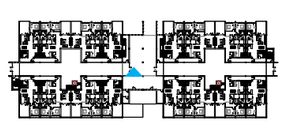


Figure 155
Visual : The connector Space



Townhouse Cluster Interior Walkway

The interior walkway within the townhouse cluster serves as the primary organizational spine of the project. All communal spaces, including areas for social engagement, dining, and recreation, are deliberately oriented to branch off from this central circulation axis. This design strategy creates a cohesive spatial framework that supports both connectivity and accessibility while reinforcing the cluster's sense of community.

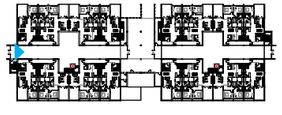


Figure 156
Visual : Townhouse cluster Interior Walkway



Apartment Block Interior Walkway

Within the apartment building, the interior walkway is integrated with the main atrium, from which individual units are setback to form inward-facing front porch areas. This configuration establishes a welcoming transition between private and communal realms, while simultaneously creating a barrier-free route to the stairways and other vertical circulation elements.



Figure 157
Visual : Apartment Block Interior Walkway

Retail Front

A walkable street scape is designed to maximize site permeability, providing uninterrupted, direct pedestrian routes from one point to another. Thoughtful spatial organization and visual connection also allow users to glimpse the courtyard beyond, inviting exploration and interaction with shared open spaces.

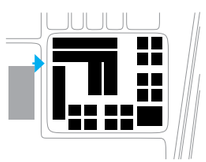


Figure 158
Visual : Exterior Retail Front

Communal Gardens

The communal garden acts as vital connectors between existing homes and the adjacent playground, fostering interaction across generations and neighborhood boundaries. These shared green spaces promote intergenerational and inter-neighborhood activity, encouraging residents to participate in collective gardening and recreation.

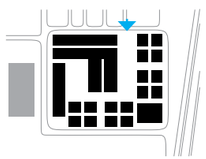
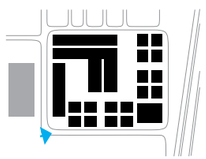


Figure 159
Visual : Exterior Community Garden

Townhouse Cluster Exterior

The cluster of townhouses is strategically situated adjacent to both the train station and the parking lot, thereby maximizing transit accessibility and convenience for residents. This locational choice not only supports a higher concentration of users benefiting from direct access to public transportation, but also reinforces the area's role as a transit-oriented community node.



▲ Figure 160
Visual : Exterior Townhouse clusters

Townhouse Cluster Exterior

The cluster of townhouses oriented to directly face the central plaza courtyard. In its winter setting, the pergola structures host fireplaces, transforming the space into a place of peace and contemplation while remaining an active point of engagement for the surrounding neighborhood.

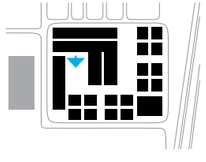


Figure 161
Visual : Exterior Townhouse clusters from the courtyard

Plaza Courtyard

The plaza functions as an integral component of the public realm, designed to accommodate a diverse range of events and activities throughout the year. As depicted in accompanying visuals, this space exhibits significant versatility, transforming into a Sunday market during warmer seasons. Such mixed-use programming enhances the vibrancy and inclusivity of the plaza, supporting community engagement, recreation, and seasonal adaptability.

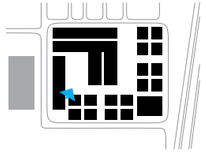


Figure 162
Visual : Plaza Courtyard

DESIGN OVERVIEW

This proposal for a contemporary urban village is organized around three core principles—home, community, and infrastructure—which collectively shape its spatial and social design framework. These principles are informed by comparative research on Blue Zones and their potential adaptation within a suburban context. In this setting, cultural values emphasizing independence and personal autonomy remain central, yet they are carefully balanced with design strategies that foster interdependence, social cohesion, and health-promoting environments. By integrating these principles holistically, the project aims to support successful aging-in-place across diverse stages of life.

