

**The *Nature* of Urban Infrastructure:
Re-imagining the City as a Continuous Productive Urban
Landscape**

by

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Abstract

This thesis argues that urban food systems in Canadian cities are essential to healthy communities and a healthy society: Urban agricultural landscapes should be considered a system of infrastructure. Growing food in cities is not a new concept; however, since the Industrial Age its production has moved further away from the city and, as a result, diminished the cultural landscape that food once provided to human settlements. Using a systems approach, rules and conditions develop how agriculture is integrated at the city, district, and building scales of Halifax. The landscape and built environment are intertwined on the ground, rooftops, and facades of buildings, providing different opportunities to connect socially and environmentally. This thesis does not propose ad-hoc solutions; rather, it represents a model infrastructure network where the concept of “continuously productive urban landscapes” reconnects people with the source of their food and, in doing so, with each other.

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Chapter 1: Introduction

One could argue that food is the most essential part of life, next to the water we drink and the air we breathe. Food is a fundamental element of identity, culture, and community — universally, it is our common ground. However, the presence and meaning of food in industrialized societies have diminished over the last century. With the advance of industrial agriculture and the centralization of food processing, people have become ever more disconnected from growing food or seeing it grown around them. Food also gets transported over larger and larger distances, threatening food security and increasing the use of petroleum in the growing, processing, and distribution of goods. Indeed, our current industrialized food system, through the production and processing phases alone, accounts for 58% of global food waste (Gooch et al. 2019, 5). Deforestation and unsustainable water usage are also major issues aggravated by the industrial agriculture system. Each of these concerns relates to a plethora of environmental problems (GHG emissions, climate change, land use change, air/water pollution, etc.) that pose a massive threat to our health and the health of our ecosystems and primarily stem from the consumption demands of cities (Bahadursingh n.d.).

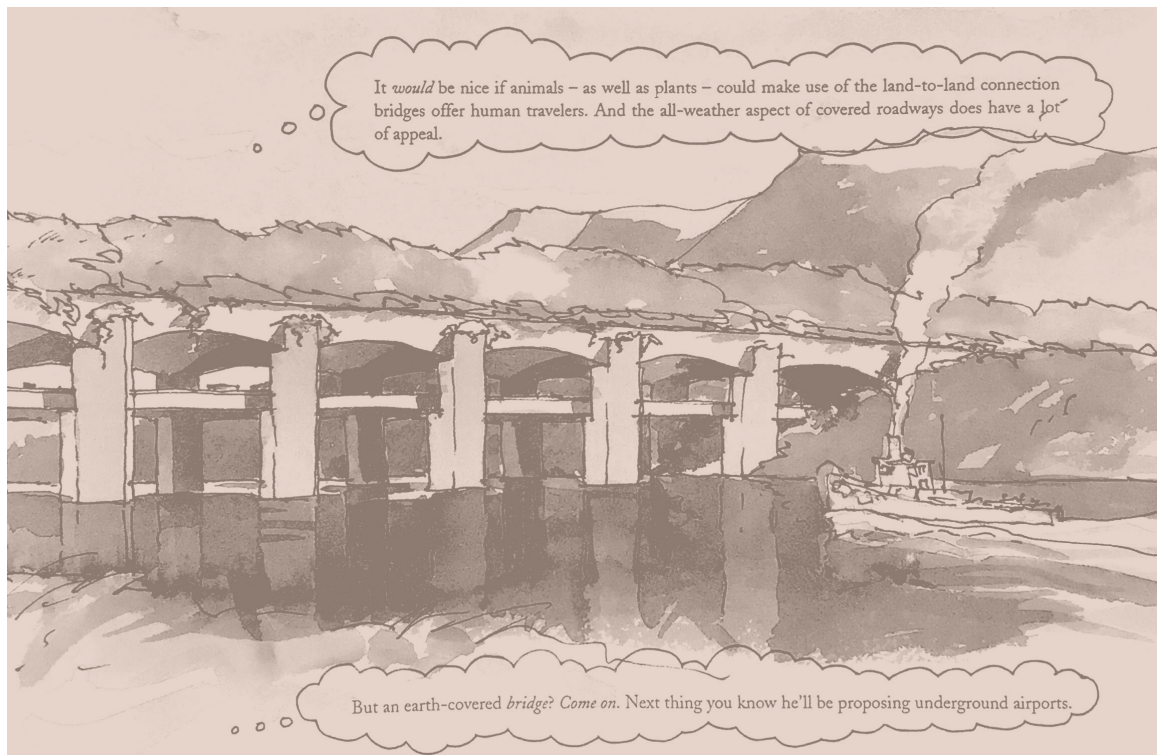


The High-line, re-imagining infrastructure as public space (Photograph by Timothy Schenck).

Cities in Canada are constructed of several layers of systems — both biological ones (people, plants, and animals) as well as inorganic ones (the built environment, watersheds, and terrain). People worldwide are facing the challenges of urbanization as ever more people migrate from rural and suburban areas into cities. Today, almost half of the world’s population lives in urban areas — a proportion that is expected to increase to more than 68% by 2050 (UN,

2018). Additionally, in the next 50 years, more food will be consumed than in the last 10,000 years combined, and 80% of that food will be eaten in cities (Precht 2019). Hence, this disconnection of the built world from the level of industrial agriculture environmental impacts should be addressed within cities. It is clear we need to find an ecological alternative to our current industrialized food system as it is a keystone in the path to achieving a sustainable industrial society (Precht 2019).

With the advance of climate change, the designs of our cities must be rethought to address both increasing urbanization and the need for cities to reduce their impact on their ecological contexts. Urban agriculture should be a central part of this effort. This thesis uses our current food system as a catalyst to rethink urban infrastructure, urban design, and urban growth.



Infra Structures, re-imagining the connection between the built and natural environment (Drawing by Malcolm Wells, 1994: 21).

This thesis argues that growing food is an essential part of urban life. So essential, in fact, that urban agricultural landscapes should be considered elements of urban design as important as streets, electric lines, water supply, sewage infrastructure, and public parks. Its departure point is to reconnect people with the source of their food and, in so doing, with each other by incorporating a system for urban agriculture in our cities.

The system aspect is important here. This thesis does not propose ad-hoc solutions. For example, people may or may not use their backyards for growing food, community groups may or may not get access to unused fields for shared gardens; and public buildings may or may not use their roofs for greenery. In this thesis, continuously productive urban landscapes are completely integrated into the neighbourhood and park systems. It represents a goal and recognizes that it may take some time for this to happen in existing and newly developed cities.

Thesis Question

Could the city be re-imagined as a continuous productive urban landscape, and could these spaces also be public spaces that strengthen a shared feeling of community?

Objective

“The *Nature* of Urban Infrastructure: Re-imagining the City as a Continuous Productive Urban Landscape” acts as a framework for re-defining the current and future development of cities. By applying the principles of André Viljoen’s concept of “continuous productive urban landscapes,” this thesis explores architecture that preserves nature while also reaping the many benefits of a productive network of

localized food culture. It aims to illustrate two things: The first is to show how to insert a network of continuously productive landscapes into an infrastructure system such as that of the Halifax Peninsula. Through mapping and case study analyses, it explores “where” and defines “how” agriculture can be integrated into an existing urban fabric. Secondly, it examines how this larger system can then be applied to a new city district: the Halifax Farmlands. The latter is the end goal, creating a systematic approach to designing neighbourhoods that are livable, community-centred, economically diverse, and ecologically resilient.



This wish image shows existing community gardens and public nodes linked to under-used lots and empty rooftops, to create a continuous system of “urban agriculture”. This illustrates the vision of integrating urban agriculture as an essential system of infrastructure, in the city of Halifax.

Chapter 2: Why Agriculture and Infrastructure

This chapter describes the relationship between urban agriculture and urban infrastructure. It defines how this new system is based upon André Viljoen's concept of "continuous productive urban landscapes." It also investigates the history of urban agriculture to understand "how" and "why" urban food growing existed in proximity to cities past and present. This analysis builds the theoretical foundation for developing the design methodology for the project.

Food Production

Food is not simply what we eat. It connects us to each other and to the natural world that sustains us. Traditionally, the practice of producing, preparing, sharing, and celebrating food has been at the centre of how people structured their lives. However, since the beginning of the industrial revolution, "what was once everyday practice has become a stranger to many cities" across the world (Bohn and Viljoen 2017, 169). In *Hungry City*, Carolyn Steel argues that food shapes not only cultural identity but influences social life and the public spaces that form our cities (2008, 152). Restoring the process and spaces for growing food in our urban environments can, therefore, enable this reconnection.

Architecture and planning integrate urban farming as a programmatic function "to bring the practice of growing, processing, and distributing food, along with nurturing vegetation, in or around urban areas" (Bahadursingh n.d.). Through implementing such a system, urban agriculture becomes "part of a network of processes aiming to sustain urban life, either directly by the produce grown or by the

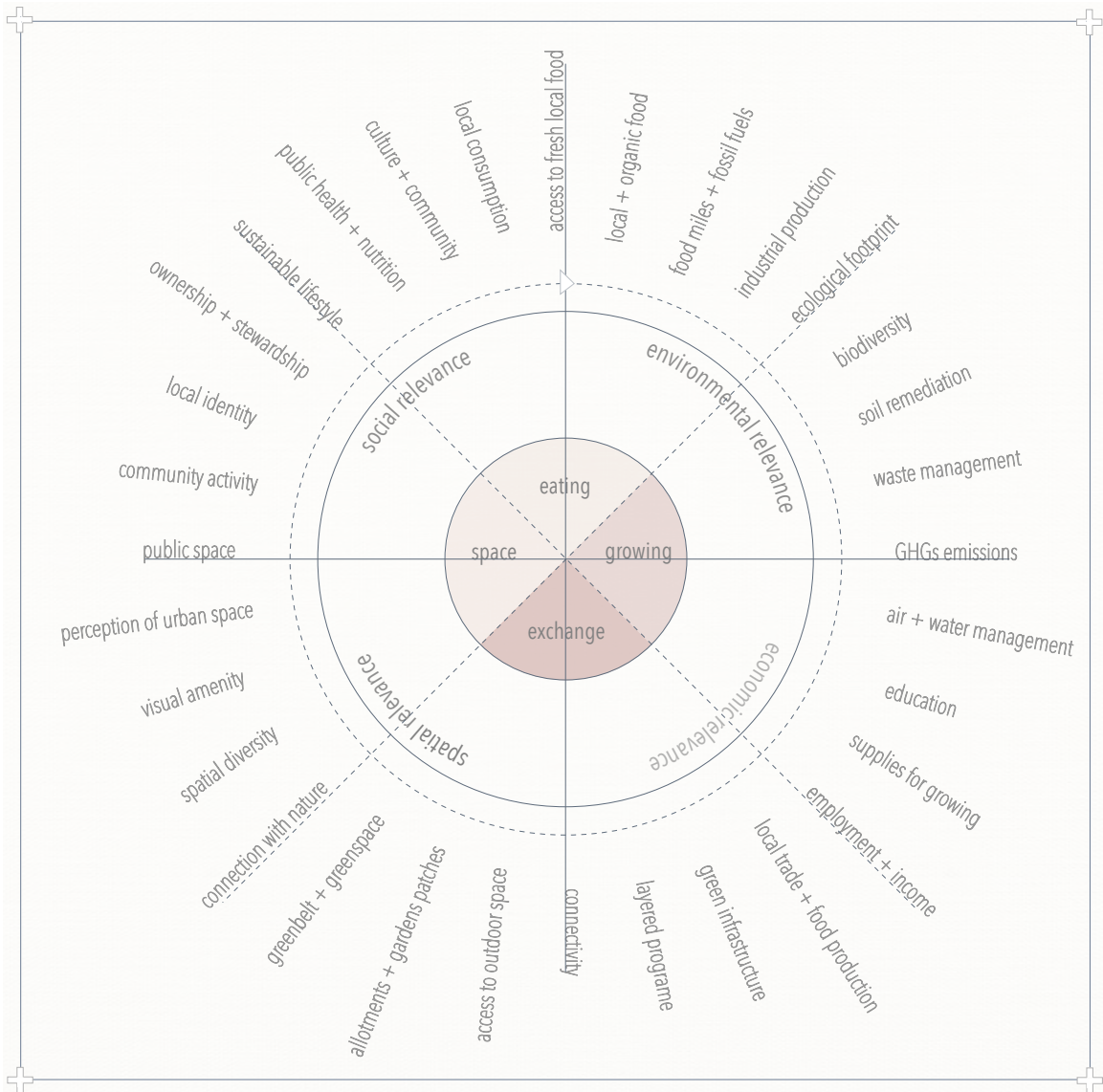
commercial [and social] exchanges it generates” (Bohn and Viljoen 2017, 177). This thesis will demonstrate how food production has been expressed in cities and show how it can be used to elevate shared public spaces throughout the city, in the form of continuous productive urban landscapes. By expanding the definition of urban infrastructure to include urban agriculture and re-establishing a place for the urban farm, architecture can regain our relationship with our local environment and foster community through the process of growing food.

Urban Infrastructure

Contemporary cities are built on a foundation of several systems — roads and transportation, water and sewage, power and light, and telecommunications. All these systems require urban infrastructure to carry these networks throughout the city: roadways for transport, pipes and treatment plants for water, and towers or satellites for radio, telephones, and the internet. In *Points + Lines*, Stan Allen discusses the “patchy” (or fragmented) nature of our cities, and how infrastructure prepares the ground for further building through its primary modes of operation:

...the division, allocation, and construction of surfaces; the provision of services to support future programs; and the establishment of networks for movement, communication, and exchange (1999, 78).

By prioritizing urban food systems as an essential and valued element of infrastructure, the approach to urban development must be entirely changed. The social, environmental, economic, and spatial qualities that urban agriculture brings to a city creates a new kind of public space that reconnects people to nature and one another.



The Urban Food System: The social, environmental, economic, and spatial qualities of integrating urban agriculture as a system of infrastructure. Each component is interconnected in a network of continuous productive urban landscapes throughout the city, creating a new type of public space: social infrastructure (Diagram adapted from: de la Cal, 2018: 330).



Making use of marginal space: South End Community Garden Transfer, Boston, MA (Boston Planning and Development Agency, 2020).

Continuous Productive Urban Landscapes (CPULs)

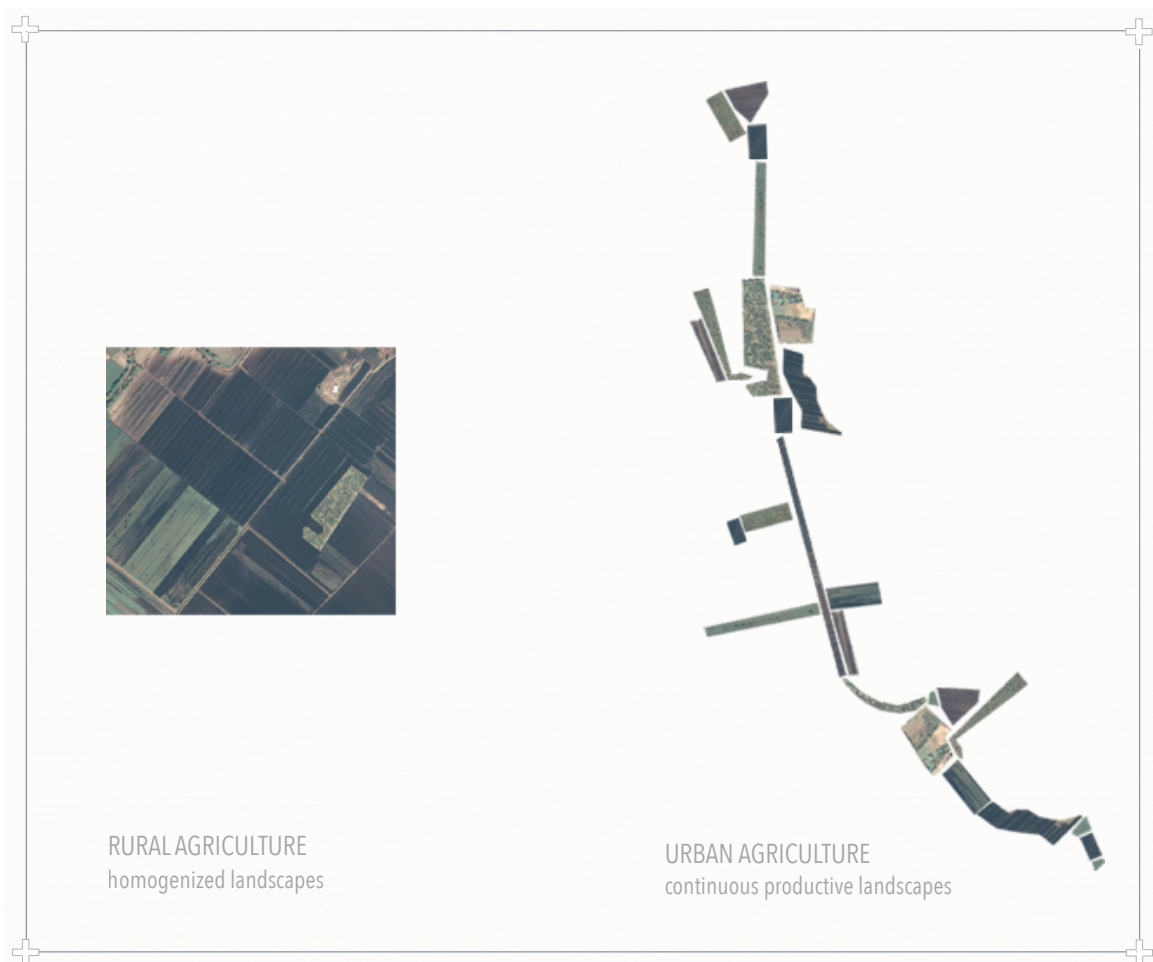
In his book, *Continuous Productive Urban Landscapes*, André Viljoen investigates the idea of urban agriculture in urban contexts as a continuously productive system. Such CPULs integrate food-growing into urban design by linking “open” and “unimproved” urban spaces with agriculture. Viljoen argues that CPULs can be integrated as a system of infrastructure within the existing urban fabric by “interweaving a multi-use landscape strategy to present and newly reclaim spaces,” thus, reconnecting our cities socially and environmentally (Viljoen 2005, 21).

