Stone by Stone

A 30 Year Vision for Robust Urban Growth in Stonewall, Manitoba

Tristan Boyd Osler

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Master of Landscape Architecture

Department of Landscape Architecture
University of Manitoba
Winnipeg

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Abstract

This report examines growth and development in the town of Stonewall, Manitoba. With a 2021 population of approximately 5000 people, the town has maintained its small-town charm but anticipates growth. In 2020, the Town of Stonewall commissioned a Residential Lands Supply and Demand study to assess future demographic and housing needs. The study lays out three population growth scenarios, with the high growth scenario projecting a doubling of the population by 2055. Facing an aging population, increasing climate risks, demographic uncertainties and a development pattern favoring sprawl, Stonewall's approach to growth will shape its identity in the 21st century. This report explores how the town can grow its population responsibly by intensifying and diversifying its housing stock and infrastructure, while responding to the challenges posed by climate change and shifting demographics. The proposed design strategy focuses on urban infill and the transformation of infrastructure. The model estimates that by 2055, a total of 1790 dwelling units could be accommodated on the Main Street site – meeting the town's projected growth requirements while addressing demographic and climatic pressures. This form of sustainable, compact growth provides a resilient model for rural urban development in the face of 21st century challenges

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Dedication

To Papa, and the generation that came before.
To Johnny, and hope for future generations.

Acknowledgments

My advisor Frits, my committee members Richard and Chris; and all of my professors, classmates in the Department of Landscape Architecture. Thank you for this education.

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This project would not be possible without any of you.



PART I
Introduction

The future has many directions – the way it manifests depends on decisions made today. Landscape Architecture is deeply intertwined with futures. They both aim to understand future conditions, both require a thorough analysis of the current situation; and most importantly, both require imagination to envision a future that is desirable. This project is a strategic landscape architecture design and a vision for the future.

Framing this exploration is the Winnipeg Metropolitan Region (WMR). Encompassing the city of Winnipeg, the WMR acts as a planning framework for urban areas that flank the city. These urban areas are designated as ‘regional centres’. Regional centres have a density that supports many commercial and recreational amenities, often contained within a 'Main Street' commercial strip. This allows them to provide services to surrounding rural areas, and act as a midway point between rural life and big city living.

Figure 2 (left)
Limestone outcroppings in Quarry Park. Personal photograph. Stonewall, Manitoba, September 11, 2024.

The Winnipeg Metropolitan Region

The WMR is the planning region for Manitoba's capital city, Winnipeg. Planning regions exists in other major cities both in Canada and world-wide. These organizations work to unite local, regional, and municipal governments within the geographical catchment area of a major city. Planning at a regional scale streamlines and reduces the cost of provisioning services and infrastructure across municipal boundaries. The WMR strengthens the planning abilities of municipal governments, by providing opportunities for collaboration across the region.

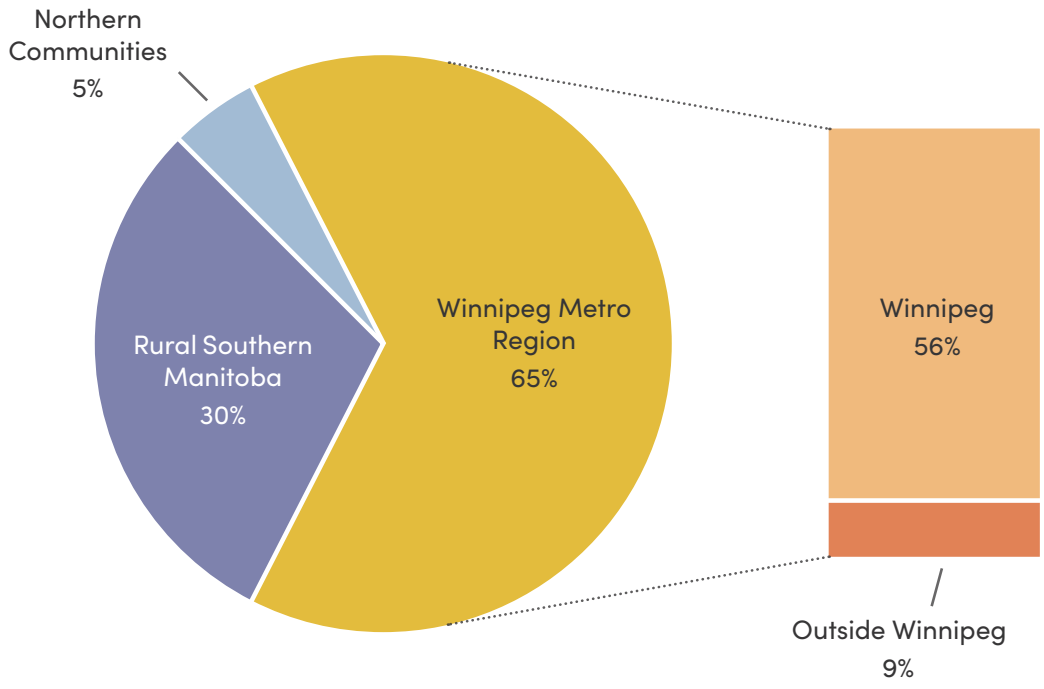
In recent years, the WMR's planning efforts have matured with the first regional plan for Manitoba; Plan20-50. This plan lays out a pathway for the region to grow and highlights the need for growth in existing Regional Centres.[1] Plan20-50 is broad in scope, emphasizing regional growth while managing natural resources responsibly.