Home: Enabling Multi-Generational Living

The design begins with unit typologies that accommodate multi-generational living. Townhouse clusters are developed on a modular arrangement that combines one-, two-, and four-bedroom units around an interior atrium. This spatial strategy provides independent dwelling spaces while maintaining inter-unit visual and physical connections. Building upon the townhouse model, an apartment block extends this typological framework at a higher density. One- to three-bedroom units are aggregated and interlinked to encourage flexible patterns of occupation, allowing households to reorganize as family structures evolve over time. In both typologies, the goal is adaptability across the life course: units can support young families, accommodate aging residents, and facilitate fluid intergenerational arrangements.

Community: Cultivating Social Infrastructure

The second principle acknowledges that successful aging is not secured solely by familial networks but also by a broader system of social relations. The research highlights the importance of both kinship ties and external community interactions in mitigating social isolation. Circulation spaces are conceived not merely as transitional elements but as social corridors. The townhouse atrium, for instance, is dimensioned to accommodate movement and informal gathering, transforming circulation into an instrument of social connectivity. The connector building physically and symbolically links the townhouse clusters to the apartment block, ensuring continuity of community life. Complementing these are purpose-built common facilities—including shared kitchens, communal laundry areas, and multipurpose playrooms—that anchor routine interaction. Together, these architectural interventions establish a layered community infrastructure where intergenerational exchange becomes both natural and frequent.

Infrastructure: Integrating with the Urban Fabric

Finally, the principle of infrastructure situates the proposal within its metropolitan context. The selection of the Aldershot GO Station site responds to the imperative of reducing car dependency through the provision of reliable regional transit. Infrastructural integration ensures that residents maintain access to broader economic, cultural, and health services, thereby extending their autonomy within a metropolitan framework. At the neighborhood scale, walkability is reinforced through a carefully programmed ground plane. Primary public spaces include outdoor plazas, pedestrian corridors, sports facilities, and event areas that facilitate both day-to-day activity and periodic gatherings. Proximity to essential services—including groceries, pharmacies, childcare, and retail—further enables residents to meet their daily needs without reliance on automobiles. Moreover, by inviting participation from surrounding neighborhoods of single-family homes and high-density developments, the project leverages infrastructural and spatial resources to foster cross-community interaction.