Urban agriculture already exists in many ways throughout cities — in urban farms, markets, individual allotment plots, private yards, and shared community gardens. The main principles of CPULs are urban food growing,

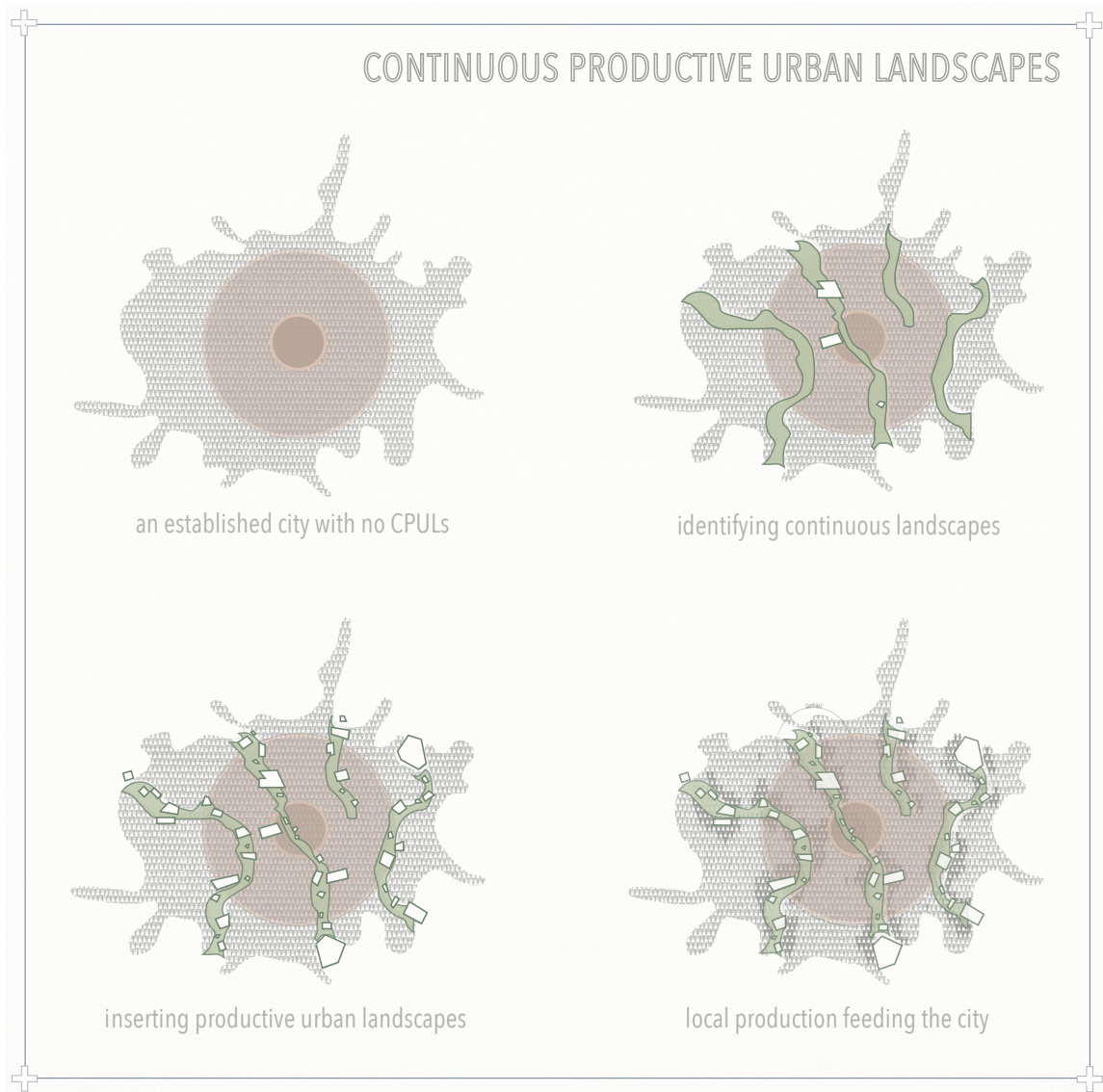


“Zug mit Schrebergarten”, train passing by community gardens: An artwork used as an 19th century German postcard (Transpress NZ-World Transport History).

local consumption, and public connectivity (Viljoen 2005, 21). CPULs transform infrastructure into shared urban agricultural space — public space used for food production. Although the concept of CPULs changes from city to city, the benefits of urban farming are universal: fresh food, local ownership, community engagement, cleaner air, and quieter cities. This is not a new concept; indeed, CPULs are essentially a modern-day adaptation of the age-old practice of growing food in urban contexts.



Shifting scale: A rural landscape of agriculture consists of vast landscapes of productive fields, homogenized under monoculture productions. While urban agriculture consists of a variety of continuous productive landscapes that feed throughout the city, interweaving in and around the built environment; blurring the boundaries between built and natural, urban and rural.



Diagrams adapted from André Viljoen's *Continuous Productive Urban Landscapes*, showing a general example of how to integrate CPULs into a city's urban fabric. This process involves beginning with a city that has no productive landscapes; identifying and linking unused lots or potential paths for integration; inserting plots of agriculture; and finally, furnishing the city with local produce. One of the outcomes of this process is a new type of food-oriented social infrastructure. (2005, 13).

Urban Agriculture



Victory gardens during the war, NYC, 1942 (Library of Congress).

Next, it is useful to look at case studies of post-industrial urban agriculture interventions to understand their history. Urban agriculture often flourished in times of crisis or resources scarcity to weather the effects of war, or economic and political turmoil. The integration of urban agriculture contributed to the rebuilding of communities and the overcoming of such hardships.

Victory Gardens

During war-time, North American's began to grow food in cities as a patriotic act, to ensure farm produce could be mobilized for the war effort, and to provide variety in rationed diets (Mosby, 2015). Such "victory gardens" were planted on both public and private lands. They improved food security and contributed to self-reliance, personal empowerment, moral responsibility, and stronger communities (Lukac 2017, 15). People reconnected with their neighbours in shared urban space, learned from one another, and cultivated a reverence for nature. Urban agriculture provided places to connect with both the land and each other during times of uncertainty and hardship.



Sheep grazing on the South Lawn of the White House, c.1918 (Library of Congress).

New Frankfurt

Following WWI, like many German cities, Frankfurt faced a serious housing crisis. In 1926, architect Ernst May and landscape architect Leberecht Migge developed models for integrating food gardens into affordable housing strategies, which were influenced by the "garden city" movement (Bohn and Viljoen 2017, 173). By law, Germany instated the right for people to have access to a roof over their heads and fresh food. Following these regulations, May and Migge



Rowhouses with backyard gardens in Praunheim II, New Frankfurt, 1928 (Henderson, 2013: 123).

developed “New Frankfurt” and the city became known for its massive housing program, which offered an accessible design for the working-class community: “Every unit had its garden, whether it was directly adjacent to a ground-floor house, or grouped in a field of allotment gardens in front of the housing blocks” (Bonnemaïson and Macy 2016, 93). This design created spaces for social interaction and local ownership.

Still thriving today, New Frankfurt exemplifies the success of Migge’s vision for “the ‘right to green’ as a necessary component of the self-sufficient city, which could produce enough food within its limits for its inhabitants” (Bonnemaïson and Macy 2016, 94). This demonstrates the potential of integrating a system of agriculture within our urban environments. By integrating urban agriculture as public space, it then becomes the system for facilitating communal exchange and sharing through the act of growing food.



The garden colony at Römerstadt, New Frankfurt, 1928.
Allotments by Migge; cabins by Lihotzky (Henderson 2013: 270).

Havana, Cuba



Community food production, Vivero Alamar, Cuba (Film still by Brockmann, 2015).

Contemporary Havana presents an unusually thorough and comprehensive example of urban agriculture today. Developed out of necessity, after the collapse of the Soviet Union decimated Cuba's export-based economy, urban agriculture in Cuba's cities developed rapidly to address a desperate need for food. Cuba suffered a loss of 80% of its international trade and all access to imported fuel, destroying the country's economy and livelihood (Viljoen 2015, 137). Their food production was dependent on fossil fuel imports to sustain their industrial agriculture model, which included machinery, fertilizer, and pesticides. "The country was thrown into a food security crisis" (Lukac 2017, 13). The people living in Cuba adapted to their situation by turning to urban agriculture, a production systems that was based on organic practices, natural methods, and regeneration, rather than the intensive monocultures of industrial agriculture (Lukac 2017, 13).

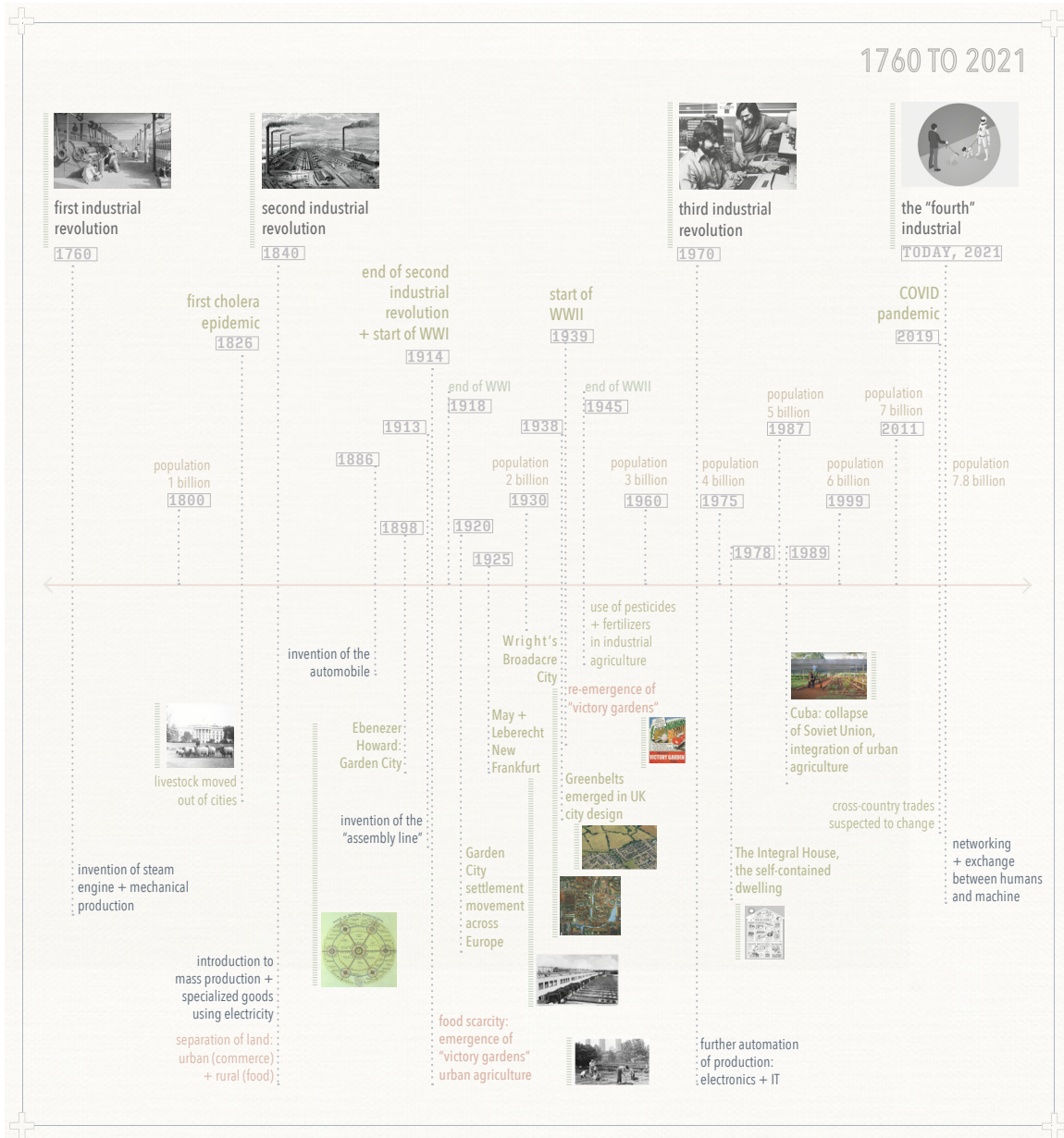


Urban Medicinal Plant Garden, Cuba (Image by: Down the Garden Path, 2010).

Havana reimagined its urban fabric as a landscape for growing food. Under-utilized or empty lots were connected into a network of continuous productive urban landscapes of agriculture. These vocabulary of green and agricultural spaces in this network included: "organoponicos" (greenhouse gardens using soil enriched by crop residues, household wastes, and animal manure), "intensive gardens" (planted directly in the ground soil), "semi-protected gardens" (under awnings using soil enriched with vermicompost), peri-urban farms, family parcels, and patios (Viljoen 2015,139, 191, and 193).

Although born of necessity, Havana's integration of urban agriculture in its dense and populated historic city is evidence

that continuously productive landscapes can be developed as urban infrastructure. Urban agriculture provided Cubans an opportunity to judge “their spatial characteristics and relationships with the built environment and people” (Bohn



This timeline shows the growth of industrial revolutions and technological advancements, in conjunction with population growth and periods of war, or economic and political turmoil. This timeline reveals that urban agriculture often resulted in times of crisis or resource scarcity to help weather the hardship.

and Viljoen 2009, 54). Through community resilience, environmental stewardship, and local production, the people of Havana were able to provide for themselves and each other.

These few examples show that urban agriculture has a long history which has continued, in isolated instances, in industrialized cities under unique circumstances. Communities grow food where they must in times of crisis or resource scarcity. These examples of urban food systems exemplify the cultural landscapes urban agriculture can generate in cities, both socially and environmentally. They also suggested ways that agriculture has been at the core of human civilization since our existence — determining space, landscapes, interactions, and structuring our environments. Continuous productive urban landscapes can re-establish this agricultural foundation within the development of current and future city infrastructure. The next chapter will apply these theoretical findings to develop the design methodology.

Chapter 3: Design Methodology

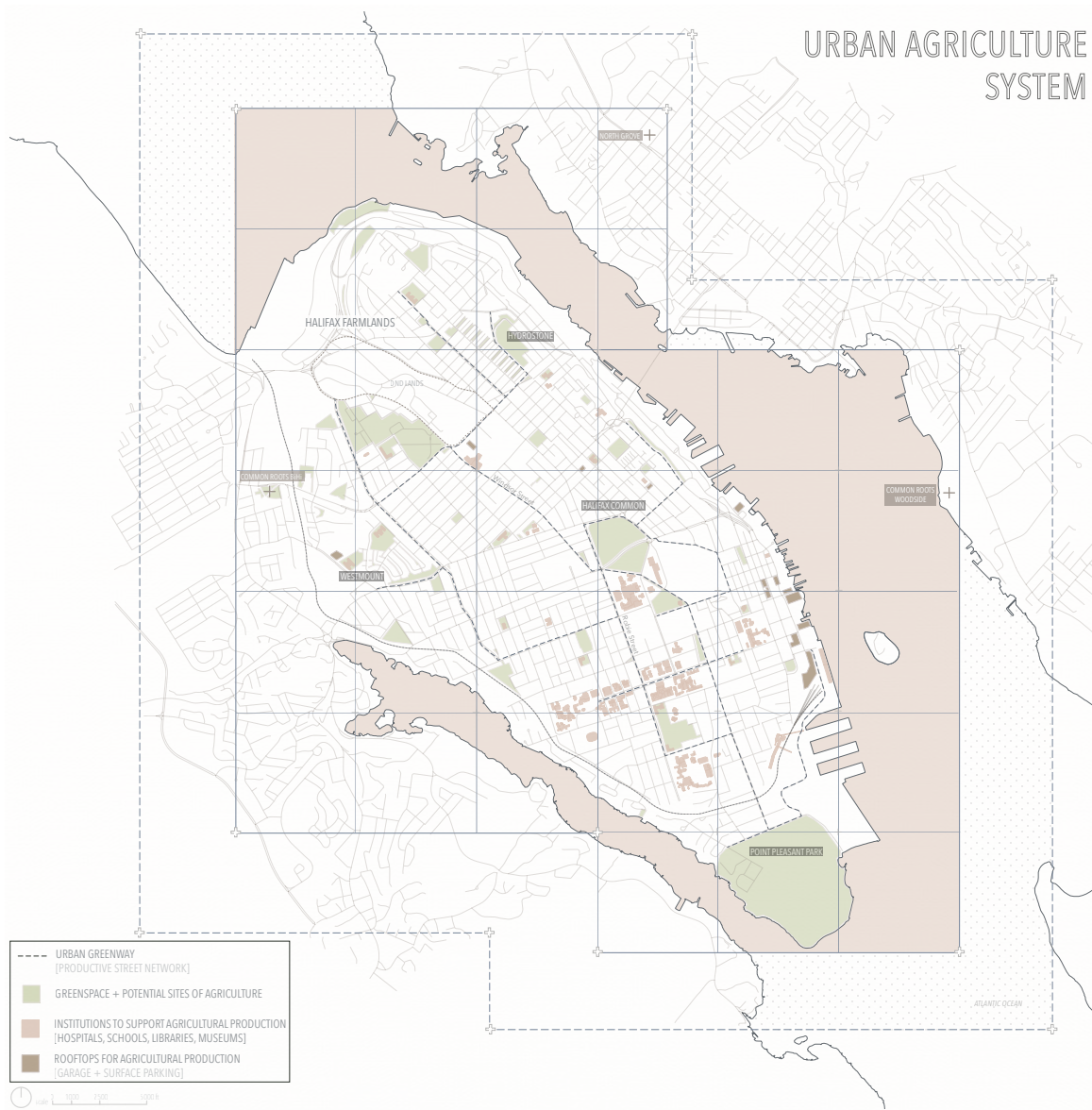
The following chapter draws on the previous urban agriculture case studies and the principles of Viljoen's concept of "continuous productive urban landscapes" to develop the design methodology. It begins with mapping the city (Halifax) to identify existing sites of urban food growing and potential sites for agriculture integration, which form the basis to lay out the CPULs. It then looks at redevelopment patterns of community planning studies to help organize the project for integrating the CPULs at the neighbourhood and building scales. More specifically, the design methodology outlines:

1. at the regional scale, strategies for how a network of CPULs can be integrated in a municipality;
2. at the neighbourhood scale, strategies for designing a new district centred around the concept of CPULs; and finally,
3. at the building and site scale, what kind of typologies promote CPULs — in public spaces (such as yards, private and communal gardens, and farms), and in buildings (houses, apartments, commercial and light industrial, and community facilities).

While this thesis focuses on the Halifax Peninsula, it is intended to be used as a model for re-imagining CPUL infrastructure systems in any city. The chapter concludes that designed strategically, urban agriculture can create a new type of public space that is critical for people to feel a stronger connection and appreciation for nature, and its role in our sustenance while also operating as social infrastructure for the community.

Mapping: Urban Agriculture System

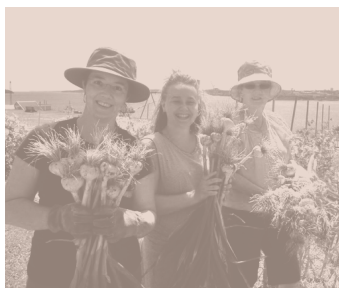
This investigation begins by looking at the whole Halifax Peninsula, and asking: where could urban agriculture most effectively be integrated into the existing city fabric?