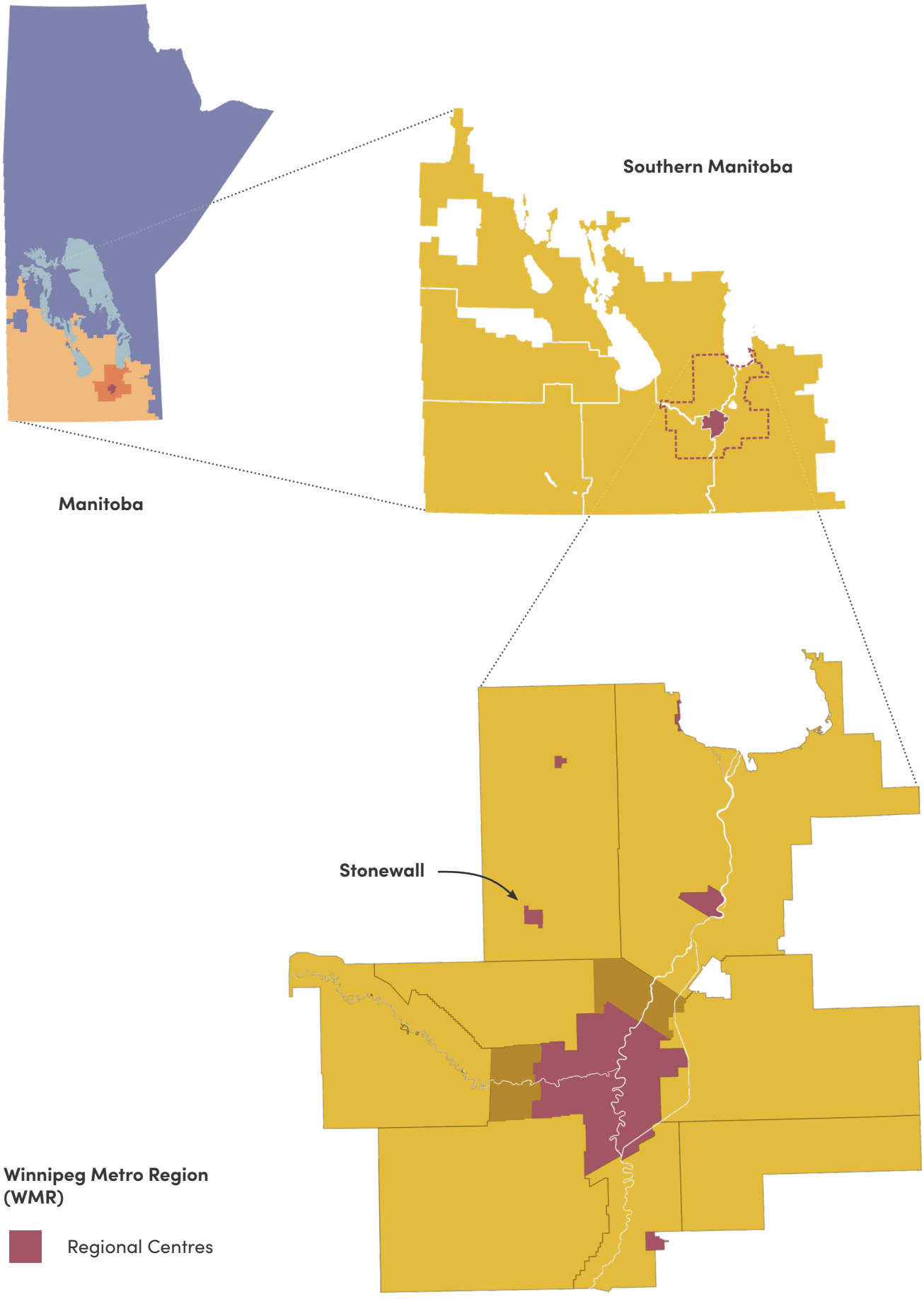
The plan highlights the need for the intensification of existing communities, to accommodate shifting demographics and the regions aging population.[2]

Ultimately, the goal of Plan20-50 is to foster complete communities that allow for a variety of uses, densities and housing options within walking distance of each other. To achieve these goals, strategies such as infill development, density targets, and long-term transit-oriented development are proposed.[3] Though politics have disrupted the initiation of the plan, this report assumes that Plan20-50 has been enacted with a similar scope to the current plan.

Figure 3 (below)
Population share within Manitoba.
Adapted from 2021 census. Statistics Canada.

Map 1 (right)
Map of the Winnipeg Metropolitan Region, with a context map of Southern Manitoba.




Manitoba
Southern Manitoba
Stonewall
Winnipeg Metro Region (WMR)
Regional Centres

Stonewall

This project is further defined by Stonewall, a regional centre in the North-West Winnipeg Metropolitan Region (NW WMR). Owing its existence to ancient outcroppings of limestone, this town's story is tied to stone. Stonewall was founded in 1879, and its early days were defined by railway speculation, and the establishment of a limestone quarry industry.

The quarry industry provided resources for regional development and remained the key economic driver for Stonewall until the 1960s, when the town's main quarry was closed. The quarry was donated to the town and became 'Quarry Park'. This original quarry continues to define the contemporary identity of the community, and acts as a major recreational and cultural hub for the region. In recent times, the quarry industry has restarted again, blasting massive quarries to the northeast of town.

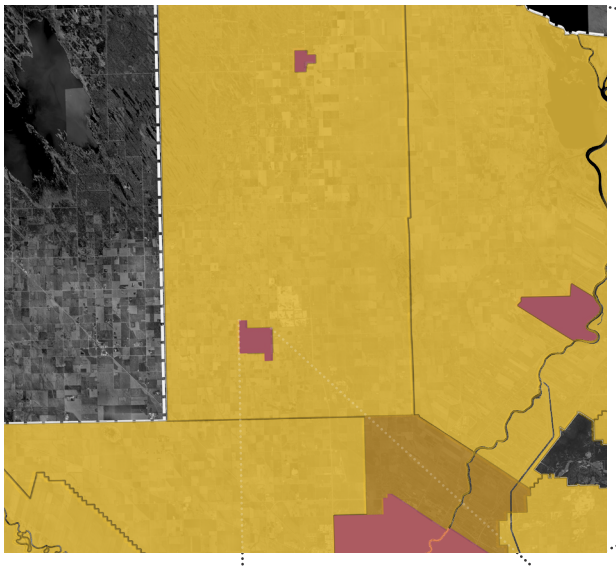
Over the last 50 years, Stonewall has matured into both a major regional centre for the NW WMR and a bedroom community serving Winnipeg. With a regional catchment encompassing the Rural Municipalities of Rockwood, Woodlands, and Rosser; Stonewall provides amenities to smaller towns like Teulon, Stony Mountain, Balmoral, and Warren. Many of Stonewall's residents commute to Winnipeg for work, while many others in the region commute to and from Stonewall for work, or school.

Located on an elevated limestone ridge, it does not have any natural bodies of water running through it. However, with ample access to a large underground aquifer, the town has successfully relied on groundwater wells for its water supply. To the west of town are its recently expanded wastewater lagoons and Grassmere Creek, which has taken the form of a drain in modern times.

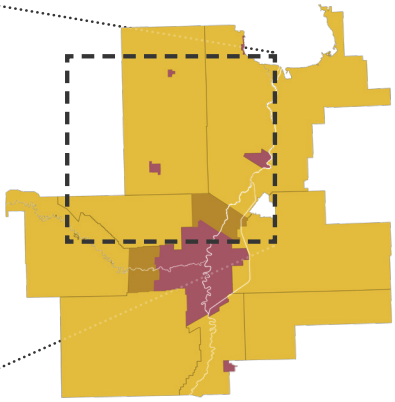
Stonewall's residents enjoy being close to Winnipeg while still living in a quiet rural atmosphere. With a 2021 population of 5000 people, and a small urban footprint, Stonewall has been able to maintain a small-town charm.[4] This manifests in an active main street with a rich commercial scene, historical buildings with facades of local limestone, and a tight knit community of people that know and help each other.

In 2020, the Town of Stonewall commissioned a Residential Lands Supply and Demand. The purpose of this study was to understand the future demographic and housing needs of Stonewall. The study lays out three population growth scenarios: low growth (1%) Medium growth (1.5%) and High growth (2%). Using the high growth scenario, the report estimates that Stonewall will reach 10,410 people by 2055.[5] The way that Stonewall approaches this growth will define the town in the 21st century.

Map 2 (right)
Map showing Stonewall, within the context of The Winnipeg Metro Region.



NW WMR



Winnipeg Metro Region



Stonewall

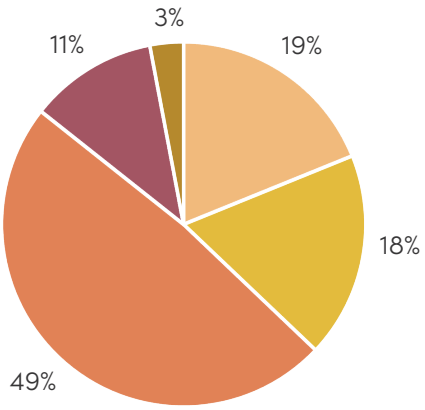
Problems

Regional Centres, like Stonewall, will face four key challenges over the next 30 years. These challenges are defined by shifting demographics, climate change, fluctuating populations and urban sprawl.