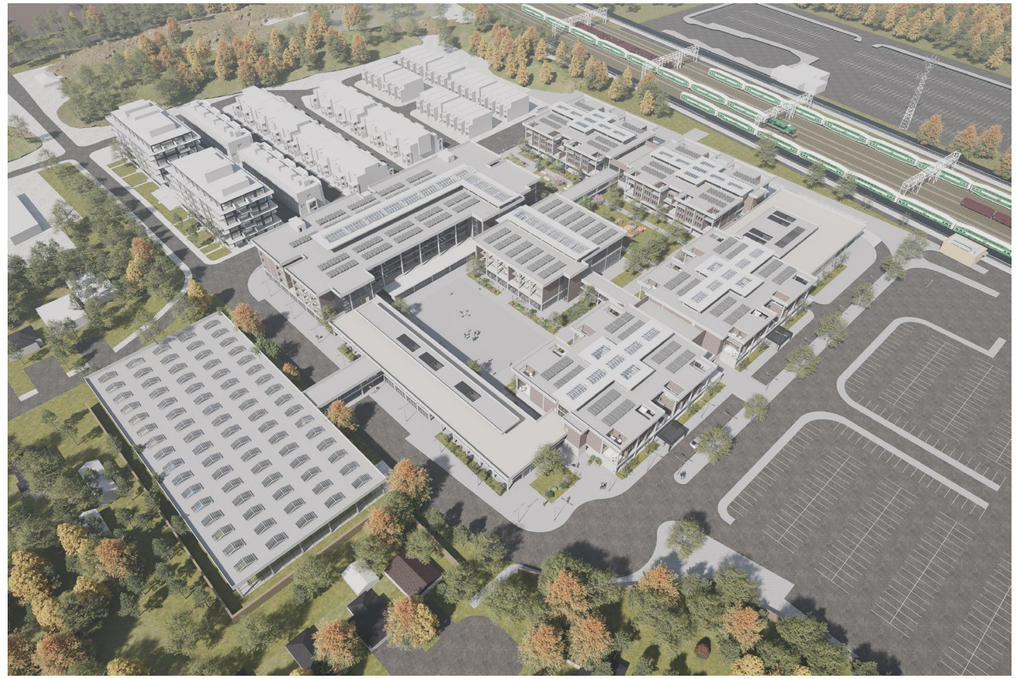


Figure 163
Visual : Ariel View

GROUND FLOOR PLAN OPTION

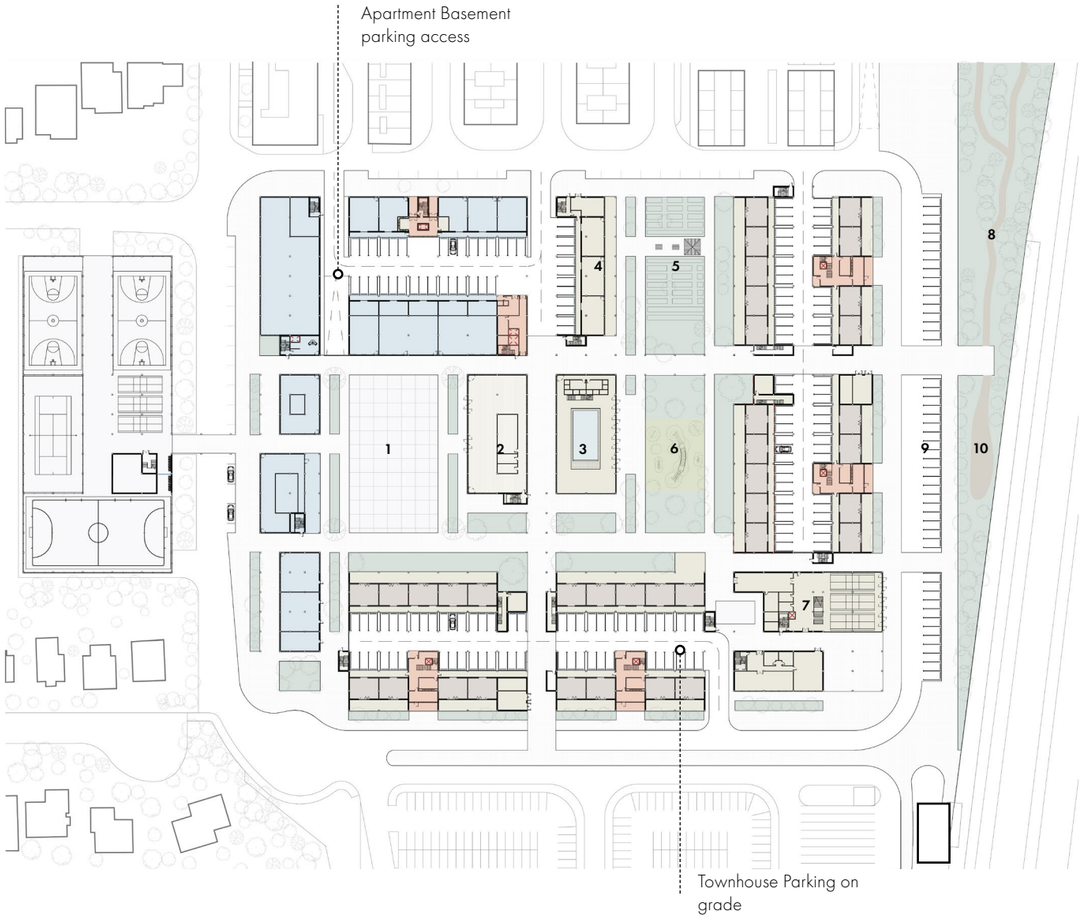


Figure 164
Ground floor plan
Option 1

This ground floor plan option proposes relocating the level 2 of the townhouse cluster's on-grade and moving the parking to the basement level. By doing so, the interior walkway on the ground floor allows the connector building and the common house to integrate more fully into the public realm originally envisioned at this level. This reconfiguration enables the communal spaces to open seamlessly to the outdoors, creating a fluid transition between indoor and outdoor environments—similar to the spatial qualities observed in Blue Zone communities.