The proposed urban agriculture system for the Halifax Peninsula: connecting existing forms of agriculture (ad-hoc community gardens and greenhouses) with potential sites for integration (yards, road mediums, green-space, public parks, community facilities, and institutions) (data from GIS database: Halifax Regional Municipality 2020).



The network integrates with and stems from the historic greensward of the city, which anchors the Halifax Common and Point Pleasant Park (Data retrieved from GIS database: Halifax Regional Municipality 2020).



Common Roots community farm in Woodside (Common Roots Urban Farm, 2017).



Dartmouth family centre, North Grove community garden (The North Grove, 2018).

Community gardens are an important component of CPULs both for their productive capacity and their ability to strengthen communities. The research found that the Halifax Regional Municipality (HRM) has many ad-hoc community gardens, including Common Roots Urban Farm and the North Grove. These ground-up initiatives generally have community plots, small greenhouses, and are supported by community engagement and volunteer activities. The North Grove also receives financial support from larger organizations like the Nova Scotia Health Authority and Community Food Centres Canada. Both Common Roots Urban Farm and the North Grove host farmers markets on their property and the North Grove also features a community kitchen. These places serve as community hubs where people come together to grow, cook, learn, and share, while forming supportive relationships among families and community members (The North Grove, 2021).

The documentary film *Six Primrose* (2018) describes community members' personal connections to the North Grove community garden. One participant, a recent immigrant to Canada from Syria, recounted his experience of finding a sense of community and place through shared gardening. Other members of North Grove — people with low incomes, single-parents, or retired people who have moved from communities they have lived in for years — all felt they too found community through collective gardening and gained a better appreciation for the food they were eating. It was through the act of growing, cooking, and sharing that people were able to engage easily with one another and share their knowledge across cultures — strengthening community connections.

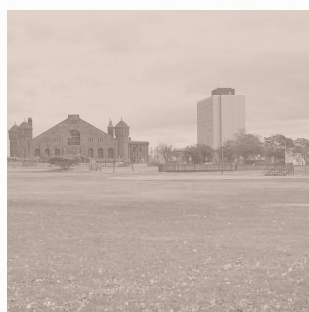
The HRM is full of sites for community gardening: parks and under-used or vacant lots can be identified as spaces for collective plots, while streets with large medians or boulevards could support urban orchards. Institutions too, such as schools, libraries, or hospitals, could support and benefit from an agricultural program. In sum, there is great potential for integrating a network of CPULs across the city.

Many of the underused green sites identified for use in the CPUL network are scattered through the municipality. But there are two large green areas on the peninsula — Point Pleasant Park on its tip, and the Halifax Common in the heart of the city, which anchor a historic greensward (an expanse of grass — historically used for pastureland — in an urban setting). This landscape has been largely developed over the years with hospital and public institutions. This thesis re-asserts this greensward by incorporating a system of CPULs that connects to these different sites throughout the city. It proposes to extend it northwards, up Robie and Windsor Street to the Department of National Defense (DND) lands. Currently up for redevelopment, the DND lands offer an excellent opportunity for a new urban district. It has long been occupied by the DND and is, therefore, less developed

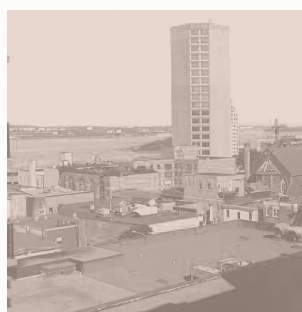


The Halifax Commons and Point Pleasant Park are two of Halifax's major community nodes for active leisure, sports, and gathering (Photos by: (left) Curtis Watson, 2018, and (right) Discover Halifax, 2021).

POTENTIAL + EXISTING SITES



FIELDS + PARKS



ROOFTOPS



VACANT LOTS



UNUSED GREEN-SPACE



BOULEVARDS



SIDEWALKS



COMMUNITY GARDENS



LOCAL MARKETS

Highlighting potential sites for urban agricultural integration and existing sites of local food production throughout the city of Halifax.

than the central or southern zones of the city and even less so than the growing suburbs on the urban periphery. These lands will be used as the site for investigating the proposed city district of the Halifax Farmlands.

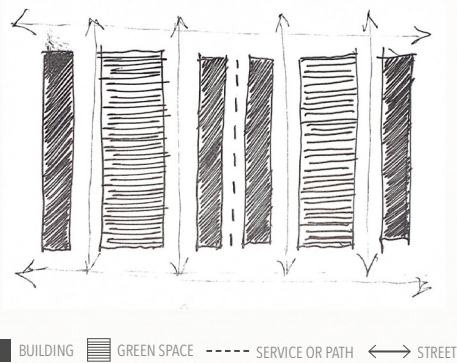
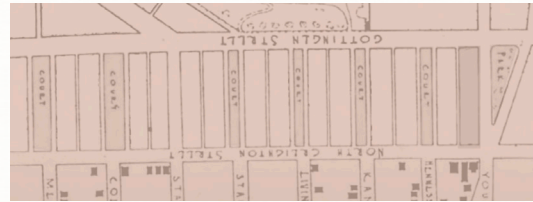
Case Studies: Development Patterns

Next, we look at how to set up a pattern for an urban district that is based on integrating a system of urban agriculture by looking at successful redevelopments in North American cities. The research highlights two of Halifax's best-known planned neighbourhoods: the Hydrostone and Westmount. Both developments are close to the project's site and are analyzed here for their success alongside San Diego's exemplary district, Liberty Station, and the, previously-mentioned, New Frankfurt housing development, in Germany. These case studies act as a guide to develop the parameters and conditions of both landscape and architectural form-making for the project.

The Hydrostone

Following the explosion in 1917, which destroyed the entire north end of the city, including more than 1,600 homes, Halifax faced a major housing shortage (History.com Editors 2019). Planners Thomas Adams and George Ross were commissioned to design a new urban district that was both affordable and socially connected for the displaced members of the community. Developed with a row house typology, central boulevards, and service lanes at the rear of buildings, people were able to connect easily with one another and with nature through the public and private yards.

THE HYDROSTONE



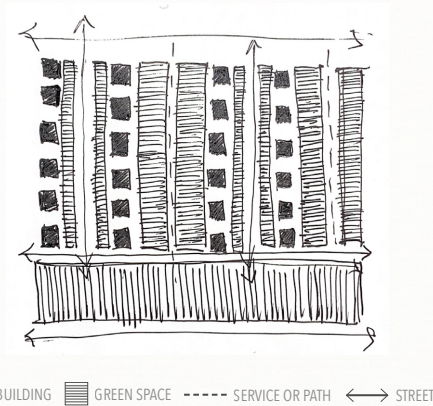
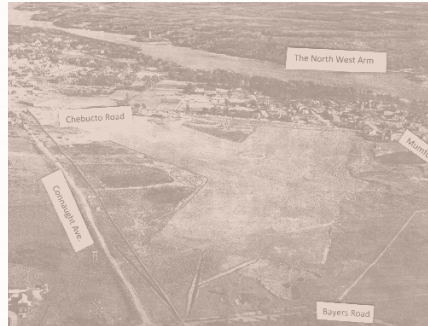
NORTH END DISTRICT - richmond area
 following the halifax explosion (1917) the city faced a housing shortage; canada's first assisted housing project -19th century; designed by planners thomas adams + george ross; the hydrostone was modelled after the garden city movement - to be a self-sustained community; affordable for the working class; 2.5 storey row house typology, central boulevards + rear service lanes; designed with safe materiality - hydrostone is stronger than wood + fire resistant; large beautified green space - english style garden suburbs; local market strip with living essentials + shops to service the neighbourhood;

Case study analysis of successful developments: the Hydrostone.

Westmount Subdivision

Previously the lands of the municipal airport, the grounds were needed for housing after the war and were turned over to the city of Halifax for redevelopment in the 1940s (Groff 2019). Similar to the Hydrostone, Westmount's design reflects strong social and environmental connections. Although this development was designed with detached single-family dwellings instead of townhouses, there is clear

WESTMOUNT SUBDIVISION

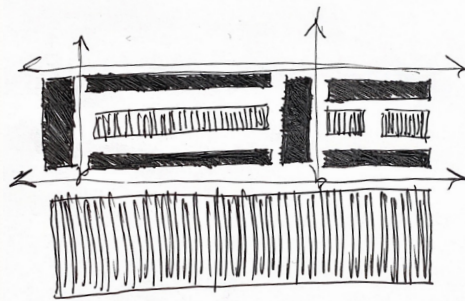


POST WAR HALIFAX - *west end district*
 land was previously used for halifax municipal airport; post wwii land turned over to city of halifax; 1948 housing development built - 305 detached homes + public park space; influenced by radburn development in new jersey which was inspired by the garden city movement - social housing + shared green space; houses face secondary streets with backyards facing a shared greenway that connects to saunders park; built adjacent to halifax shopping district for living amenities;

Case study analysis of successful developments: Westmount.

intent for integrating both private and shared green-spaces throughout the neighbourhood. The houses front onto secondary streets with backyards facing a shared greenway that connects to a larger public park. This arrangement elevates the importance of connecting in shared space and with nature.

LIBERTY STATION



BUILDING
 GREEN SPACE
 SERVICE OR PATH
 STREET

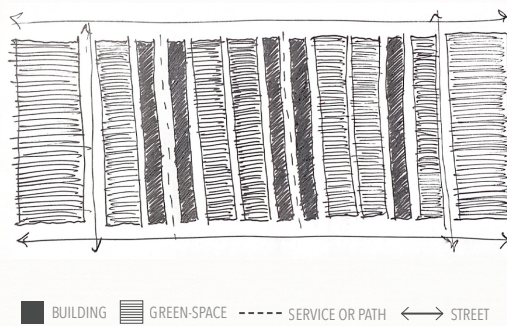
POST NAVAL BASE - san diego
 former naval training center - closed 1993;
 land + buildings repurposed into multi-use
 development - 361 acres; became
 the art district of san diego; central spine
 of green space and park adjacent to
 development along the water channel;
 living amenities and public restaurants,
 shops + attractions found within the
 development; 500 homes used for military
 with the remaining residential space for
 residents of san diego; naval training to
 arts training - radically changed to support
 the community's art + history;

Case study analysis of successful developments: Liberty Station.

Liberty Station

Following the closure of the navel base in 1993, the land and buildings of Liberty Station were repurposed into a multi-use development containing 361 acres of land (Liberty Station 2021). The development offers a large amount of shared public park space, as well as individual and collective garden plots. Still thriving as a main social hub today, this reclaimed

NEW FRANKFURT



POST WAR GERMANY - *frankfurt*
 following the first world war the city faced a housing shortage; urban development programme to provide over 10,000 dwellings in ten new housing estates on the periphery of the city; still exists today; designed by ernst may + leberecht migge; influenced by the garden city movement - progressive social housing + food self-sufficiency; affordable for the working class; integrating agriculture as an urban system within the housing development; individual family garden parcels and communal plots for residents to tend to + engage in a shared space;

Case study analysis of successful developments: New Frankfurt.

development is the city's destination for housing, retail, arts, recreation, and community green-space.

New Frankfurt

As mentioned previously, New Frankfurt is a major housing development that provides over 10,000 homes to the working-class of post-war Germany. Conceived as the "garden city," this project integrates agriculture as an urban

system within the housing development itself. It provides local ownership and community engagement in both individual and shared garden spaces — emphasizing food as an essential component and urban system to a healthy, connected community.

These four local and international developments exemplify the fundamental principles of shared public space in nature. The Halifax Farmlands proposal applies the concepts of shared urban park as greenway as well as the use of individual and collective gardens as part of public space. These concepts were derived from the New Frankfurt and Liberty Station case studies. Westmount subdivision exemplifies conforming to the neighbouring urban fabric (with detached homes and private yards) while also incorporating shared green-space. The Farmlands district abstracts this idea of incorporating an urban greenway that connects to a larger park by integrating leisure green-space in buffer zones between buildings. From the Hydrostone, the Farmlands directly reproduces the strategy of dwellings along large central boulevards, by continuing the city grid and pattern typology in the lower part of the district. Each of these case studies inform different conditions for developing the new district's urban strategy.

Rules and Conditions

The strategies taken from these case study patterns develop a set of rules for the proposed urban greenway and district to follow. These rules are set out in the form of a continuous productive landscape of agriculture, branching off and connecting to different garden and building typologies. The following three rules are set out for this integration:

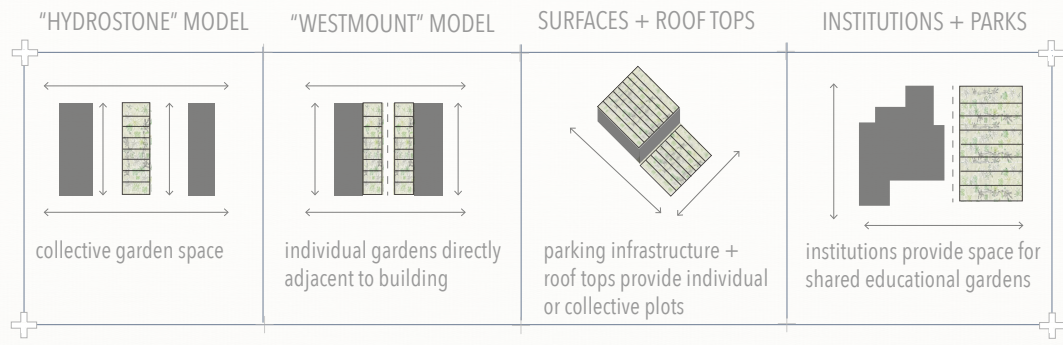
1. **No building without a garden**, is abstracted from New Frankfurt and Liberty station, where residents have access to both individual and collective garden plots for growing food;
2. **Surfaces and fields integrate agriculture**: green-space is intentionally integrated in each of these developments, but more specifically the Hydrostone typology which offers a shared central boulevard that can be re-imagined as space for collective gardening; and finally,
3. **Public gardens are for collective use, while private gardens are for individual use**, is taken from Westmount, where there are clear distinctions and thresholds between the public and private yards.

These rules develop this new ecological infrastructure, where the natural landscape and built environment are intertwined throughout the city and district. At the building scale, roof and facade typologies are designed to incorporate the CPULs with the built form. The goal of implementing this system of CPULs is to regenerate the existing urban fabric and develop new typologies that reconnect our social and environmental landscapes. Alongside this system integration, this thesis also acknowledges the value of working within the municipality's planning framework and references these strategies when analyzing the city.

SET OF CONDITIONS FOR DEVELOPMENT IN HALIFAX

- *generalization of current development patterns
- *gardens are city or personally maintained

THE CONDITIONS



RULE 1: NO BUILDING WITHOUT A GARDEN

RULE 2: SURFACES + FIELDS INTEGRATE AGRICULTURE

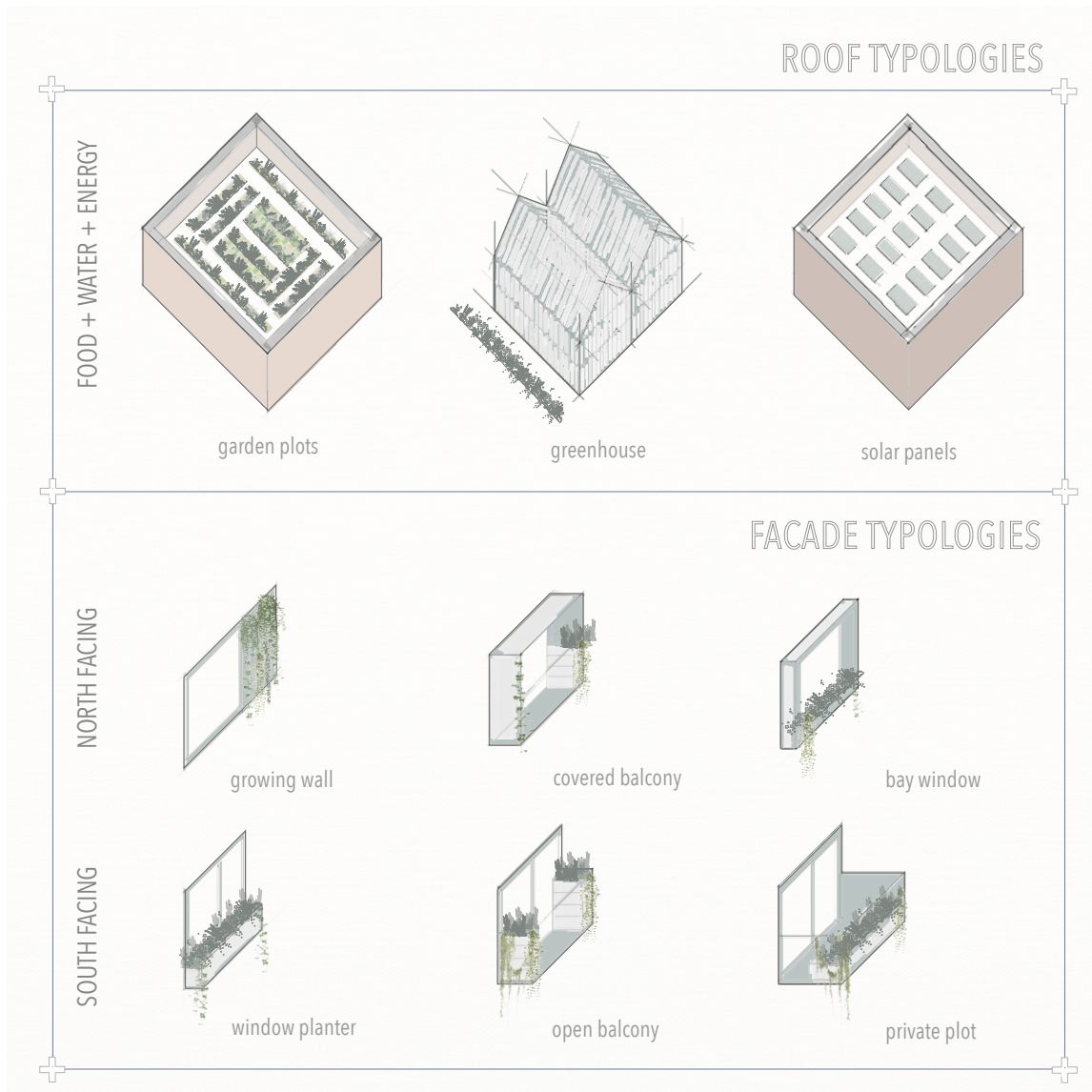
RULE 3: PUBLIC GARDENS = COLLECTIVE, PRIVATE GARDENS = INDIVIDUAL

- *surfaces - roof tops, unused lots, street parking
- *fields - green space, medians, yards

THE RULES



The conditions and rules for the project are set out for integration. The system of agriculture is integrated from a regional scale down to the detail of the building. Connectivity is represented at various scales from circulation, energy, the landscape, and community. The rules are developed by this notion of CPULs coexisting with the built form. These rules are exemplified generally on the city scale and then developed in greater detail for the scale of the building.