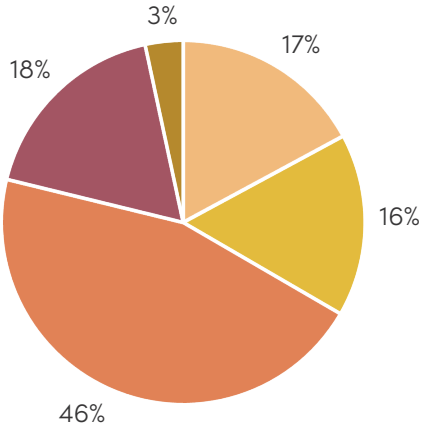
Shifting Demographics

The region's demographics are changing. As of the 2021 census, 21% of the population of Stonewall was over the age of 65. With an average age of 43 years old, Stonewall has already begun to see people steadily entering their senior years.[6]

Changes in the demographic makeup are putting pressures on the capacity of healthcare and eldercare amenities. The demographic problem is made worse by a lack of young people staying in town – seeking better opportunities in large cities. Without retaining young people or attracting newcomers, there will be no one to staff or expand the amenities needed for an aging population. This means a 'greying town' with no younger generation to take over.



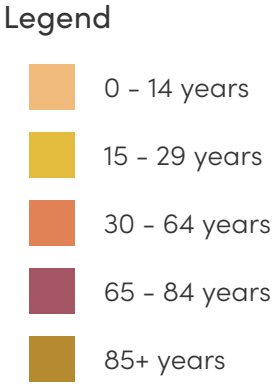
2011

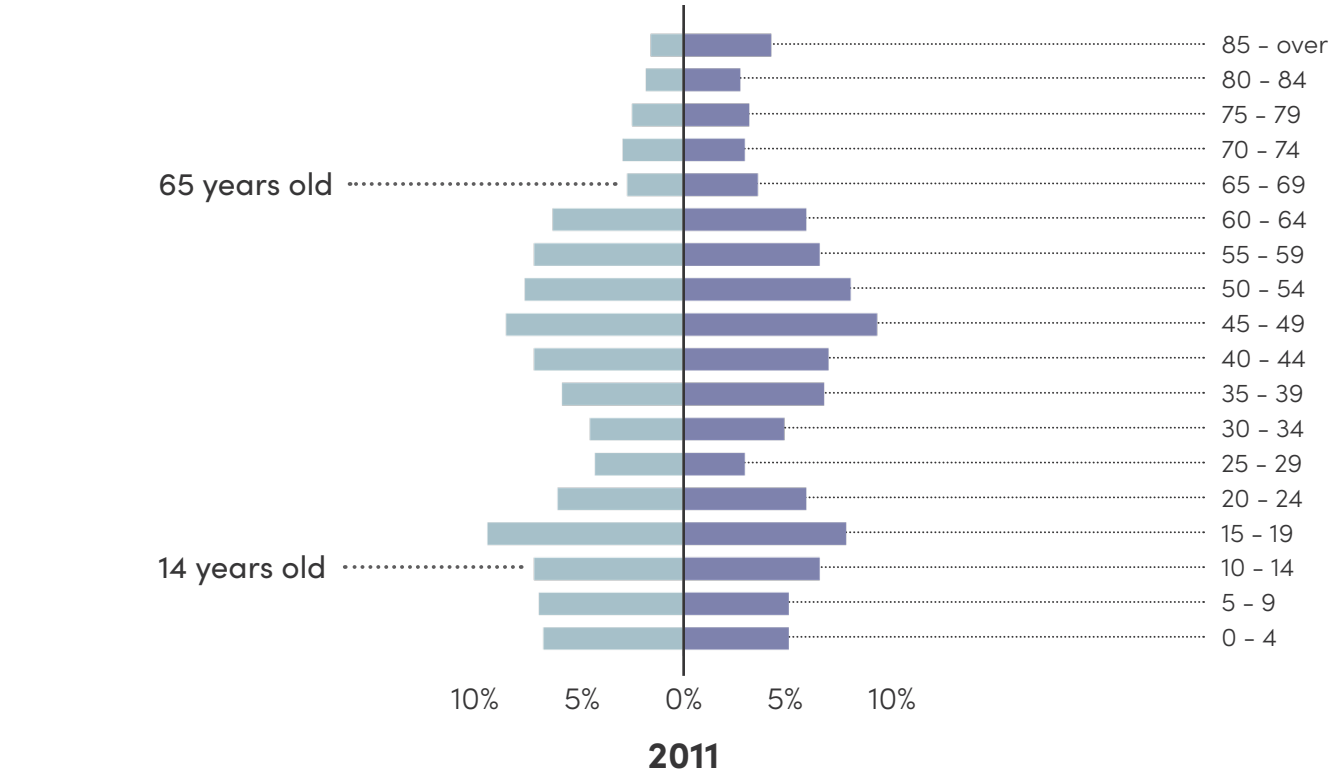


2021

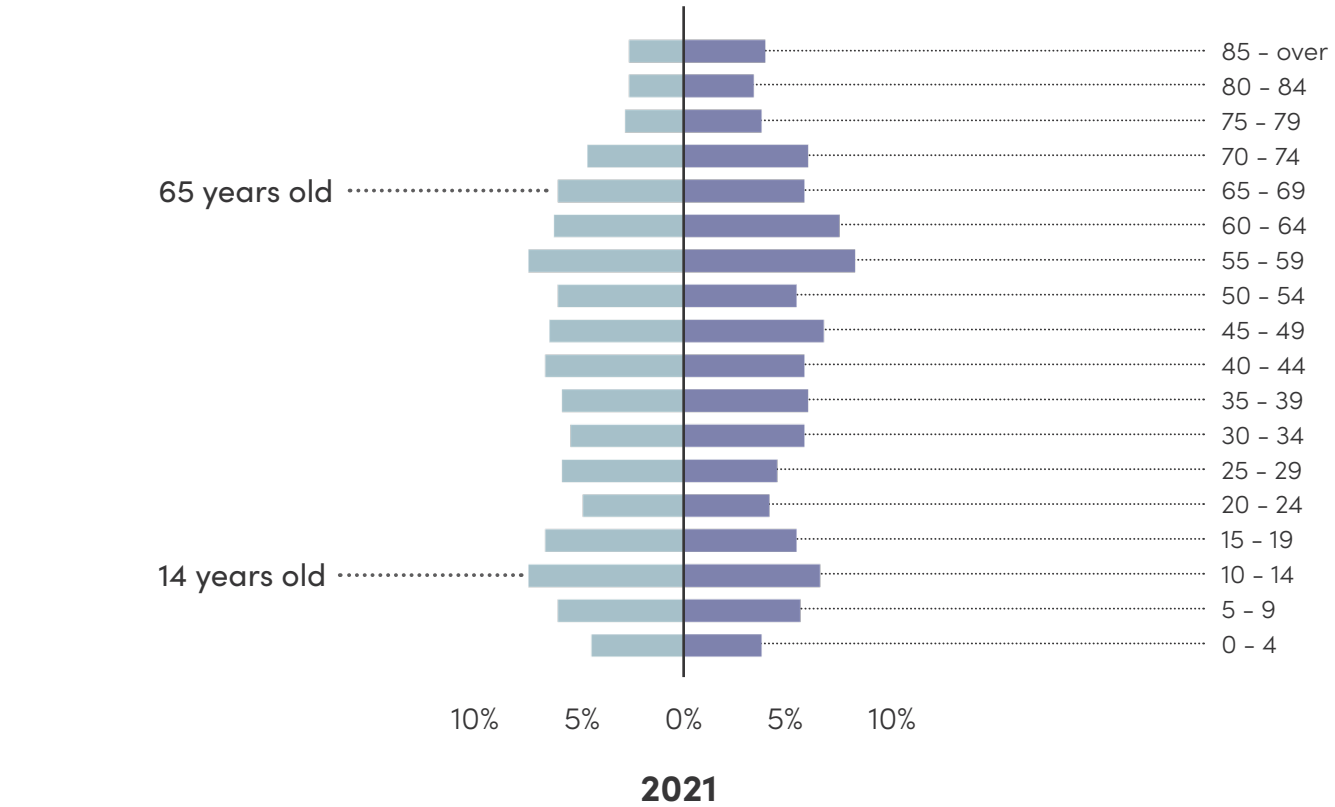
Figure 4 (left)
Demographic makeup of Stonewall.
Data adapted from Census 2011, 2021. Statistics Canada.