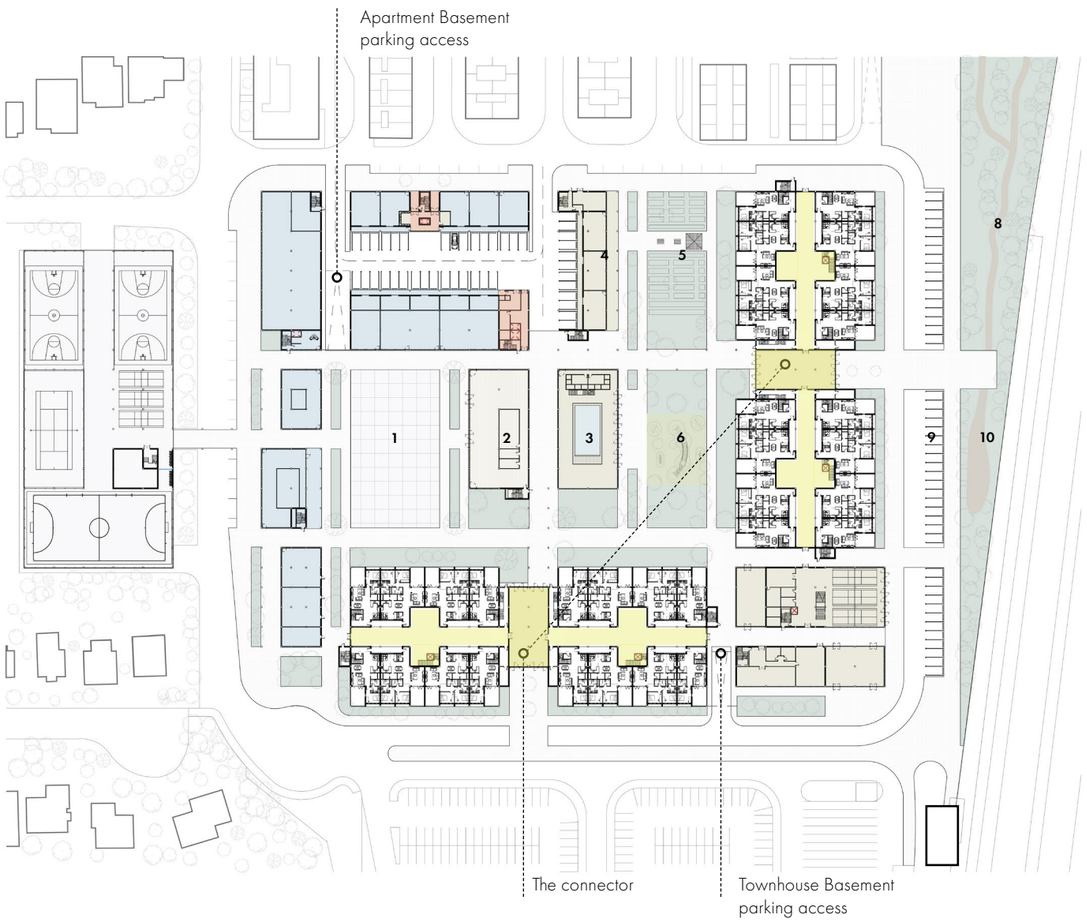


Figure 165
Ground floor plan
Option 2

1. Plaza
2. Multi purpose Hall
3. Community Pool
4. Community Clinic
5. Community Garden
6. Children's Play Area
7. Common House
8. Walking Trail
9. Additional Parking
10. Dog Park

The Connector (re-imagined)

This iteration of the connector space explores its potential at the ground level, integrating semi-private areas as extensions of the public realm. While still linking the townhouse clusters, the space is conceived as a double-height volume that acts as a vibrant communal hub. Designed to support year-round activity, it provides an area for children's play and active engagement. Its spatial configuration intentionally encourages lively, dynamic uses—blurring the boundaries between indoors and outdoors and fostering a welcoming environment for noise, movement, and social interaction among residents of all ages.



Figure 166
Visual : The connector Space re imagined

CONCLUSION

The starting point of this thesis was the investigation into the adverse health impacts of suburban sprawl, characterized by car dependency, limited walkability, and increasing social isolation. This problem is particularly acute among aging populations, for whom the suburban model too often fosters exclusion rather than support. Although suburban densification is frequently advanced as a remedy, in practice it tends to amplify these challenges by reinforcing car dependency and failing to foster meaningful community engagement. Against this backdrop, the central research question asked how principles of longevity observed in Blue Zone communities could be understood spatially and adapted to propose alternative suburban housing models that support aging-in-place and human well-being.