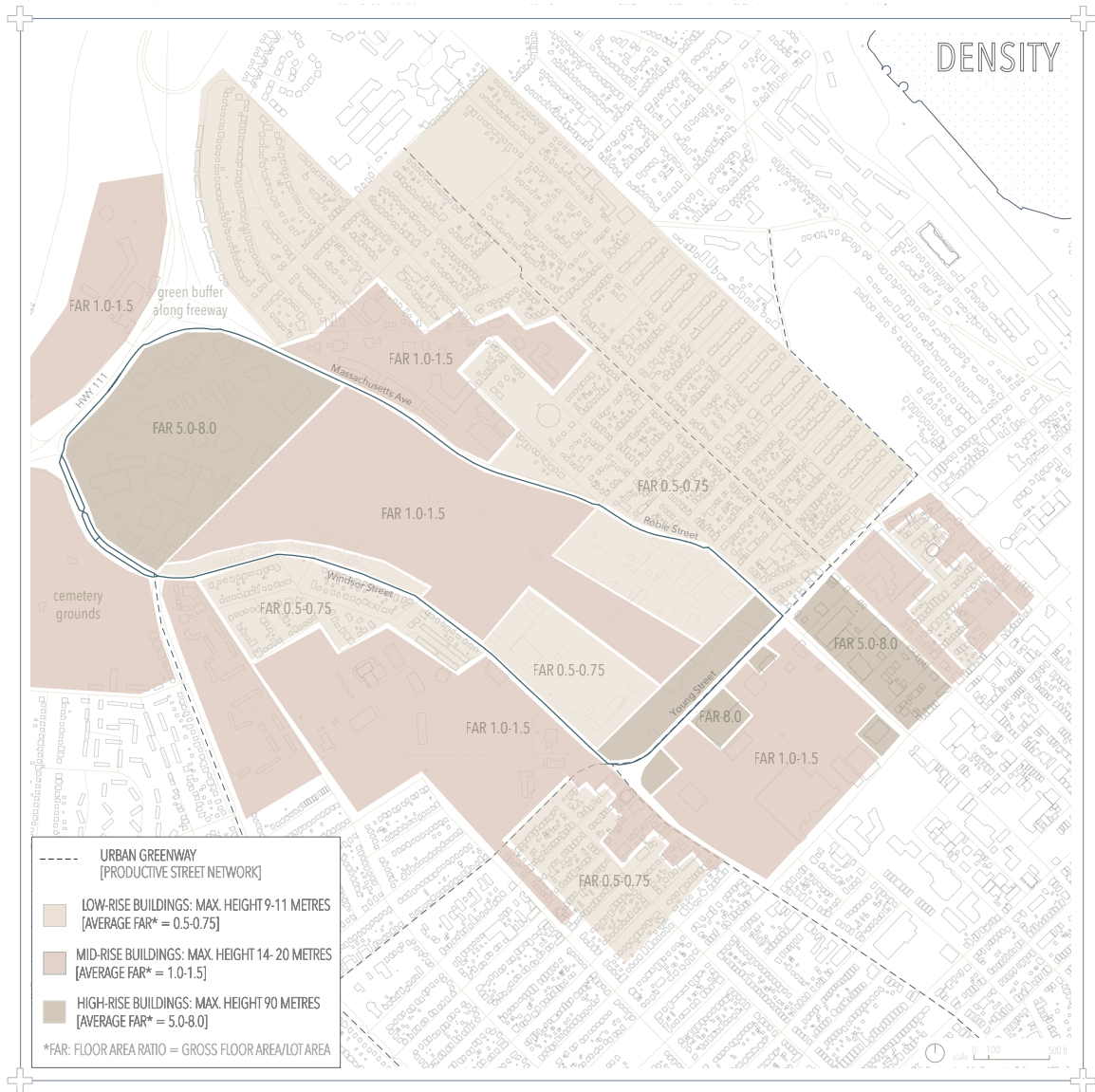
The roof and facade typologies are dependent on the type of building and its orientation. Garden plots may be found on the roofs of apartment buildings, while greenhouses may be found on farm buildings where water can collect and food can be stored at a higher capacity. South facing facades may incorporate balconies for food growing, while north facades may incorporate large windows for daylight and cross ventilation.

Planning Strategies

The Centre Plan and Halifax Land Use By-Laws (LUBs) state the expectations for current and future developments within the HRM. These two documents were referenced when establishing the urban strategy for the new district, the Halifax Farmlands. Located in the north-west end of the peninsula, the planning documents designate the DND lands as having high potential for being a major growth node for the city. The site is bordered by major streets (Robie Street, Young Street, and Windsor Street) and covers a large parcel of land that is greatly under-used, offering a rare development opportunity for much-needed housing, small businesses, and public green-space in the form of a CPUL. The HRM requires that new developments gradually transition in density and zoning to their surrounding neighbourhoods (Halifax Regional Municipality 2021, 50). Through interpreting the “floor area ratio” (FAR: the above-ground floors in a building, divided by the lot area) and the “maximum building height” requirements mandated in the Centre Plan, we can begin to lay out the existing conditions (density, building typologies, and street conditions) of the neighbouring context and the urban strategy for the district (Halifax Regional Municipality 2021, 133).

Density Analysis

First, the density analysis investigates the surrounding urban fabric with respect to key patterns such as residential typologies, road types, and pedestrian routes, as well as unused space like the green easement buffering the site from a major thoroughfare and freeway. Given this urban condition, small scale buildings line Windsor Street to the south, while mid-rise apartments front Massachusetts Ave



This map illustrates the densities of the surrounding neighbourhoods and the proposed redevelopment of the project, responding to the expectations for future growth for the Halifax, mandated in the Centre Plan and LUBs (base map data from GIS database: Halifax Regional Municipality 2020).

to the north. The greenway buffer continues to the industrial waterfront with its views of Bedford Basin. Thus, the periphery of the Farmlands surrounded by freeway, working port, and open water, are well-suited to high densities such as towers. The south and east edges of the Farmlands, by contrast, abut busy urban streets with pedestrians, slower traffic, and public transit. Here, along Robie and Windsor Street, single-family dwellings present a familiar and neighbourly face to the site, matching the adjacent residential neighbourhoods. The east end of the site along Young Street, faces high-rise mixed-use towers and office buildings, reflecting HRM's current planning framework for high-density development on major arteries. Here, the Farmlands responds with mixed-use buildings (retail below and residential above) at the eastern entry of the district, creating an "urban street" for passers by (Halifax Regional Municipality 2021, 50). We see then, that these surrounding conditions and the internal rules set out for the project, influenced the urban strategy and layout of the Halifax Farmlands.

Within the Halifax Farmlands, the range of density and the variety of building types reflects a similar variety in neighbouring districts. The site is divided into three zones — the Lower, Central, and Upper Farmlands. The density increases from Young Street towards Highway 111, with low-rise buildings to the south and east, mid-rise in the centre, and high-rise buildings to the north and west. The surrounding context is what determines the densities and building typologies that are allowed on the adjacent site.

The incorporation of mid- and high-rise residential living compensates for the lower density areas and the prioritization of urban space throughout the district. Meeting the projections of future growth for the city is a

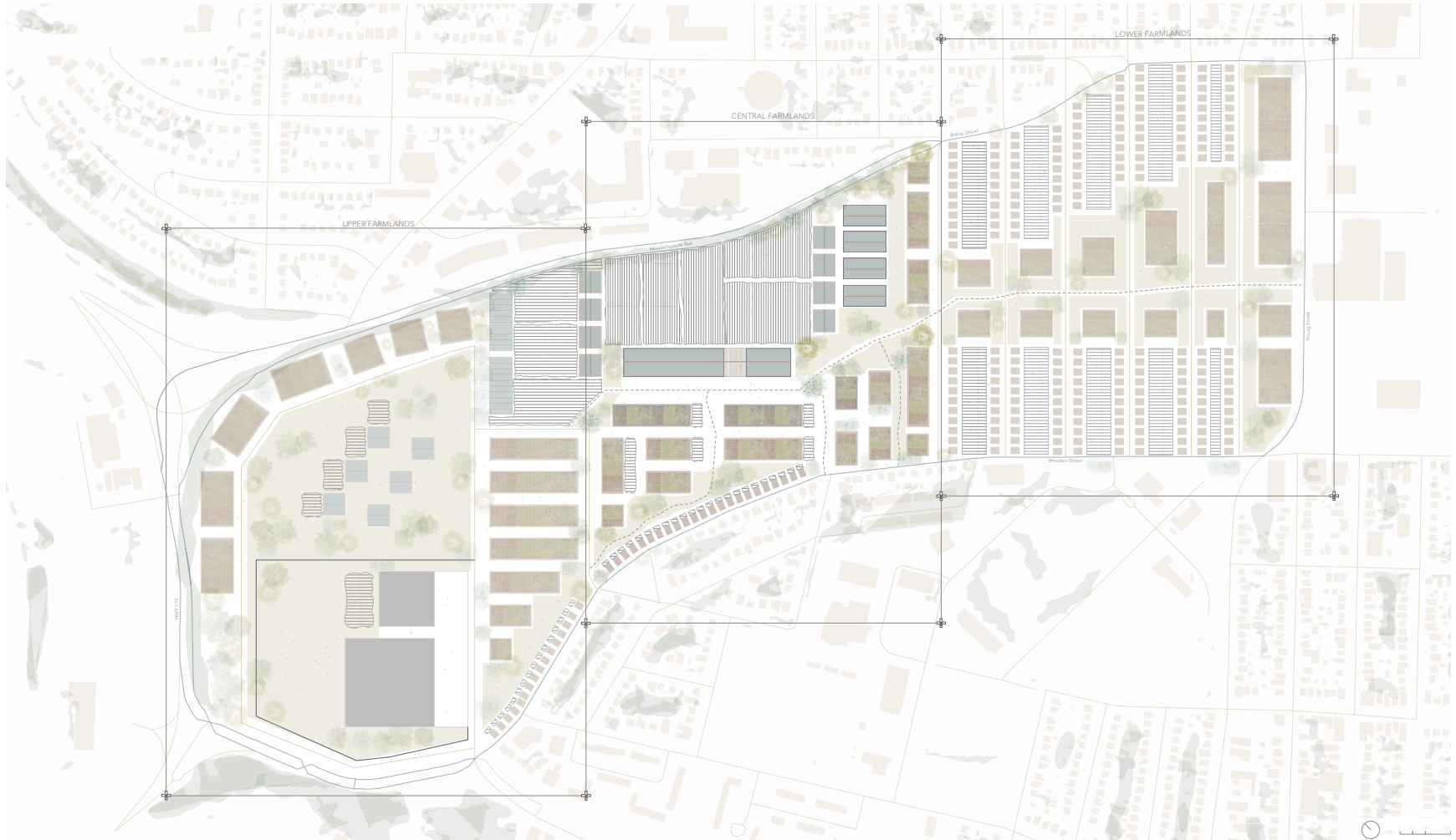
primary concern for the Centre Plan and Land Use By-Laws. However, creating livable, sustainable, and socially connected neighbourhoods is also of high concern. Therefore, the Halifax Farmlands takes into consideration the necessity for meeting the density requirements for a growing population but it also prioritizes and optimizes the landscape and design for the benefit of people, nature, and community. The next chapter will detail the finer grain of the urban strategy and outline the development of the CPUL infrastructure system at the district and building scale.

Chapter 4: Project Design

This chapter details the design of the Halifax Farmlands. First, it elaborates the design and organization of the lower, central, and upper zones of the Farmlands outlining the three parts of the district's urban strategy. It then outlines the four central systems that develop the landscape, organize the placement of buildings, and establish the community programs. It concludes by discussing the land ownership and development strategy for the Farmlands. The proposed urban system and district model engage with the unexpected opportunities afforded by the ecologies of our landscapes by incorporating a network of CPULs (Mostafavi and Doherty 2016, 36). Together, they make up the framework for designing a district centred around urban agriculture. The Halifax Farmlands looks to enhance the location, function, and daily operations of maintaining our cities through this new system of ecological infrastructure.



The urban farm, located at the core of the district. This vignette shows the potential of working, volunteering, learning, and engaging with the community and the process of growing food.



The proposed urban strategy for the Halifax Farmlands district.

Urban Strategy

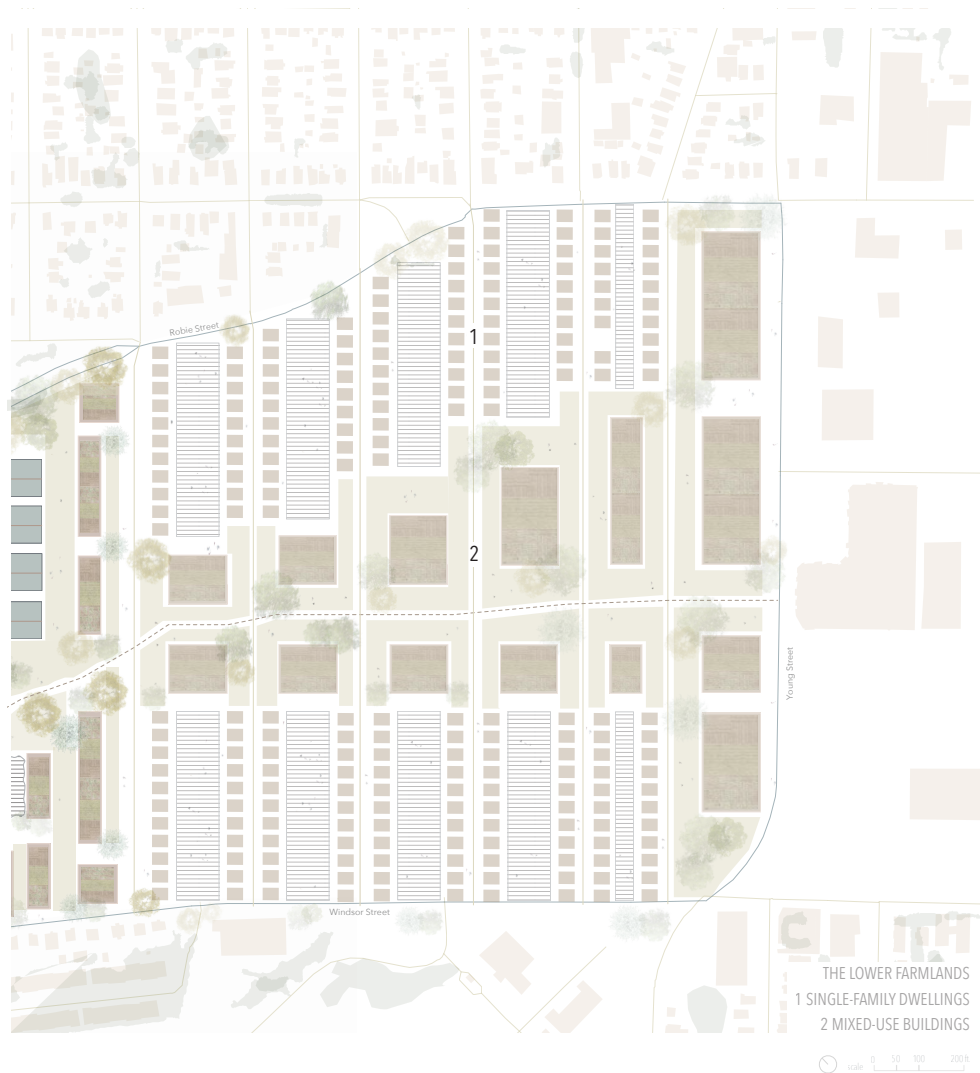
The district's urban strategy evolves from this notion of CPULs integrated with the built form. The rules established from the development case studies, as well as the density and urban condition research, dictate the proposed urban strategy for the district. By dividing the site into three zones (the Lower, Central, and Upper Farmlands) the approach to establishing the overall district strategy is more easily attainable. It also provides a better response for redeveloping such a large territory by strategically organizing the landscape.

The three neighbourhoods provide different forms of amenities — social, residential, commercial, industrial and institutional — but they function together as a whole through an integrated system of CPULs. One of the primary organizational moves in the Farmlands is to reinforce a main axis from the larger CPUL network of the city. This central spine is dedicated to pedestrians, cyclists, and other active transportation users, and feeds through CPULs across the territory, organizing the different landscape typologies and placement of the buildings. It is crossed by two main streets that section off the three zones, as well as secondary streets that serve the low-rise dwellings located in the Lower Farmlands.

The Lower Farmlands

The Lower Farmlands reflects the adaptation of the Hydrostone planning strategies by incorporating single-family dwellings and large central boulevards. Rather than being used for leisure activity, these green-spaces form shared community gardens for the houses on the street. This small-scale residential typology extends across from Robie to Windsor Street, smoothly transitioning to adjacent

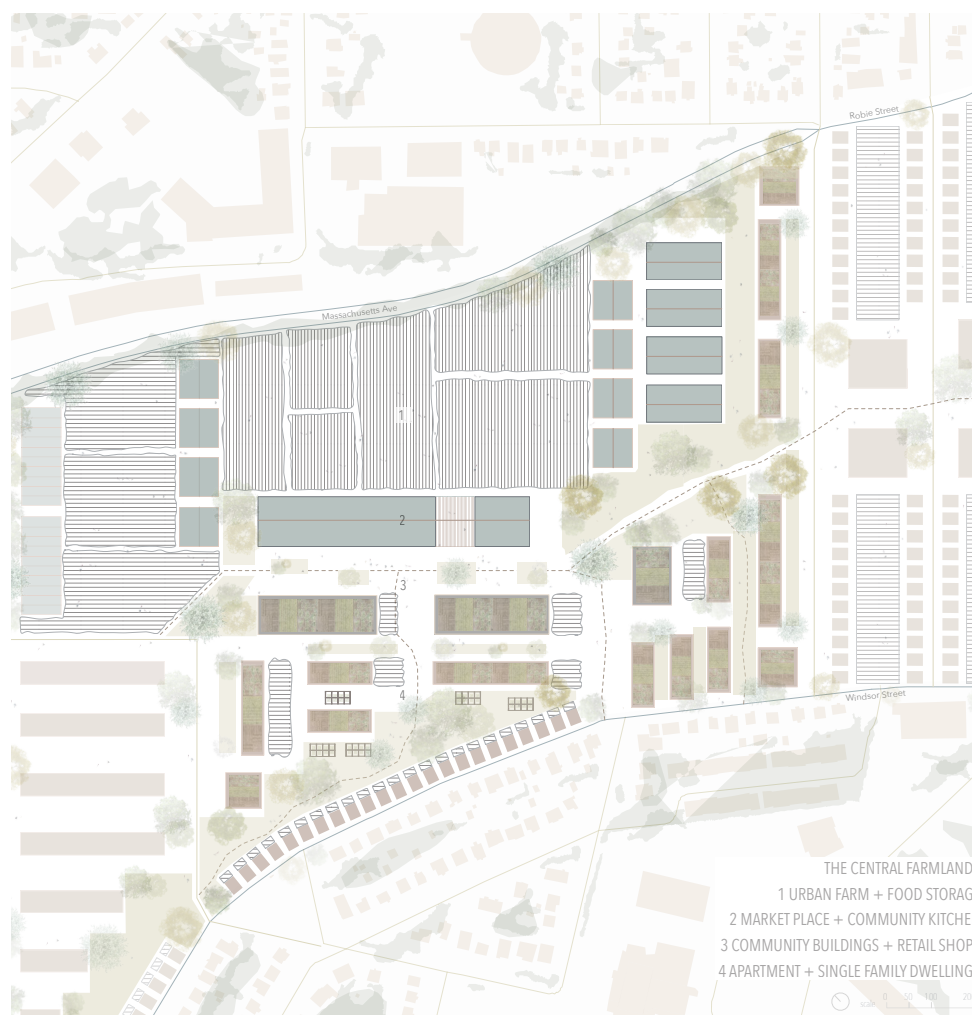
neighbourhoods while allowing higher density and mixed-use buildings along the central axis. Additionally, higher density is allocated along Young Street to meet the city's objectives for zoning and to reflect the high-rise towers in the opposite area. The small housing type also transitions towards higher densities to the west, as you enter the centre zone of the district — the Central Farmlands.