Figure 5 (right)
Demographic pyramid chart for Stonewall.
Data adapted from Census 2011, 2021. Statistics Canada.





2011



2021

Legend

Females Males

Climate Change

As climate change alters environmental risks in the region, areas like Stonewall will be more prone to more extreme heat events, long lasting droughts, strong storms and an increased potential for overland flood events. However, there are also some benefits; the region will see a longer frost-free season, more annual precipitation, and more growing degree days.[7]

These changes will allow new plants and crop species to become available in the region. This could mean more varieties of crops, trees, flowers and other edible species. However, this also comes the potential migration of new pests and invasive species into the region.[8]

To mitigate the worst effects of climate change on communities and ecosystems the region will need to consider the impacts of human activities and allow space for natural systems and ecological services. This is specifically important to consider when it comes to expanding and planning the future of urban areas.

More hot days (+30 °C days)

Past average	1976 - 2005	9 days	
Predicted change	2050	23 days	+ 14 days
	2080	43 days	+ 33 days

More frost free days

Past average	1976 - 2005	128 days	
Predicted change	2050	148 days	+ 20 days
	2080	168 days	+ 40 days

More precipitation

Past average	1976 - 2005	503 mm	
Predicted change	2050	534 mm	+ 6% more
	2080	538 mm	+ 7% more

More growing degree days (GDD) *

Past average	1976 - 2005	1726 GDD	
Predicted change	2050	2116 GDD	+ 390 days
	2080	2545 GDD	+ 819 days

Figure 6 (immediate right)
Predicted environmental changes in the WMR. Data from The Climate Atlas of Canada. 'Region: Selkirk'. Data-grid 647.

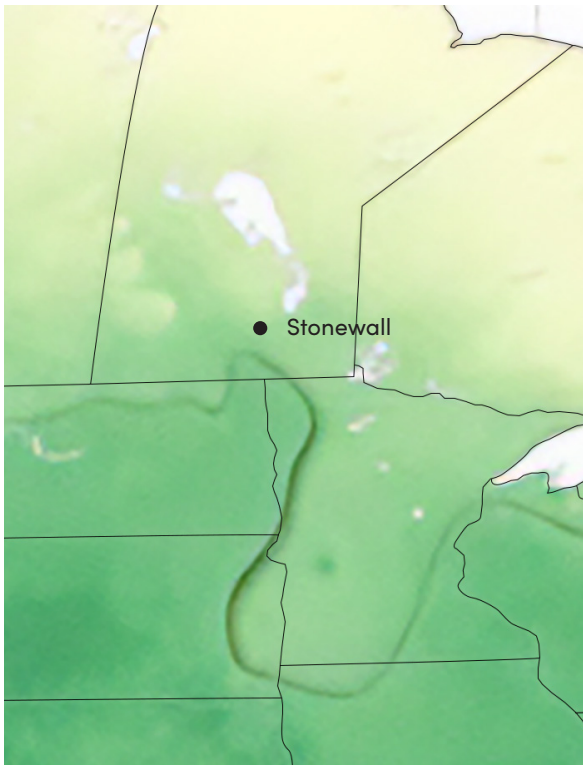
* Growing degree days (GDD) are an average of daily maximum temperature against a 5 °C base temperature. GDD measures the heat available for growth and maturation of plants and insects. GDD is often used to determine the suitability of a climate for specific plants/crops and insects.

Fluctuating Populations

As global climate change intensifies, massive shifts in regional climates will take place. In 2020, a report titled Future of the Human Climate Niche laid out these regional changes over 50 years.[9] This report analyzes the climatic region that has traditionally been the most suitable and productive for human needs. This area is dubbed the 'Human Thriving Zone'.

The report's findings show that the North American 'Human Thriving Zone' is moving slowly moving northwards.[10] Under extreme climate change, the report predicts that the 'Human Thriving Zone' will enter southern Manitoba by the 2070s.

This shift could result in population growth in the WMR over the next 50 years. This growth could manifest itself as a trickle of immigrants, seeking better weather, or a full-on population boom triggered by a major natural event. As the region is primed to accommodate future growth, it is pertinent that this rise in population doesn't further influence and intensify existing demographic and climatic challenges.



Conditions: 2070 *Credit: ProPublica*

Under extreme climate change



Historical conditions *Credit: ProPublica*

Figure 7 (right)
Predicted changes to the human suitability zone over the next 50 years.
Adapted from Lustgarten et al. ProPublica, 2020.

Legend

More suitable →

Urban Sprawl

Contemporary growth patterns in the region have been defined by the creation of car centric developments. These developments typically include spaces for residential use, and spaces for commercial use. Connecting these uses are large roads, dotted with driveways in residential areas, and parking lots in commercial areas. Car centric developments, specifically commercial developments like big box stores and strip malls, take business and economic activity away from traditional commercial strips, like Main Streets, and can result in a decline in their economic and social function.

This rigid separation of uses and amenities, combined with the prioritization of movement by car, results in inequalities for segments of the community. Without owning a car, or having the ability to drive, car centric areas make it challenging to access daily needs or get in and out of the neighborhood on foot. These difficulties are especially felt by senior citizens, and young people.

Car-centric developments also take up excess land, often expanding the footprint of an urban area. This expansion requires new infrastructure, like roads and sewer systems, which require regular maintenance and replacement. Often, car centric developments do not provide the tax base to fulfill these maintenance burdens, which can lead to future financial issues.[11] Not only does this strain local governments, but it also intensifies threats posed by climate change like the formation of urban heat islands.

Expanding the urban fabric of regional centres, like Stonewall, with car centric development would worsen the existing demographic issues and create infrastructure maintenance burdens. In an era of increased climate change, these forms of development will only create more issues for Stonewall, and the greater region.