To address this question, the thesis undertakes a spatial decoding of the world's Blue Zones, regions distinguished by unusually high proportions of centenarians who maintain independence and vitality. Sardinia and Ikaria exemplify communities where purpose and social cohesion are sustained through extended family structures; Okinawa and Nicoya illustrate how low-intensity daily movement, gardening, and cultural frameworks such as ikigai and plan de vida reinforce resilience; Loma Linda demonstrates the impact of collective, faith-based practices on long-term health; while Singapore demonstrates a manufactured Blue Zone through policy interventions that enable multi-generational living, community programming, and walkable urban design. Across these examples, common spatial qualities emerge: environments that facilitate daily human connection, embed movement into daily routines, and enable individuals to pursue meaning and social belonging. This study positions longevity, understood through these spatial conditions, as a powerful metric for reorienting suburban housing design.

Building on this analysis, the thesis undertook a critical examination of precedent projects such as the Windsong Cohousing Community in British Columbia and the Vindmøllebakken Project in Norway. Both communities exemplify principles of community-centered design, the strategic use of shared amenities, and collective resource stewardship. Notably, each introduces interior walkways and atriums at different scales—Windsong's glass-covered pedestrian street connects clustered townhomes and common facilities, fostering year-round social interaction, while Vindmøllebakken integrates shared circulation and multipurpose communal spaces to support vibrant daily life for residents of all ages.

These precedents serve as key architectural inspirations for the proposed design, illuminating how spatial arrangements and amenity provision can facilitate frequent, informal encounters, robust communal activities, and inclusivity across generations, the final design proposal introduces a multi generational, co-living housing typology adapted to the Canadian suburban context. The design deliberately positions itself between single-family sprawl and mid-rise typologies, offering an alternative framework that prioritizes aging-in-place through spatial interventions such as year-round interior walkways and atrium, clustered housing arrangements, ground-floor flex spaces for hobbies, these spaces can also serve as standalone one bedroom units on the courtyard side and small business units facing the street. These design features are grounded in the belief that housing must be evaluated not only by density and efficiency, but by its ability to actively foster human flourishing.

The selected site in Burlington, Ontario, underscores this proposition by embedding the project within a suburban landscape undergoing incremental densification. Situated directly adjacent to a regional transit station, the site illustrates how suburban housing can be reorganized around transit access to reduce car dependency while maintaining aspects of suburban living. This location also aligns with Burlington's ongoing efforts to reimagine its suburban expansion through transit-oriented growth, offering a replicable model of retrofitting suburban nodes into walkable, connected communities. Proximity to schools, grocery stores, healthcare, and parks ensures that residents' daily needs are met within walking distance, diminishing reliance on the private automobile. The project thus leverages existing suburban infrastructure to establish an accessible, socially oriented, and sustainable pattern of living.

At the same time, this inquiry acknowledges its limitations. Blue Zones are deeply embedded in specific cultural values, climates, and traditions that cannot be directly transposed into the Canadian suburban condition. Efforts to adapt these models must respond to Canada's cultural diversity, its household heterogeneity, and the absence of entrenched traditions of communal living. Moreover, implementation faces economic and systemic barriers. Features such as interior walkways, underground parking, and extensive shared programming elevate both construction and operational costs. Enclosed year-round circulation, for instance, imposes higher mechanical loads and energy demand, while underground parking requires excavation and structural reinforcement, significantly inflating development costs. Consequently, economic accessibility remains a central challenge, particularly for lower- and middle-income households.

Equally significant are the cultural challenges. Shared-space models, while theoretically conducive to community formation, may be experienced as intrusive within cultural settings that valorize privacy, autonomy, and the nuclear-family ideal. In suburban North America, where values of private ownership and self-sufficiency predominate, collective living may be rejected as burdensome rather than socially supportive. Thus, the proposal must contend with both economic viability and cultural reception: conditions of affordability, access, and social uptake depend not only on design but also on broader shifts in attitudes toward shared living and collective well-being.

At the same time, demographic trends suggest a growing receptivity to alternative living arrangements. Recent data indicate that 7% of Canadians now reside in multi generational households, a record figure that reflects significant shifts in family structures and lifestyle choices across the country. These arrangements are increasingly seen in metropolitan regions and among newcomer, blended, and chosen families, offering flexible support systems for care giving, companionship, and fostering stronger family bonds. The growth of multi generational households points to an evolving conception of the Canadian family home, highlighting the value of intergenerational relationships and adaptive living environments in response to changing societal needs.