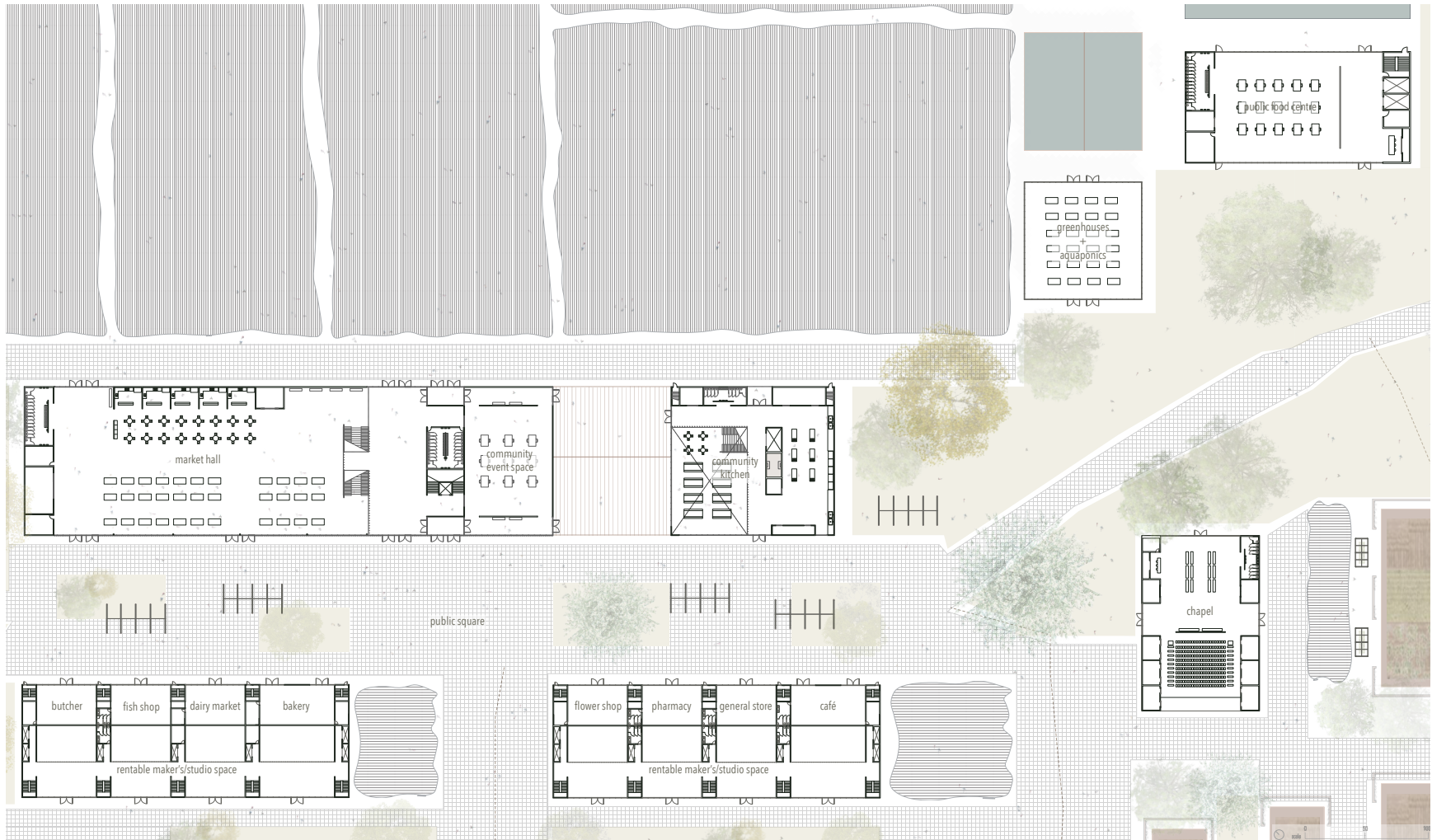
The Lower Farmlands typology reflects the grid of the small scale residential homes and the adaptation of the Hydrostone planning strategies. This grid affects a smooth transition to surrounding neighbourhoods and allows for higher density along the central axis.

The Central Farmlands

The centre portion of the site is the main social hub for the Farmlands district. The Halifax planning framework characterizes the Central Farmlands as a “centre” for local and regional residents, and as a “destination” for visitors to the city (Halifax Regional Municipality 2021, 51). This part of the district consists of a community farm, public buildings, and low to mid-rise residential living.



The Central Farmlands is the main social hub for the district and becomes a “centre designation” for the city of Halifax. The urban farm and associated community buildings are found in the Central Farmlands.



Building plan of the social hub located in the Central Farmlands: marketplace, community kitchen, public square, hub, chapel, greenhouses and aquaponic structures, and the public food centre.

The Central Farmlands consists of several community buildings. The marketplace and community kitchen are the main social buildings, straddling the urban farm and main public square. The market provides an open hall with small kitchen amenities for local vendors to prepare, cook, and sell or trade fresh produce. It is supported by the production on the urban farm, as well as local farmers and businesses of Nova Scotia. The marketplace hosts a large dining hall on the upper floor and event space on the main floor (at the bookend of the building) which offers rentable gathering



The network of gardens provides connectivity for the community in the form of public space through engaging with food. This vignette of the community kitchen's collective dining hall illustrates this notion further. Where people gather to cook, eat, and share food that is supplied by the adjacent urban farm.

space for the community. Adjacent to the market is the community kitchen where people can cook, learn, and engage in food-related activities. The kitchen is open to the public for daily meals and social activities, providing people with a place to interact with other members of the community. The kitchen is supplied with food from the farm, which is operated and financially supported by the Nova Scotia Health Authority and Community Food Centres Canada, as well as partnered with the Immigrant Services Association of Nova Scotia (ISANS). These established organizations would provide the support needed to sustain the farm while offering education, jobs, and community opportunities for the residents of the district and the greater city of Halifax. The marketplace, community kitchen, and urban farm serve as the foundation for this social hub and connect with the main public square at the heart of the district.

In the public square, people can meet, socialize, and participate in group activities. Adjacent to the market and kitchen, it allows these public programs to extend outdoors into the social space. The square fronts onto the hub buildings, which consist of local retail shops and a café — that support artisans and farmers — as well as rentable maker spaces for work-related activities or events. The hub buildings represent the CPULs integrated at the building scale. They are hybridized with a greenhouse structure overhanging the shops and studio spaces — giving users a direct multi-sensory engagement and experience with nature. The greenhouse functions as an overhead atrium, with hanging vines that are supported in the space frame structure. The greenery purifies the air through the aromas of honeysuckles, sweet peas, and eucalyptus plants. The garden is supported by the architecture, while the buildings



The Farmlands district demonstrates the continuity of nature and engagement of community at different scales. This vignette of the social hub's atrium and maker's space illustrates this notion further. The continuous productive landscapes are interwoven with the built form. This community building provides users with space for events or activities, while engaging in a multi-sensory experience with nature.

and interior spaces are enhanced by the presence of the garden. The hub, public square, market, kitchen, and farm support different community activities throughout the network of CPULs.

The remaining buildings in the Central Farmlands are the community chapel, public food centre, farm buildings, and residential dwellings. The chapel bookends the public square and provides the community with a place of worship where people can engage and reflect in shared practice. This important institution sits adjacent to the public food centre, where people can learn and participate in food production as a community. The food centre is next to the urban farm and its associated buildings (greenhouses and aquaponic structures) which supports the centre's educational program. These farm buildings also serve to store food and supply produce year-round; as well as to store water and serve as a composting facility that collects runoff and food waste from the entire district. Finally, the residential dwellings are a mix of low- and mid-rise buildings. Single-family homes border along Windsor Street, bridging to the existing conditions of the urban fabric, and transition to apartments as you approach the centre of the social hub. The Central Farmlands intertwines the buildings with nature, as well as the living, social, commercial, and industrial systems throughout the district. It bridges the density from the small-scale residential typologies in the Lower Farmlands to the high-rise towers found in the Upper Farmlands.

The Upper Farmlands

The final zone of the district is the Upper Farmlands. This portion of the site looks out to the industrial yards and the harbour. It is comprised of high-rise towers/blocks and larger

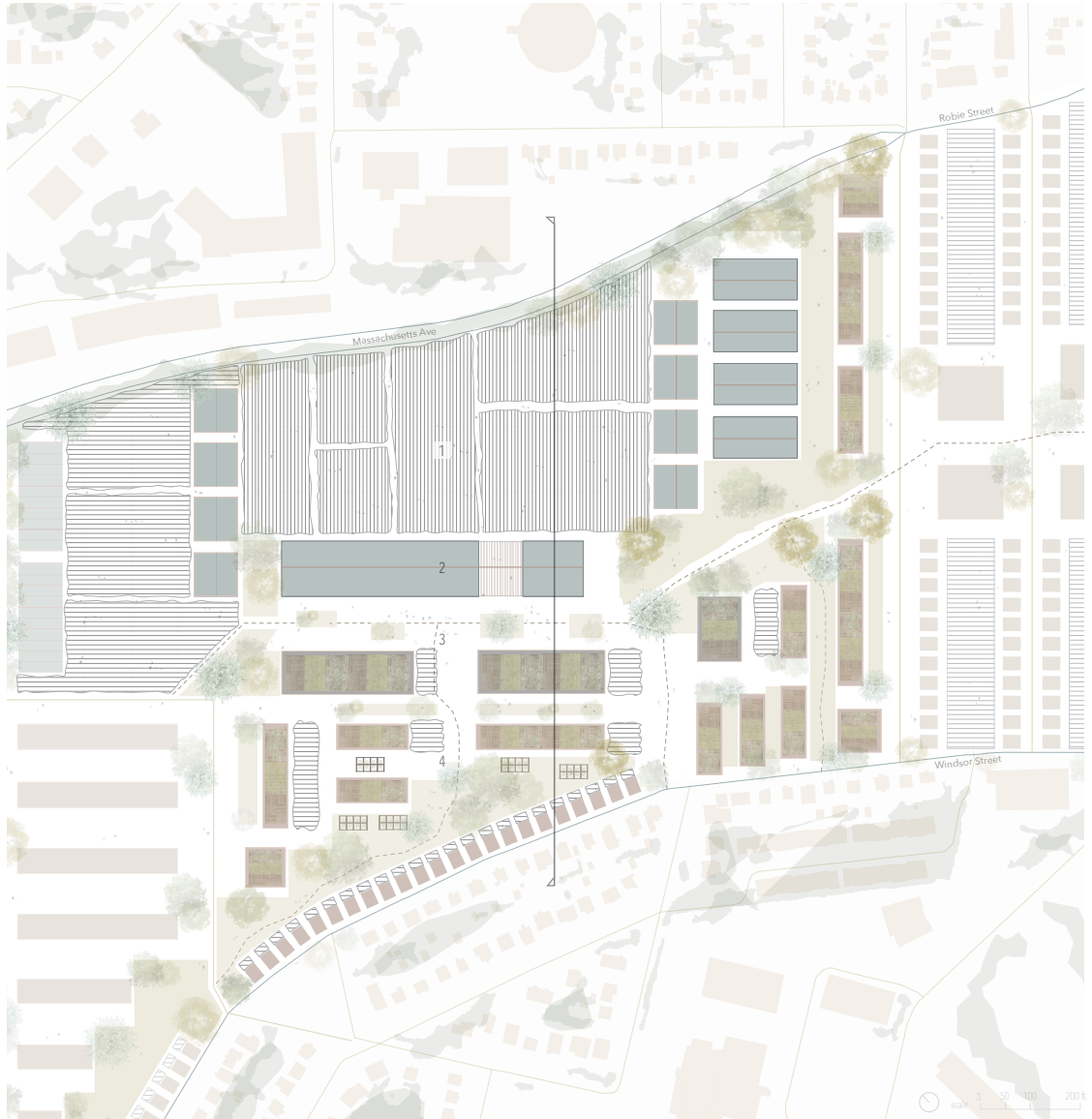
community buildings, since the surrounding context permits higher density. In the Upper Farmlands, a second community hub contains another large green-space for recreation and more food-growing, providing easy access to community gardening. The high-rise residential towers and blocks that line the periphery of the site, would be well-suited to an elderly population, with panoramic views of the Bedford Basin and close proximity to a library, community green-spaces, and roof-top gardens. The community buildings include a elementary school, library, and greenhouses, with



The Upper Farmlands typology consists of higher density and additional recreational and institutional amenities for the district.

a nearby composting facility. The elementary school serves families who live in the district and more widely, as does the community library. The greenhouses and composting facility would attract people interested in learning about and participating in agricultural production, and their proximity to the elementary school would support agriculture as a part of the children's curriculum. Here, the CPULs are not only integrated physically into the landscape but are also directly incorporated into the program and functions of the buildings. The Upper Farmlands concludes the urban strategy for the entire district.

Each of the three neighbourhoods contribute to the Halifax Farmlands as an urban system with agriculture at its heart. Commercial, institutional, residential, industrial, and community programs are supported by a range of building types interconnected through a network of CPULs. These, in turn, provide the central metaphor for the Halifax Farmlands — a new kind of urban neighbourhood conceived of as an interconnected network of flows, with four contributing systems: continuous productive urban landscapes; food waste, energy, and water; circulation of people; and residential dwellings. The next section will describe each of these in greater detail, focusing on the Central Farmlands.



THE CENTRAL FARMLANDS

1. THE FARMLANDS
2. THE MARKETPLACE
3. THE HUB
4. THE HOUSING

The Central Farmlands program groupings. *note the section cut for the longitudinal section on the following page.



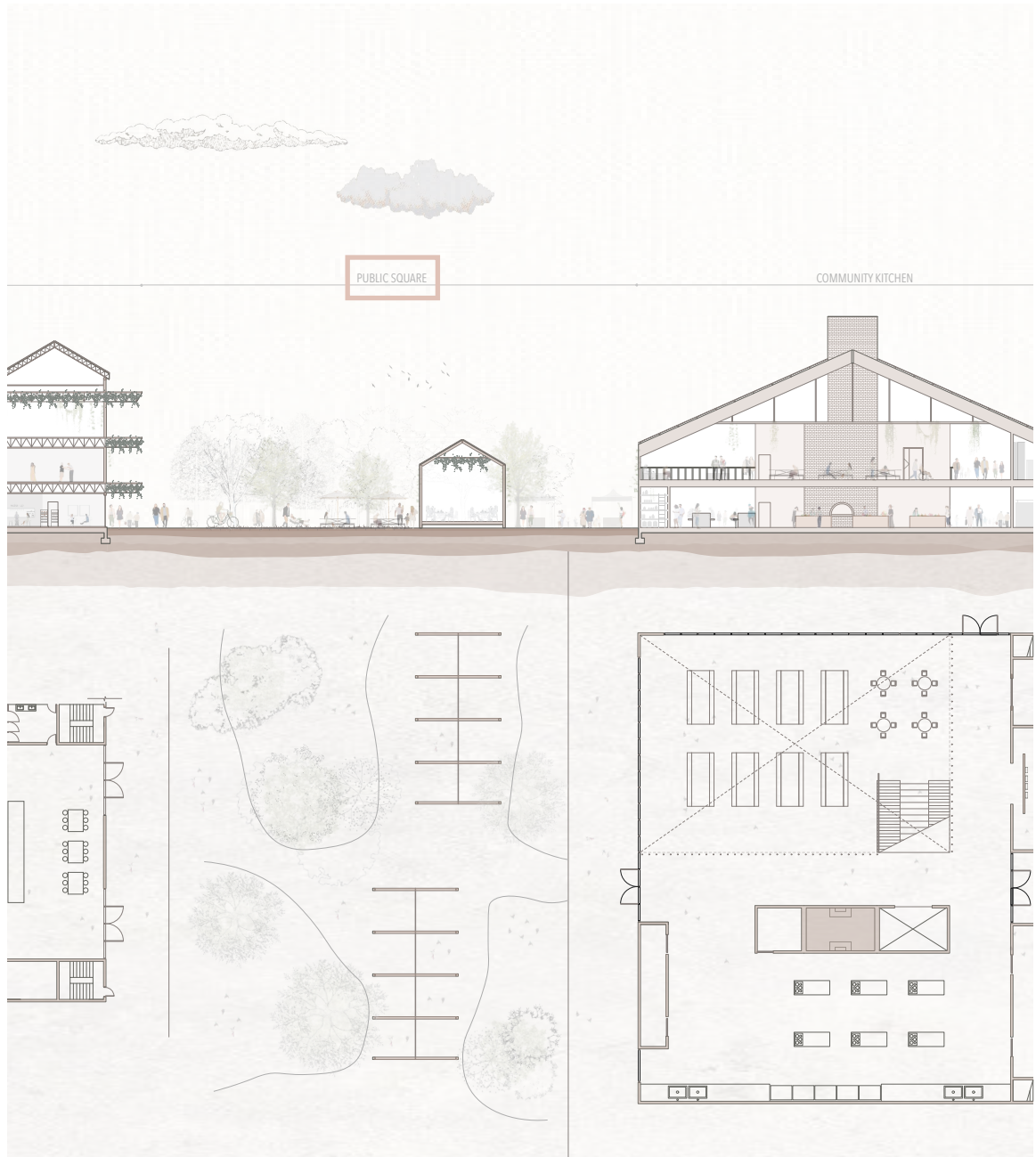
This is a slice through the main district, in the Central Farmlands, showing an interweaving of the dwelling and garden typologies.