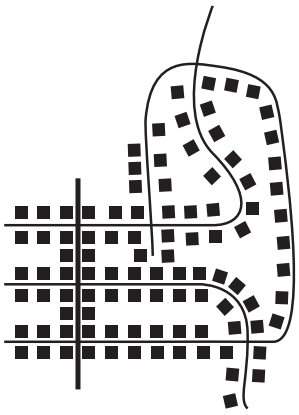


Figure 8
Car centric developments create inefficient street layouts.

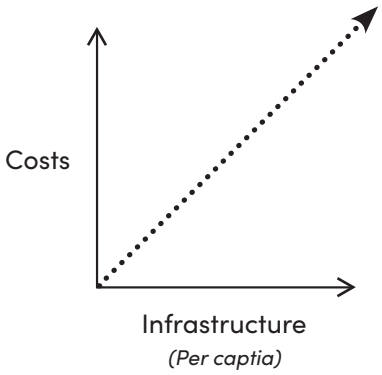


Figure 9
Expanding a towns footprint means more costs.

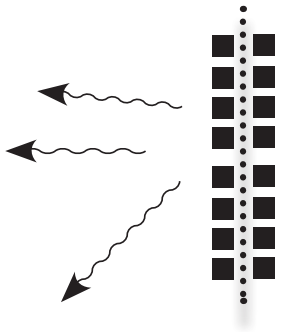


Figure 10
Divert the focus away from main streets.

Problem Statement

With an aging population, increasing climatic risks, future demographic uncertainties and an urban growth regime that promotes sprawl, regional centres face four key challenges over the next 30 years:

- Accommodating the demographic needs of an aging population.
- Mitigating, adapting, and planning for the effects of climate change.
- Sustainably preparing for potential population fluctuations.
- Finding an alternative to growth through car centric developments.

To better understand the challenges faced by regional centres in the WMR, and potential solutions to these challenges, Stonewall was chosen as the site of the analysis and design solution.

Design Objectives

The resulting design will include a vision for the NW Winnipeg Metropolitan Region, a vision for the Town of Stonewall, and a detailed design for a portion of Stonewall's Main Street.

The design suggests that Stonewall reorient its growth inwards. With a focus on a diversification of housing options through the addition of infill development on Main Street, and its bisecting Avenues. With this growth, Main Street needs to be re-imagined into a walkable public space that responds to the town's social and demographic needs, while adapting the urban area for the effects of climate change. To achieve this, the design will need to:

- Accommodate an aging population.
- Allow for Stonewalls desire to grow.
- Mitigate the effects of climate change.

Research Question

This report seeks to understand how Stonewall can responsibly grow its population capacity through the intensification and diversification of both its housing stock and existing infrastructure, while addressing the threats that are posed by shifting demographic patterns, and climate change.

Methodologies

To explore the site and its challenges, this project has used a combination of analysis techniques. Including both physical and theoretical analysis. These methods all to assist in understanding the primary components of the site, and its informing elements.

Historical Analysis

- Reviewing and interpreting the palimpsest of the broader region, the Winnipeg Metro Region and Stonewall's palimpsest allow for an understanding of the nuanced historical layers present on each site.

- Social and climatic interactions are tied into the palimpsest study to provide a better image of the sites' past.

Theoretical Analysis & Precedent Studies

- Researching and understanding applicable theories, and principles that could be used to achieve and justify a viable design solution.

- Reviewing successful projects and judging them based on the theories analyzed.

Physical Analysis

- Site visits to Stonewall, including site walks, on main street, the railway trail, older neighborhoods and Quarry Park. Visits to the local interpretive centre, and a meal at a local restaurant.

- Due to vehicular constraints, site visits have been limited, but driving through town has also provided valuable analysis of the outlaying suburban neighborhoods.

Mapping & GIS Analysis

- Analysis of maps has allowed for a seamless view of the landscape, at a variety of scales.

- Integrating the maps from the Palimpsest research into GIS has allowed for a physical understanding of the flow and arrangement of the landscape.

- Visual analysis of maps, through use of satellite imagery technology, and street view services has proven extremely helpful in gaining a regular familiarity with the landscape.

Modeling

- Modeling has allowed for a deeper spatial analysis and perspective into the site.

- Digital modeling in Sketchup allows for quick iterative design development, and a basis for final drawings.

- Physical modeling with foam helps with analyzing refining the form of the design.

Drawing & Tracing

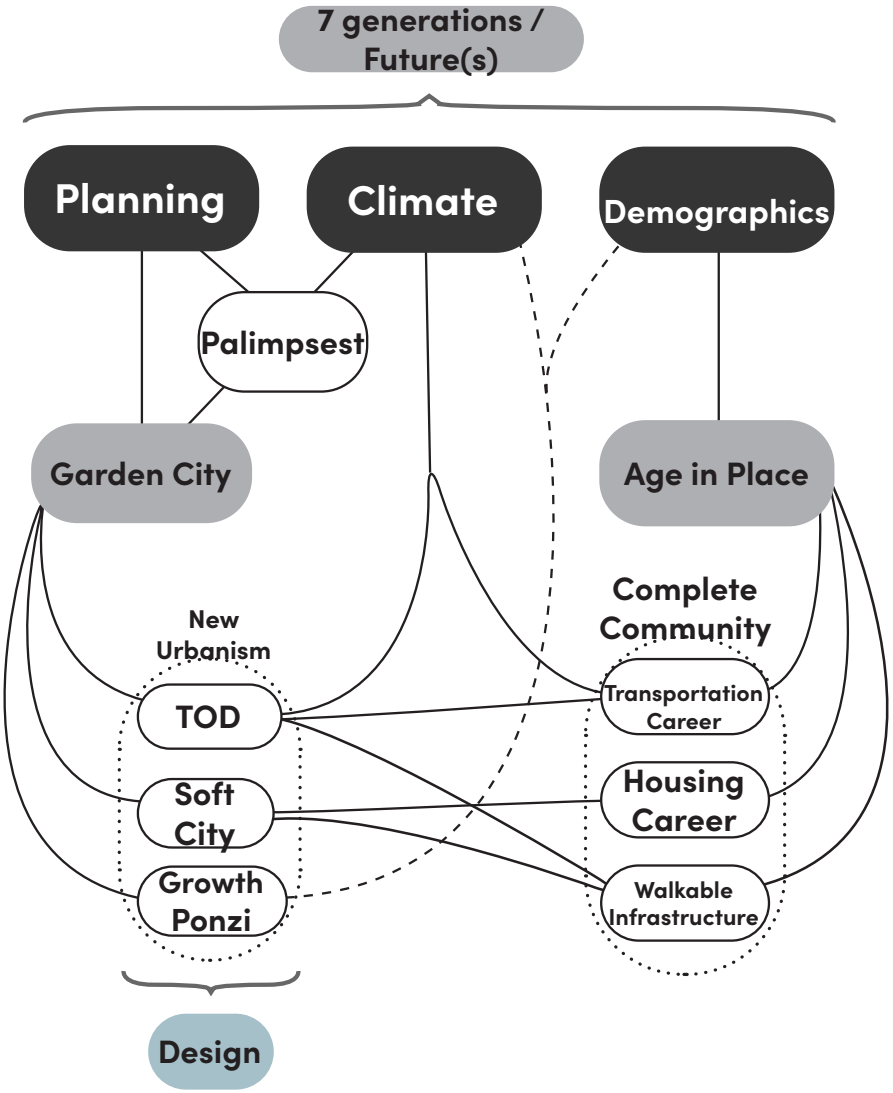
- Drawing on maps with provides another angle for analysis, and the freedom of movement and physical feedback it provides encourages the exploration of design ideas and approaches.