By situating these findings within their potentialities and constraints, this thesis contributes to the ongoing discourse at the intersection of urban health, architecture, and community design. It advocates a shift away from purely quantitative measures of density toward the qualitative evaluation of spaces that sustain human life across generations. While the proposal cannot replicate the cultural and lifestyle intricacies of the world's Blue Zones, it demonstrates architecture's capacity to reinterpret their spatial logic in ways that encourage walkability, strengthen intergenerational connection, and support communal resilience in the Canadian suburb.

In advancing this position, the thesis calls for a paradigm shift in architectural and planning practice. Housing and neighborhood design should be understood not as passive containers of life but as active determinants of public health. A growing body of evidence demonstrates that neighborhoods which encourage movement, social connectivity, and purposeful engagement can mitigate chronic disease, reduce isolation, and improve long-term well-being. Within this light, suburban retrofits are not merely a question of density management—they are imperative interventions in the pursuit of healthier, more resilient communities.

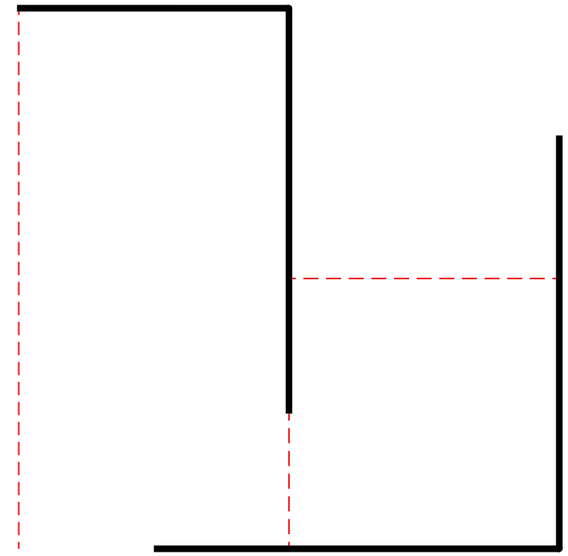
Reflection

With this thesis, I set out to create an exploration of ideas—using the unique opportunity that a thesis provides to push boundaries, challenge conventions, and venture beyond the limits of traditional practice. My aim was to move architectural thinking past questions of spatial efficiency, toward a broader investigation that encompasses cultural morphologies and the wellbeing of entire communities. Through the articulation of a pressing health issues in the urban sprawl, this work identified and investigated a research area grounded in the study of Blue Zones, engaging not only with spatial qualities but also with the underlying cultural dimensions that promote longevity and social resilience.

By systematically analyzing co-housing models as practical applications of the developed framework, the research sought to rigorously translate theoretical insights into a design proposal, testing the framework's capacity to address real-world complexities and push the boundaries. In doing so, this project actively engaged with the evolving discourse on spatial reconfiguration and community-driven housing, while remaining anchored to the core principles established by the research.

The resulting design stands as a an embodiment of the framework envisioned in this thesis, integrating findings from multiple disciplines and responding to the unique challenges of contemporary, cold-climate multigenerational living. However, upon reflection, it is clear that this work has only begun to uncover the full potential of such a framework. To fully realize and substantiate its possibilities, I recognize the need for further investigation in several areas, like a detailed analysis of social outcomes within varied co-housing typologies, particularly as they relate to intergenerational relationships and overall community wellbeing. The development of technical details and construction strategies that support sustainability, flexibility, and inclusiveness in practice.

While this thesis establishes a foundation for innovations in community-centered housing, it simultaneously uncovers new directions for future exploration and thoughtful critique. The research and design work presented here marks only the initial step in a much broader process—one that requires ongoing commitment and a willingness on my part to probe deeper into how the built environment can shape, support, or hinder aging in place, multigenerational living, and a sense of community. This investigation has begun to materialize through the redesign of the ground floor, particularly by rethinking how communal spaces relate to both the building itself and the adjacent public realm. Engaging with this spatial interface has enabled an early inquiry into the relationship between private and public spheres, suggesting avenues for even more integrated and holistic approaches in future work.



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