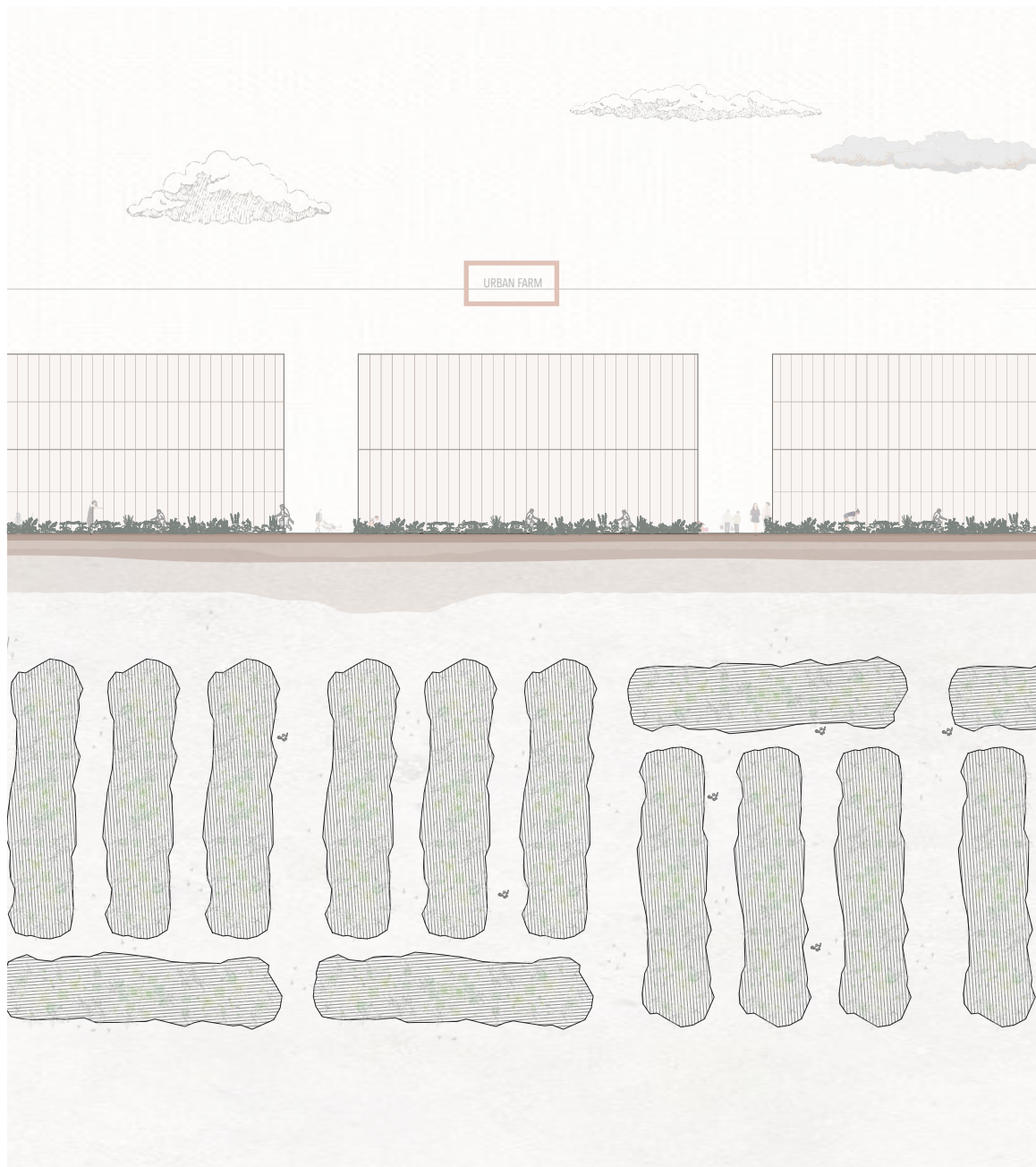
Along Windsor Street, the low rise dwellings with private garden plots back on to the leisure garden space, which buffers between the homes and the mid-rise apartment building.



The apartments sit between a community greenhouse to the left and a leisure garden buffer to the right, approaching the social hub.



This Hub falls along the main spine of circulation through the district. This hub consists of a public square surrounded by mixed-use buildings that house local shops and maker's space, a farmer's market, and community kitchen. The square allows these programs to be drawn outdoors into the central space, connecting the interior with the exterior courtyard.



Adjacent to the hub is the district's urban farm, where the neighbourhood's main food growing takes place and is supplied to the shops, market, and community kitchen.

System Strategies

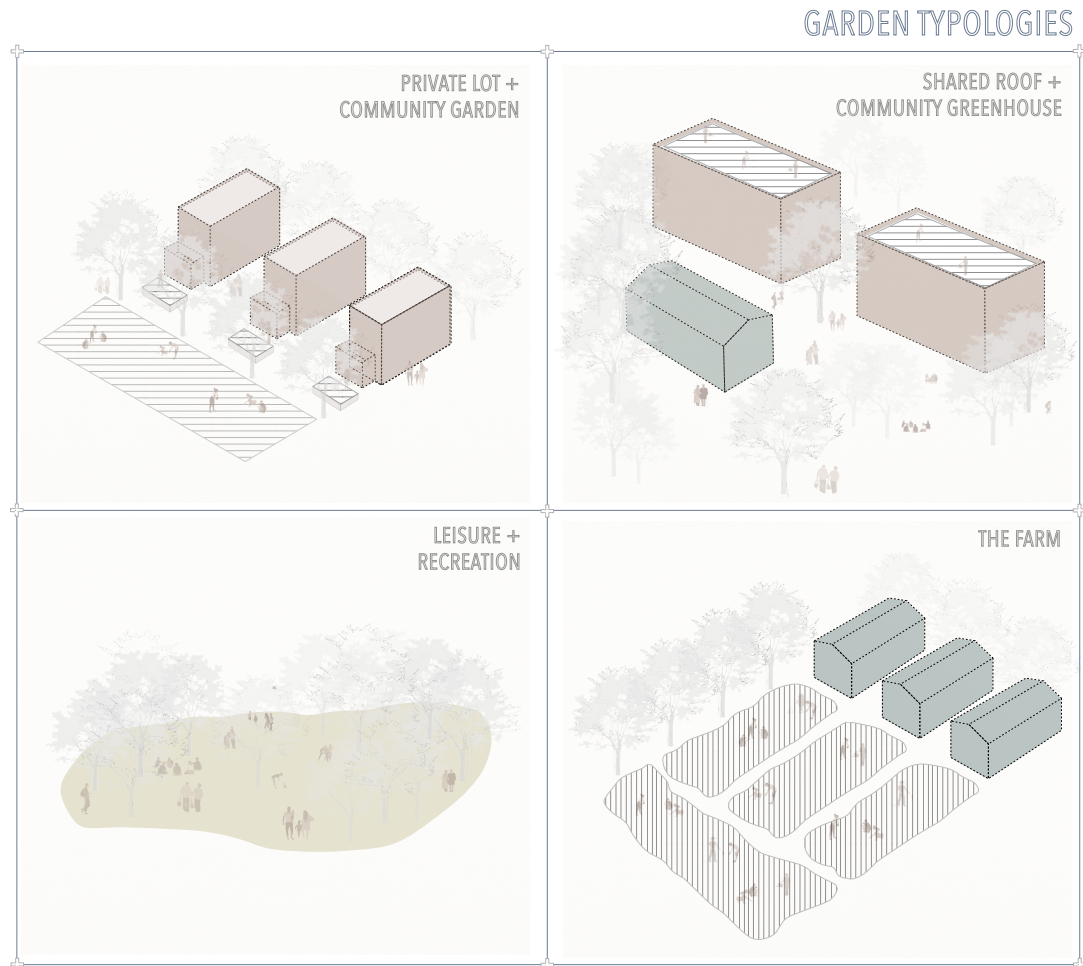
Programs in relation to working, living, learning, growing, and engaging are developed through four main system strategies:

1. Continuous Productive Urban Landscapes System
2. Food waste, Energy, and Water System
3. Circulation System
4. Residential Dwelling System

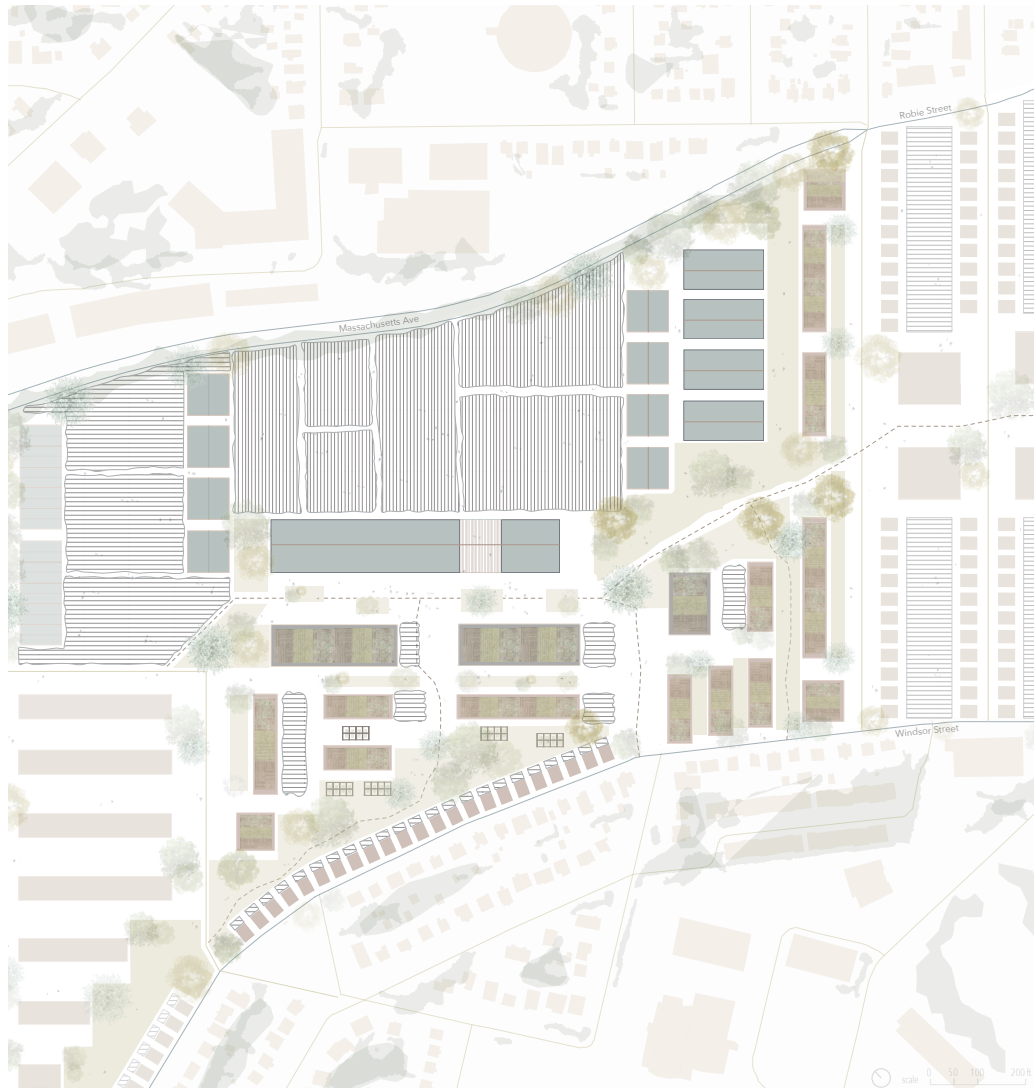
Continuous Productive Urban Landscapes System

The CPUL system is comprised of four distinct garden typologies that organize the landscape and enhance the programs throughout the district: private gardens, shared rooftops and community greenhouses, leisure green-space, and the urban farm. The private garden plots are located in the backyards of single-family dwellings or on the balconies of apartment buildings. These are for the personal use of each apartment dweller or home owner. The shared gardens are located on rooftops and in community greenhouses adjacent to the residences. These provide opportunities for people to garden as a social and community activity. The leisure garden space occupies the buffer zones between buildings, providing a natural barrier and a continuous landscape of greenery. This is similar to the green-space found in the backyards of Westmount subdivision, where a shared urban greenway separates the private zones. The final garden typology, the urban farm, is the core of the district. It provides fresh produce for residents, and supports local shops, markets, and the community kitchen, while also forming the main social hub for the northwest end of the

city. Each of the gardens contributes to the interconnected network of greenery for the Halifax Farmlands — connecting landscape with buildings, and people with nature.



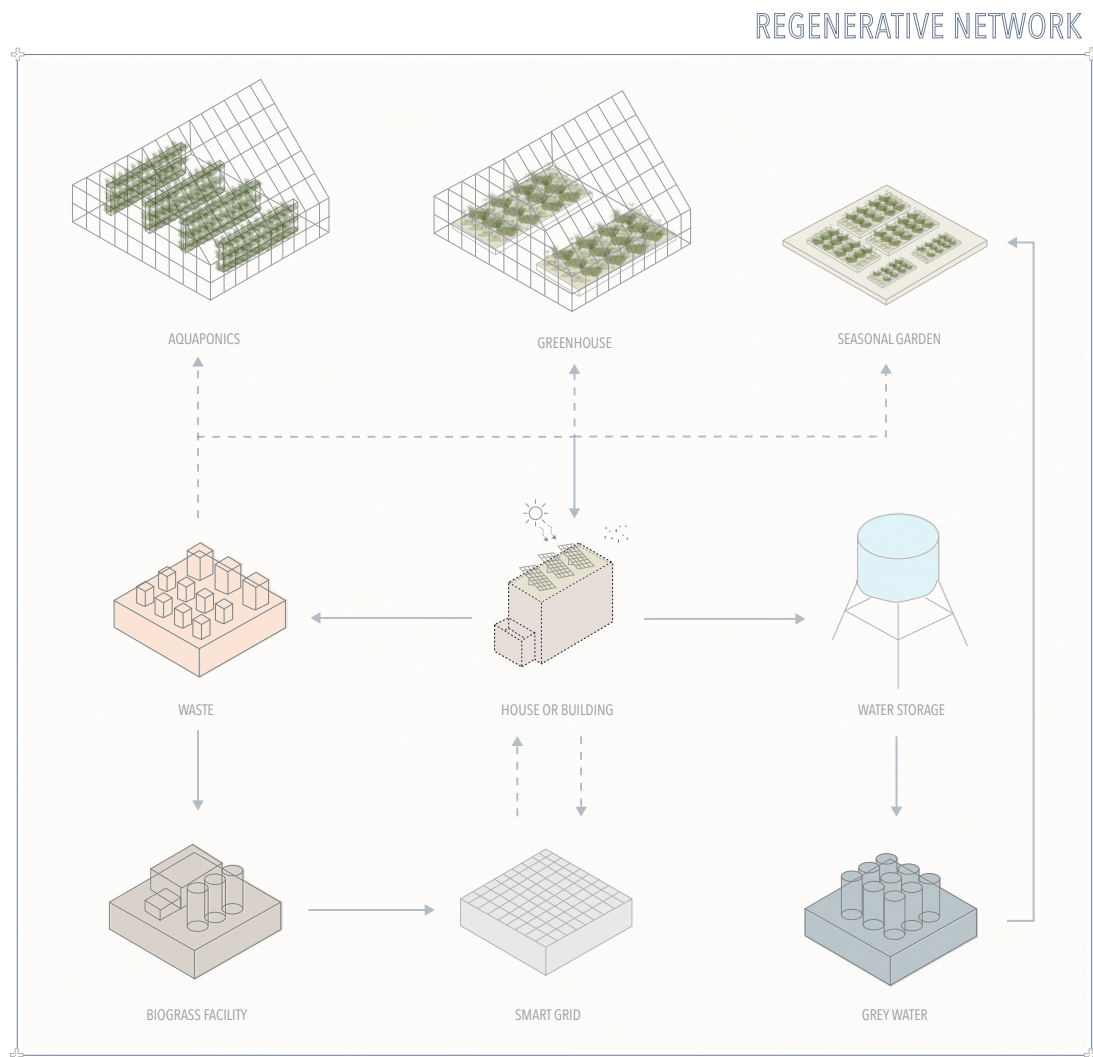
The CPULs offer four different garden typologies: private lots in back yards or balconies, shared gardens on rooftops, community plots and greenhouses adjacent to residencies, leisure green-space in buffer zones, and a central farm in the core of the district.



The row of small houses at the bottom of the plan, along Windsor Street, is the private lot and community garden, which is also seen in the Hydrostone typologies found in the Lower Farmlands. The brown apartments in the middle are the shared rooftops and community greenhouses. The green-space that is marked in green is the leisure and recreation zones. And, finally, the buildings in blue surround the urban farm. The gardens provide an interconnected network of greenery through the district—connecting the landscape with the built form, and people with nature.