Theoretical Framework + Approach

With the need to adapt to shifting demographics, population fluctuations and climate change. The design needs to be tied to theory, and existing principles that can alleviate these pressures. Theoretical analysis has looked at key urban design and sociological principles to help highlight where a design solution should be focused. The topics reviewed are: Garden Cities, The Growth Ponzi Scheme, Age in Place, Future(s) Studies, New Urbanism, Infill TOD, Housing Careers, and Soft City.

With the multitude problems facing Stonewall, and the greater region, a strategic approach is required to understand how these challenges could be alleviated. The remainder of this work will provide a careful review and inventory of the site covering its physical and social features. This information will be paired with theoretical analysis to help find viable design solutions. To begin the analysis an understanding of the sites history and background it required.

Figure 11 (below)
Theory interrelations diagram.



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1. Winnipeg Metropolitan Region, “Plan20-50 – *First Reading*,” https://20to50.ca/, January 2024, 57.
2. Ibid, 11.
3. Ibid, 58.
4. Statistics Canada, “Census Profile, 2021 Census of Population profile Table,” Profile table, Census Profile, 2021 Census of Population - Stonewall, Manitoba, August 2, 2024.
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6. Statistics Canada, “Census Profile, 2021 Census of Population profile Table,” Profile table, Census Profile, 2021 Census of Population - Stonewall, Manitoba, August 2, 2024.
7. Climate Atlas of Canada, and Prairie Climate Centre. “Winnipeg: Climate Atlas of Canada,” Climate Atlas of Canada, July 19, 2019. https://climateatlas.ca/map/canada/annual_meantemp_2030_85#z=7&lat=49.78&lng=-95.57&grid=646.
8. Ibid.
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10. Ibid.
11. Charles Marohn, “America’s Growth Ponzi Scheme,” Strong Towns, August 30, 2024.



PART II
Design Research

PALIMPSEST RESEARCH

DESIGN STRATEGIES

PRECEDENTS

Figure 12 (left)
Suburban development on the edges of Stonewall.
Personal photograph. January 13, 2025.



PALIMPSEST RESEARCH
Palimpsest

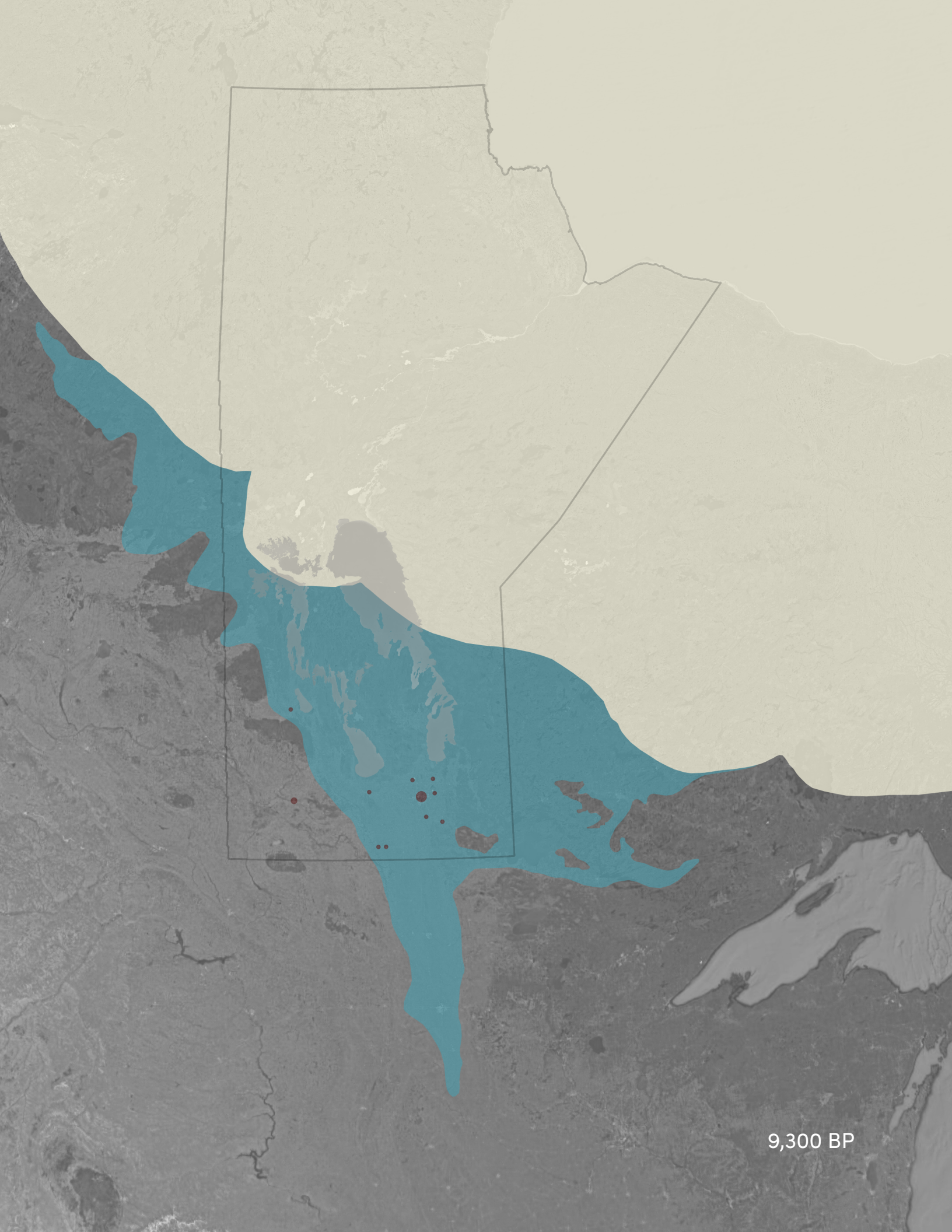
Introduction

A palimpsest is something that has been altered but still holds traces of its past form. The word is derived from manuscripts – where the original authors would re-use paper by erasing old materials and writing new works. Through careful analysis, historians are able to uncover the marks from the erased material – uncovering its palimpsest.[12]

This chapter allows for a review and interpretation of the region's physical palimpsest. This scaled and layered approach allows for a more complete understanding of the nuanced features present on each site. By pairing these observations with their social, cultural and climatic context, an understanding of the sites temporal patterns is achieved.

This analysis reviews seven layers of influence: the ancient, the ecological, the pre-settlement, the fur trade, the colonial, and the boom times. This analysis is then folded into a review of contemporary influences. To start, the analysis begins deep in the past, at a time when glaciers reined supreme across the landscape.

Figure 13 (left)
Limestone kilns in Quarry Park, under repair.
Personal photograph. September 11, 2024.