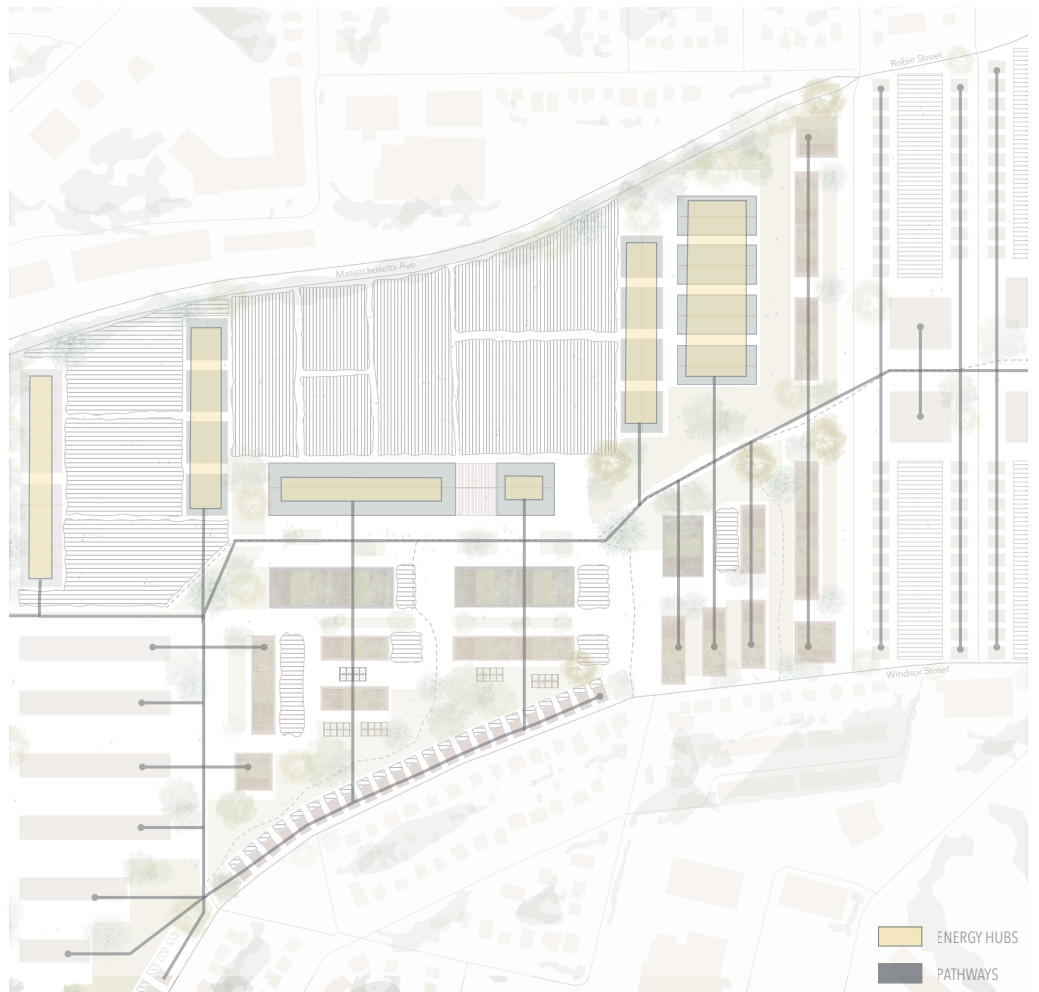
Food Waste, Energy, and Water System

Next, looking at the food waste, energy, and water system, we begin to understand the complexity of the urban farm. The farm is the primary source for this regenerative system. The buildings collect rainwater and solar energy which are then fed to the main water storage and energy grid located on the farm. The water storage recycles and feeds water throughout the district, including the management of the gardens. The gardens produce food for the community, and

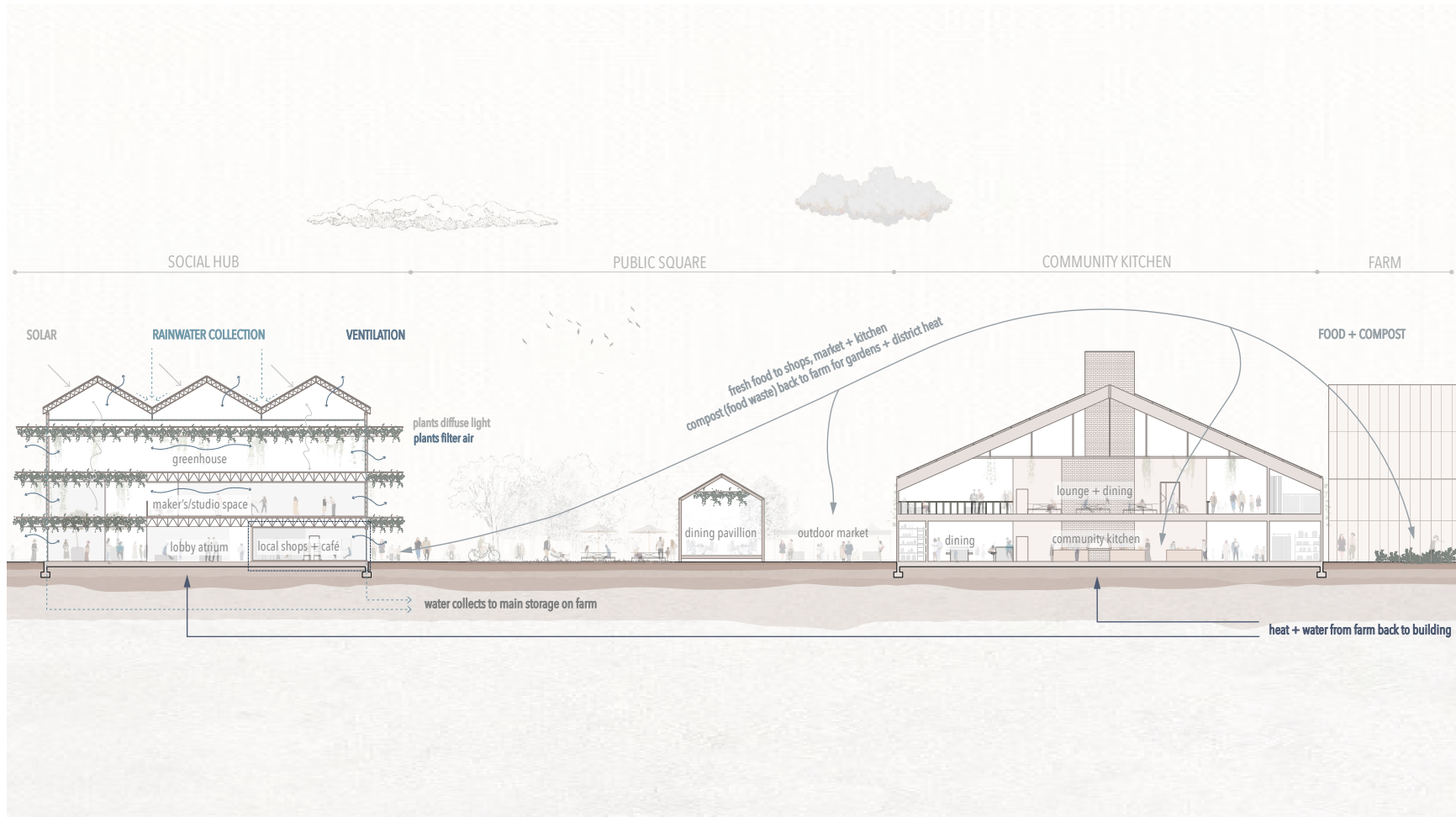


Regenerative system technologies are implemented into the district, with the farm as the primary source for maintaining and supplying these resources.

in turn, compost is generated to feed back to the gardens. The compost also generates heat to the biogas facility which produces energy for the district. This energy grid is also supplemented by surplus heat from the food storage buildings and the solar energy that is collected on rooftops, as well as the larger city grid. The urban farm has the ability to incorporate these renewable technologies. Located at the centre of the hub, along the main route of circulation, these networks are connected throughout the Halifax Farmlands.



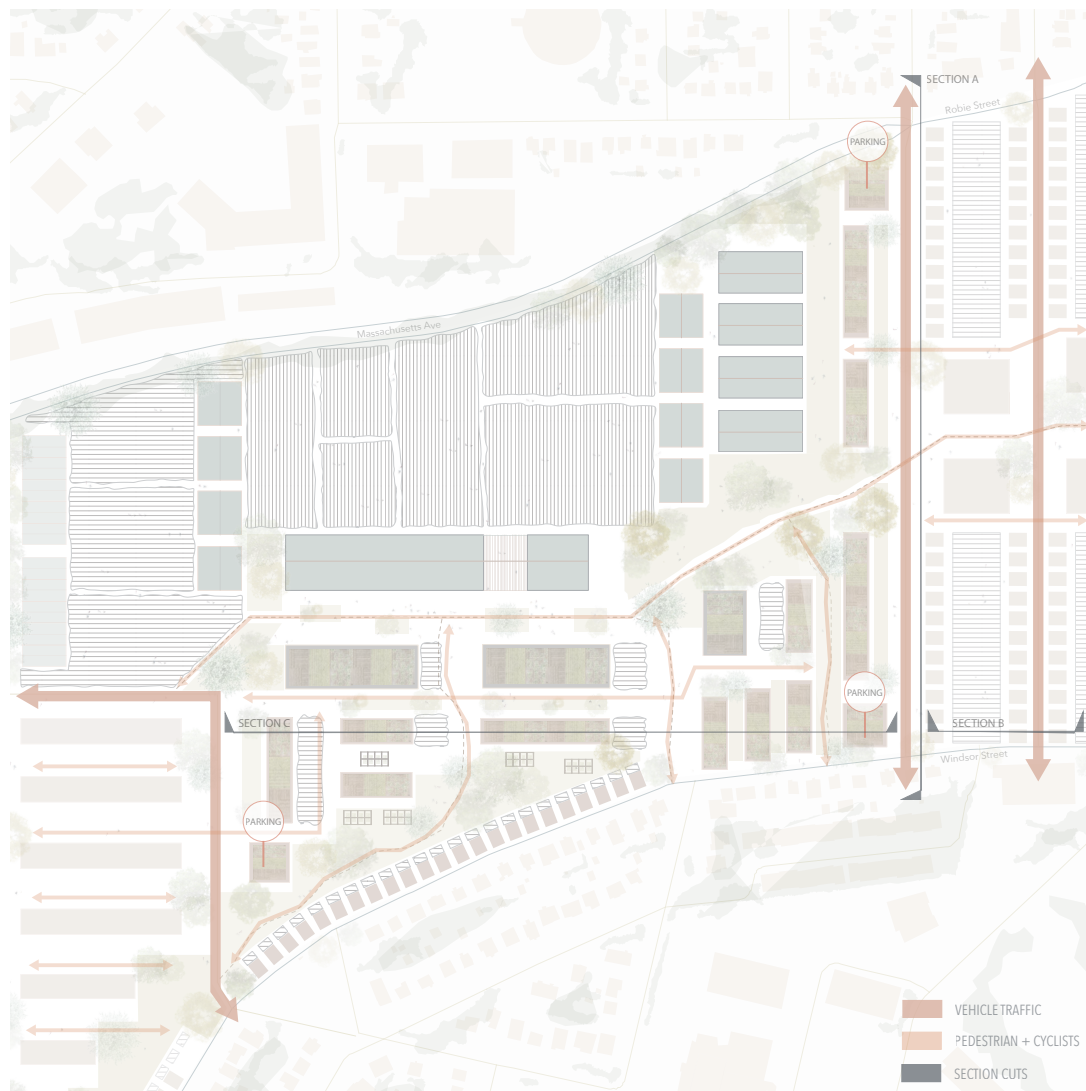
Feeding from the storage on the farm, the energy will be distributed throughout the district through the black lines as seen on the plan.



These flows are illustrated in the diagrammed section of the main hub, showing the relationship of these systems and their association with the different programs. The local shops, market, and community kitchen are provided with food from the farm and in return these provide the compost for energy system. Rainwater is collected on the roofs, recycled to the main storage, and supplied back to through buildings and gardens. The entire district works in a regenerative system.

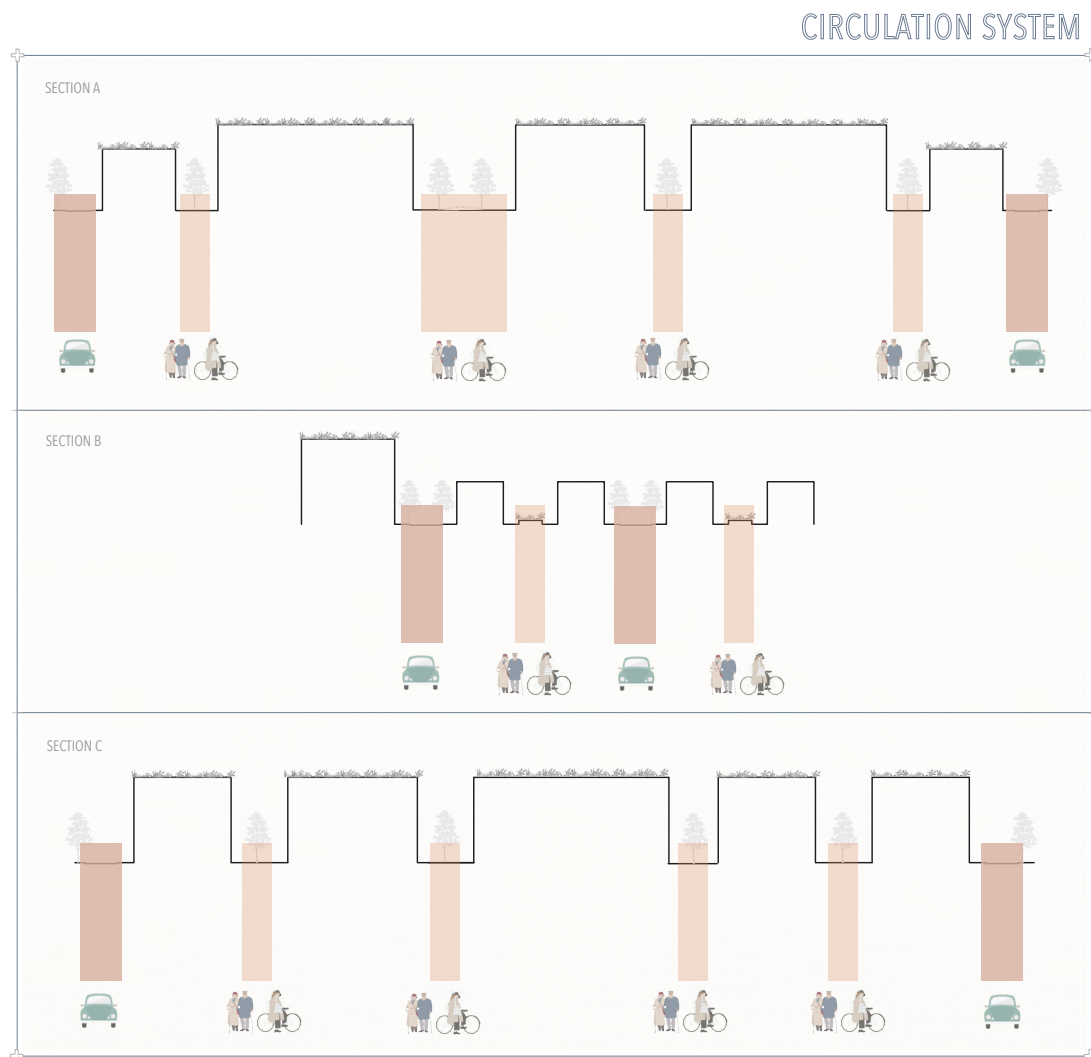
Circulation System

The third system we are going to look at is circulation. The circulation is developed by connecting people in public space and with nature. For this to happen, the pedestrian is prioritized over the auto-mobile. As mentioned previously, the main routes of circulation throughout the district are for active transportation users, while vehicles are sectioned off to the peripheries (bordering the Central Farmlands). Small

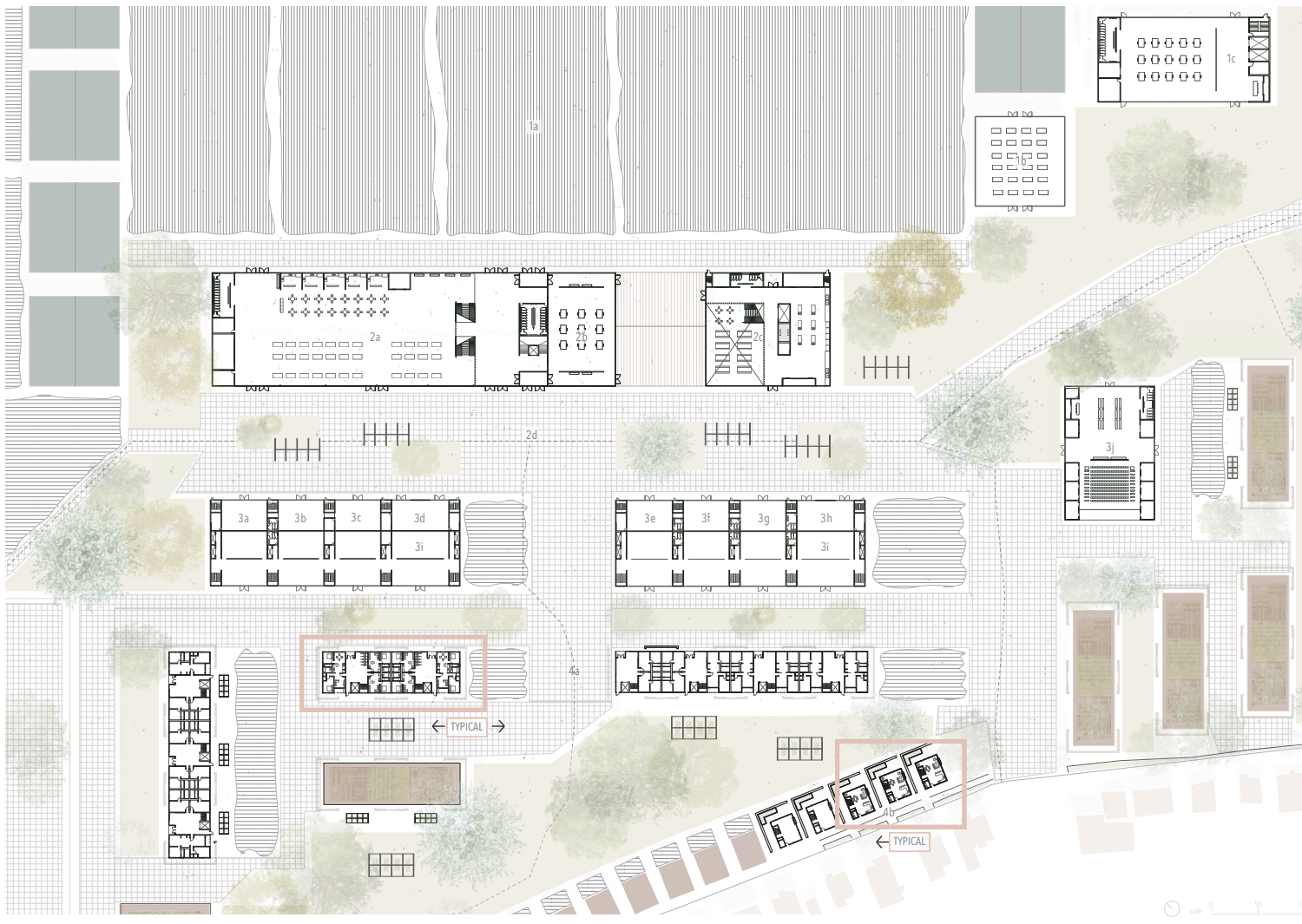


This plan shows the different routes of circulation for vehicle and non-vehicle traffic, highlighting the relationship between the pedestrian pathways and the gardens.

parking garages are located at the main side streets of the district, for people who live in the apartments or for visitors to the neighbourhood. Like New Frankfurt and Liberty Station, the district is designed to create a built form that is safe and comfortable for people to walk, engage, and find leisure throughout the network of CPULs. The circulation system is carried through to the residential dwellings, organizing the internal programs and the placement of these buildings in the landscape.



The series of sections, called out on the plan, cut through the site highlighting the priority for non-vehicle traffic.



THE CENTRAL FARMLANDS
internal programs

1 FARMLANDS

- a. urban farm
- b. public food centre
student / vocational classes
- c. food storage
greenhouses / aquaponics

2 MARKET PLACE

- a. indoor / outdoor market
buy - sell - trade
- b. community event space
- c. community kitchen
collective dining hall
- d. public square

3 SOCIAL HUB

- a. butcher
- b. fish shop
- c. dairy market
- d. bakery
- e. flower shop
- f. pharmacy
- g. general store
- h. café
- i. maker's space
- j. chapel

4 HOUSING

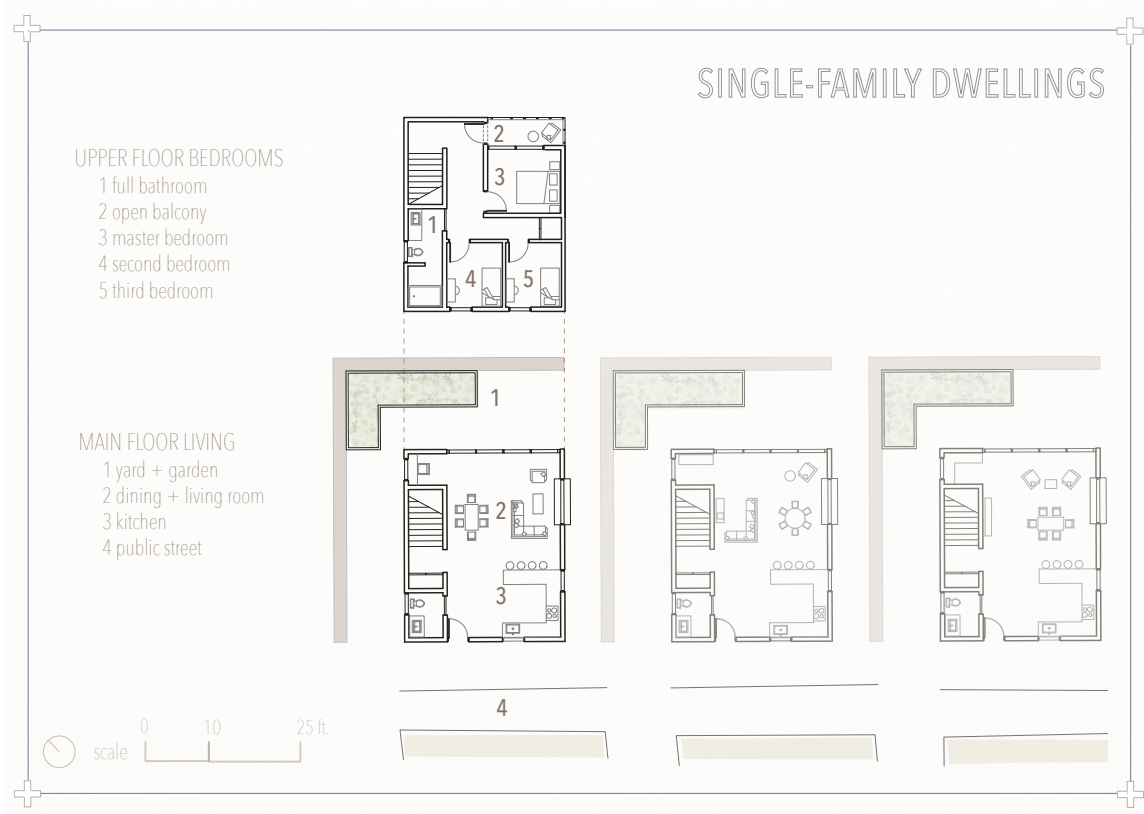
- a. single family dwellings
- b. apartments
1 or 2+ bedrooms

The Central Farmlands building plan showing the residential typologies that are located adjacent to the social hub.

Residential Dwelling System

The final system is the residential dwelling. Within the constraints of the urban planning framework, the Halifax Farmlands includes a diverse mix of housing types: single-family dwellings, mid-rise apartments, and high-rise towers/blocks. The goal is to create a neighbourhood made of people from different socio-economic backgrounds, cultures, and ages — in other words, a complete community that reflects the diversity of the whole metropolis. The Central Farmlands includes two of these three housing types: single-family dwellings and mid-rise apartments. Each of these types has its own approach to integrating CPULs into domestic life.

We begin looking at the single-family dwellings. These houses continue the Hydrostone typology from the Lower Farmlands and mirror the small-scale buildings across



Building plan of single-family dwellings showing the versatility of units.

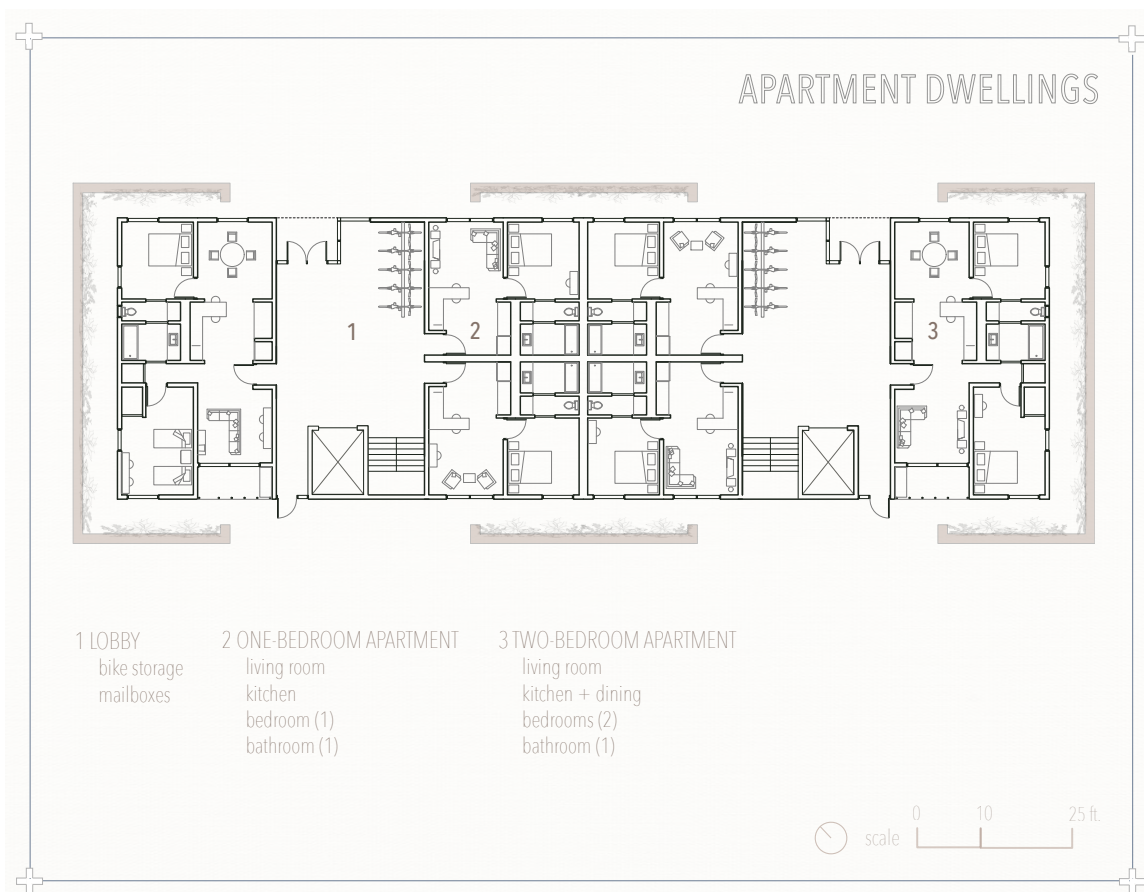


Diagram of what a single-family dwelling may look like, showing the relationship from the inside to the outside — the focus for this thesis.

Windsor Street. These houses ensure a seamless transition from the neighbouring urban fabric to this new district. The three-bedroom houses in the Farmlands are large enough to accommodate single families and also group living situations (with rented or shared units). The house is separated both vertically and horizontally, with communal spaces on the main floor and bedrooms on the upper floor. The kitchen is next to the street, looking over a public sidewalk, and the living room faces the backyard, looking onto a community garden. A low wall surrounding the house directs circulation and helps to create a threshold between the houses' gardens and those of the public.

North of each community garden, that serves as a buffer zone between the single-family homes, are the apartment buildings. These one or two-bedroom dwellings are designed

to meet the needs of students, new immigrants, single parents, or any other groups of people looking for a rentable and affordable living option. The units are organized around central circulation cores. These cores open to outdoor garden space, providing an opportunity for residents to meet each other daily on their way to and from their apartments. The units are clustered in mirror image around central service cores of bathroom and kitchen amenities, to keep construction costs low and to give the living and sleeping quarters direct access to daylight. Like the single-family homes, the apartments too, are surrounded by low walls. These walls are great for sitting and socializing, and also indicating the threshold between private and public, while subtly directing circulation around and through the building.



Building plan of apartment buildings showing the versatility of units.



Diagram of the apartment building typology, again highlighting the relationship between the interior and exterior spaces.

These also provide a small barrier or “yard” for ground floor residents to grow plants or find retreat. Upstairs apartments have access to an outdoor balcony to facilitate these activities.

Each dwelling is designed to reflect the focus of the thesis: connecting people with public activity and nature. Community gardens and greenhouses surround the dwellings, giving people the opportunity to connect in shared space or recreational activities; while the buildings integrate private plots and balconies for people to grow food individually or to find retreat. The design of these dwellings are prototypes for the project. Given this large-scale district project, these buildings may be developed by several architects, and therefore, may have different shapes or forms in the end. The design of these residential types is meant to illustrate the

relationship between the interior and exterior that is created by the CPULs — to represent how the CPULs integrate with the built form so that when and if this district is developed, the focus of the thesis is understood.

The four main system strategies (the CPULs system, the Food Waste, Energy, and Water system, the Circulation system, and the Residential Dwelling system) develop the Farmlands district. The CPULs integrate with the built form to encourage local ownership, social interaction, and natural barriers between buildings; the Food Waste, Energy, and Water system (provided by the farm) sustain the urban district; the Circulation system facilitates community interaction through its walkability; and finally, the Residential Dwellings offer a variety of living options that connects people and nature. The CPULs are the necessary component to designing through this ecological lens. The four system strategies represent the collective working in multiple ways to reinforce community. Furthermore, the concepts and values underlying community (sharing and connectedness) question the district's strategy asking: how can development happen without displacement? The next section discusses the approach to implementing and maintaining a district in a city that is susceptible to growth and change.

Halifax Farmlands Development Strategy

Often when new city districts are developed, the original intentions of the project can be lost through growth and gentrification, because of an influx of more affluent residents or businesses. This can be seen in the Hydrostone, where it was originally designed for displaced members of the community and is now one of the wealthier neighbourhoods of the city. It is important for the Halifax Farmlands to

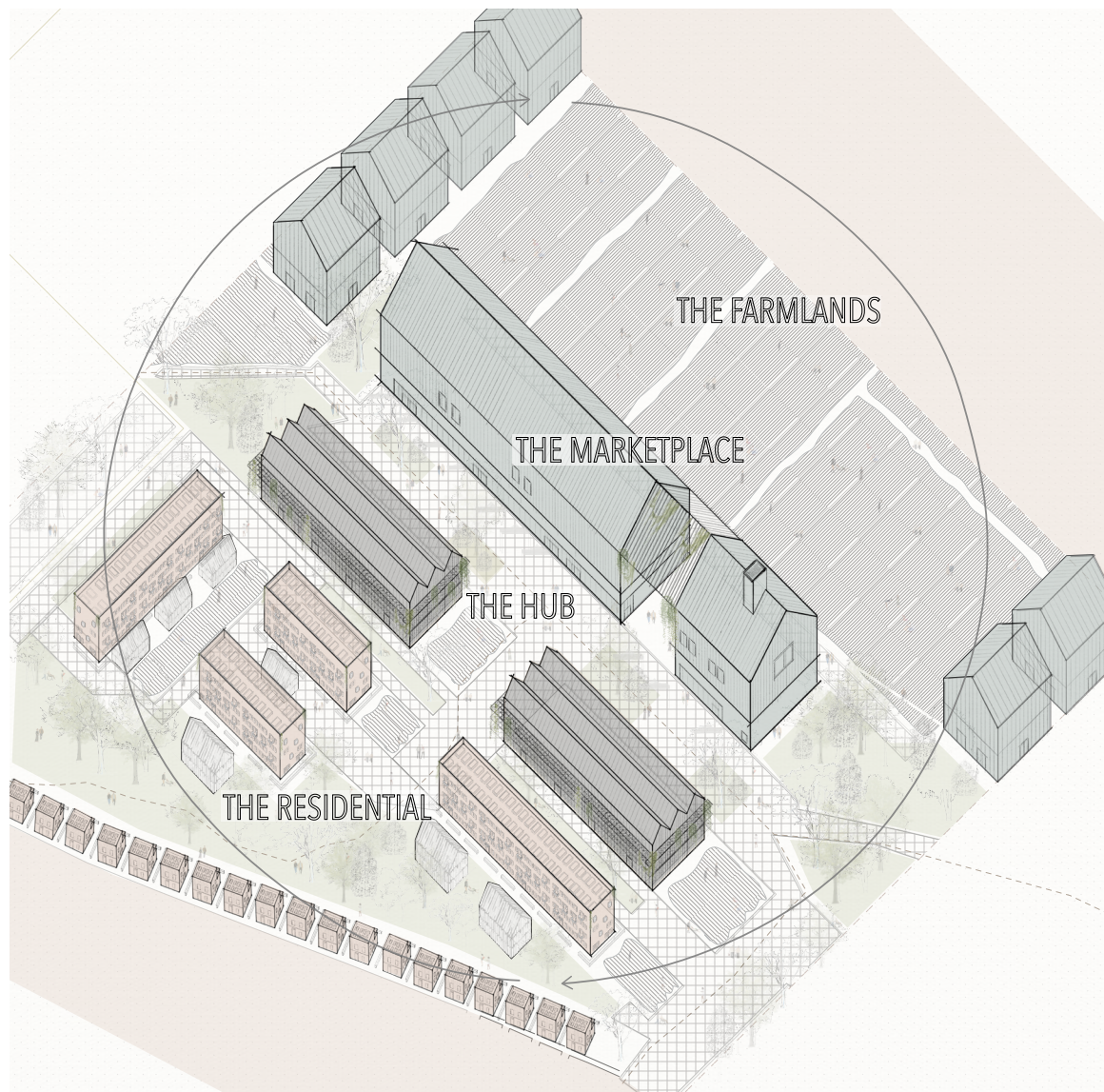
implement an approach that ensures the community values of this thesis are maintained through future growth. This section outlines the organization of the land ownership and development strategy for the Halifax Farmlands.

Formally owned by the DND, the land is now governed by the community, and supported by a nonprofit corporation, such as ISANS. Like the urban farm, the district's land works as a collective. The territory is organized through "Community Land Trusts" (or CLTs), which offer an alternative model of land use tenure that permanently removes properties from the market and places it in communal ownership (Sorice 2004, 3). Through "Ground Leases," land is inheritable or mortgage-able, allowing the owners of residential or commercial buildings to obtain private financing to construct or improve their structures — new or existing (Davis 2014, 5). The land can be leased out as "individual parcels for the construction of housing, the production of food, the development of commercial enterprises, or the promotion of other activities that support individual livelihood or community life" (Sorice 2004, 3). Coupled with the network of CPULs, the CLT model ensures the goals of connecting with nature and creating a resilient community are achieved in the Halifax Farmlands.

The CLT model has been "a proven and trusted method for expanding homeownership opportunities to low- and moderate-income households" for decades — encouraging development without displacement (Sorice 2004, 6).

The legal separation of the land from the structure enables low- and moderate-income households to attain homeownership because they only have to borrow enough to purchase the structural improvement which results in a significantly smaller mortgage than if they had bought both the home and the land in the conventional market" (Sorice 2004, 4).

The CLT model, therefore, also achieves the goal of affordable housing for the district. This component of land ownership is crucial to realizing this new kind of district of local food culture established within the city, and an actual possibility for the future. It grounds the design and organizes the project for development.



The Central Farmlands is modelled here to show the relationship between the different programs and buildings, and how these are organized within the landscape of gardens. The CPULs are interwoven with the built form, creating new forms of public space throughout the district.

Chapter 5: Conclusion

An integral goal for the urban agriculture system is restoring the social and environmental connection to place. This thesis is based on the premise that because freshly-grown food is a basic human need, the provision of fresh food should be an essential component of urban design and planning. An investigation of the literature and relevant precedents showed that many cities in Western culture have relied on urban food-growing to weather economic and political turmoil, especially in war-time. This thesis proposes that urban agriculture should have a place in contemporary cities in peace-time as well.

Urban agriculture provides food security through its proximity, availability, and affordability; community through its social activities like growing, cooking, learning, and eating; active leisure through engaging people with one another outdoors and with nature; and a sense of belonging; through personal investment, ownership, and accountability. This thesis argues that agriculture is an essential urban systems for creating resilient communities — one as important as clean water and air; roads and transportation; housing and institutions; and public parks. This thesis stresses that when people reconnect with the source of their food, they also connect with each other and, thus, creates a new type of public space within our cities.

This thesis uses the existing urban fabric of the Halifax peninsula to investigate how CPULs can be completely integrated into a neighbourhood — in this case the former DND lands, re-envisioned as the “Halifax Farmlands”. This paradigm shift of local food culture represents a goal and recognizes that it may take some time for this to happen

in existing and newly developed cities. This thesis also realizes that this lifestyle is not an option for everyone. However, by implementing urban-food growing as a system of infrastructure it becomes part of the city's foundation and allows people the option to participate, while also functioning as social infrastructure.

This thesis aims to be a guidebook for re-imagining the current and future infrastructure systems of cities, and the approach to developing new urban districts. The concept of urban agriculture and CPULs, when supported by a set of clear design principles like those proposed in this thesis, can provide architects with the tools to evaluate and design cities that support inclusive social spaces connected to nature. As each city and site are different, further research can investigate how and where this new type of infrastructure can be incorporated into other cities in Canada and across the world.

Although it is neither possible nor desirable to feed cities entirely on urban agriculture, local food production can provide community resilience, security for the entire population, encourage social interaction, and support local ownership. In times of uncertainty, and in light of the growing climate crisis, the designs of our cities must be rethought to address increasing urbanization and the need for cities to work better within their ecological contexts. This thesis argues that urban agriculture is a central part of that effort and uses our current food system as a vehicle to rethink urban infrastructure, urban design, and urban growth. The following quote by Ian McHarg eloquently expresses the foundational belief of this thesis: "we need nature as much in the city as in the countryside...let us abandon the simplicity of separation and give unity its due" (1971, 5).



Shared space: A final image of the market square, giving you the essence of the community engagement this new social hub and district provides for the residents of the neighbourhood and the greater city of Halifax.

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