9,300 BP

PALIMPSEST RESEARCH

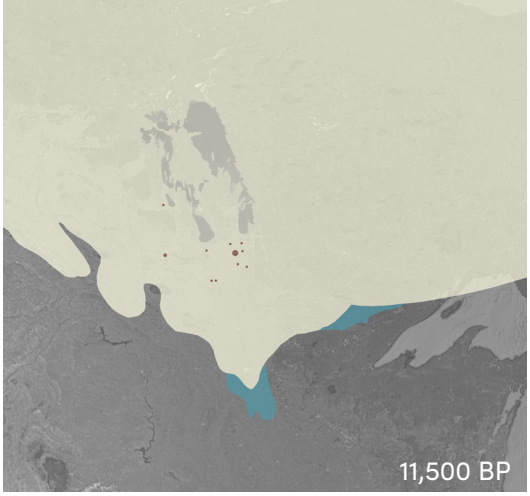
Layer 1: The Distant Past

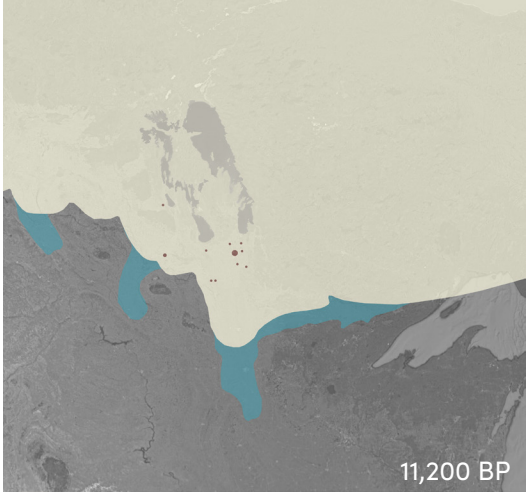
Introduction
Beaches and Soils
Glacial Wonders
Manitoba's Material Palette
The Extreme Past
Within the context of Stonewall
The lasting effects on the landscape

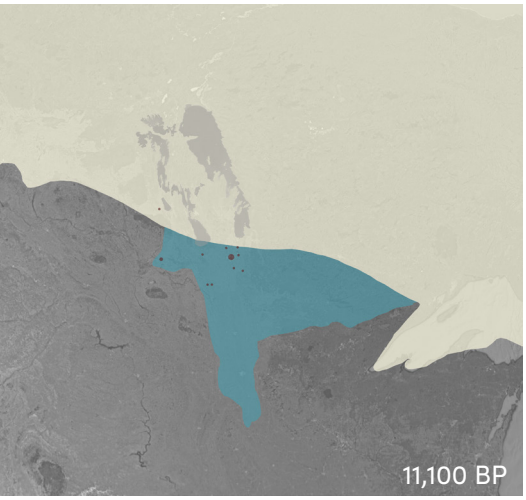
Map 3 (left)
Map of Lake Agassiz and Laurentide Ice sheet, 9300 BP. GIS Map.

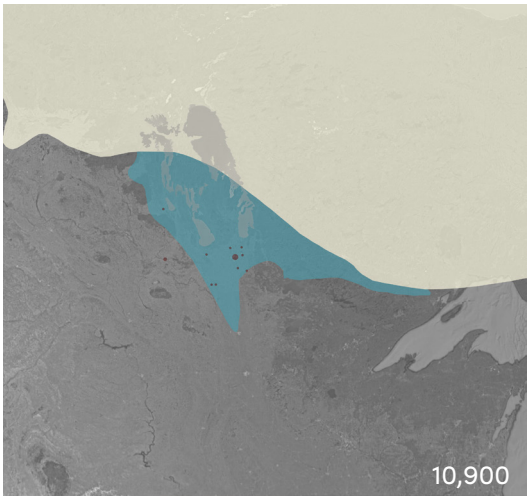
Adapted from Teller et al."Geomorphic and Sedimentological History of the Central Lake Agassiz Basin." 1996.

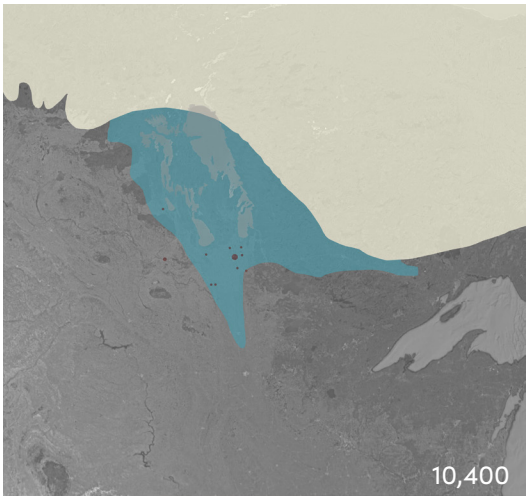


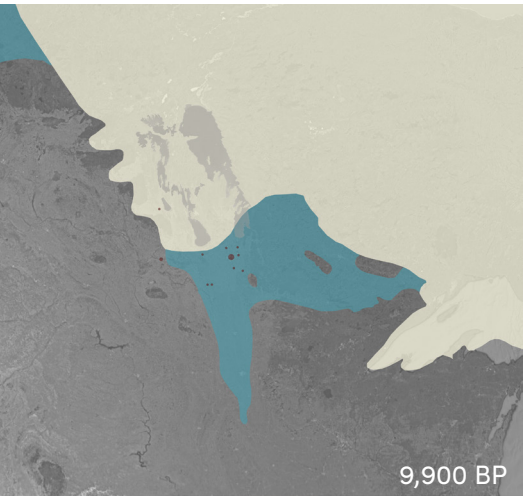


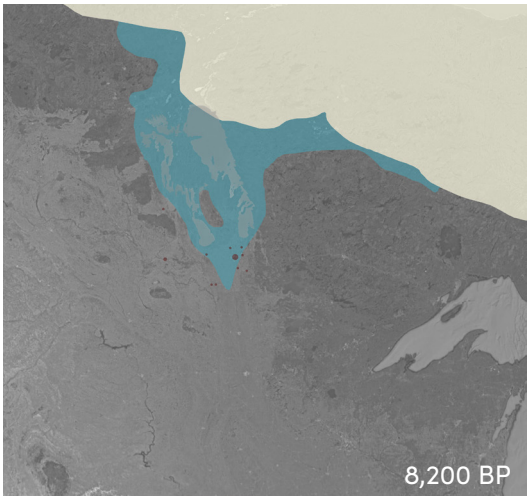


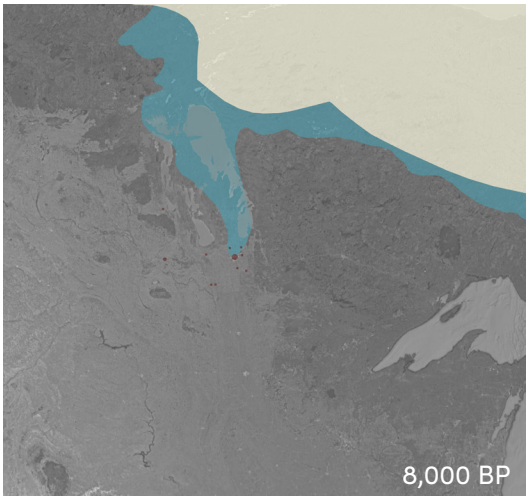


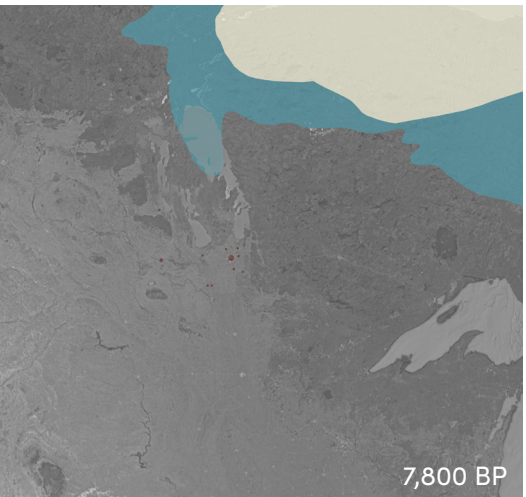


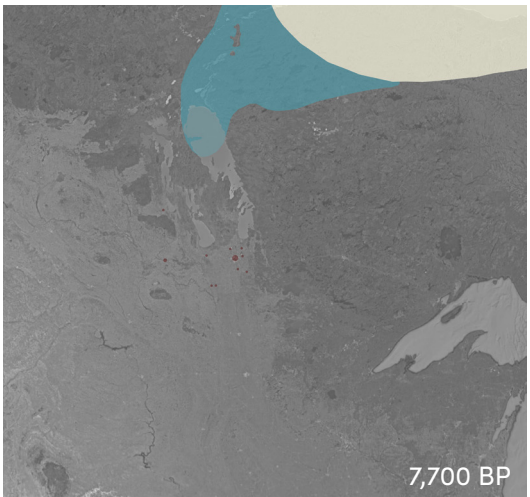












Maps 4 - 14
GIS Maps showing the various stages of Glaciation and Lake Agassiz, from 11,700 - 7,700 BP. Note that 9,300 BP is depicted on page 18.

Adapted from Teller et al.“Geomorphic and Sedimentological History of the Central Lake Agassiz Basin.” 1996.

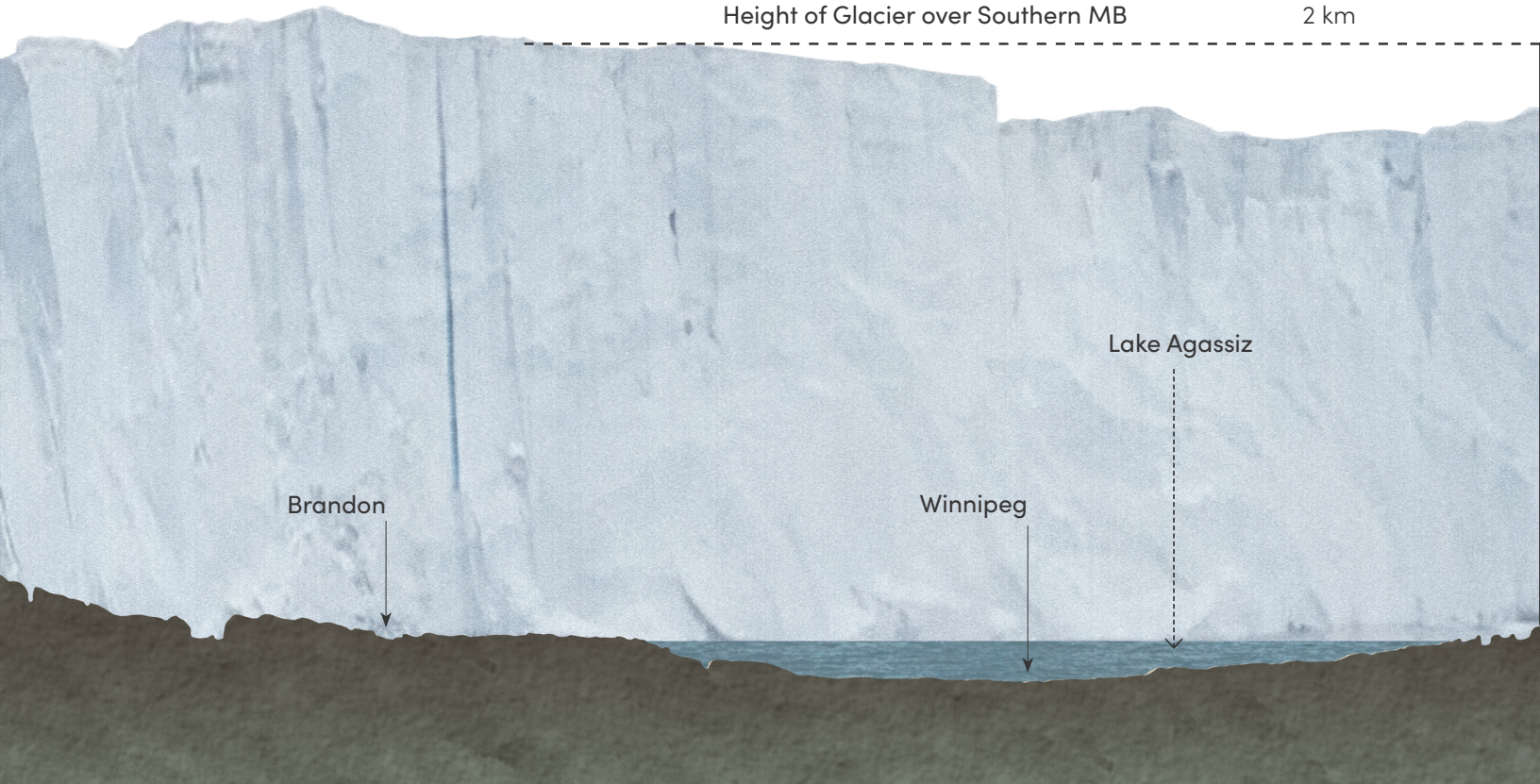
Introduction

Two kilometers above Southern Manitoba there once stood a mighty glacier. Known as the Laurentide Ice Sheet, it engulfed and compressed the landscape. As the glacier grew and receded over thousands of years, it decimated the preexisting landscape by carving up rock into till and carrying boulders across regions. In times of glacial recession low laying areas would be inundated with melt waters. Glacial forces can be identified by the physical imprints they left on the landscape, like moraines, eskers, beaches, and out-washes.

In Manitoba, the most influential of these physical imprints come from an immense glacial Lake. Around 11,500 years ago, glacial melt-waters began to pool at the foot of the Laurentide ice sheet, forming the massive glacial Lake Agassiz. At one time, Lake Agassiz was the world's largest lake, covering a total area of 263,000 km^2.[13] Lasting in some form, the lake molded the landscape continuously for 6000 years.[14]

During this span of time the interaction of the water and land allowed extensive beaches to form wherever the lake met the landscape. The waves from the lake carried silt, sand, and sediment. Even boulders would get carried away by the force of the waves. This ancient sorting of material provided the contemporary basis for soil and surface composition of Southern Manitoba.

Figure 14 (Below)
Section of Lake Agassiz and Glacier, 9300 BP.



Beaches and Soils

Lake Agassiz imprinted itself on the landscape by assembling immense amounts of materials into distinct forms. The best way to understand this ancient sorting is by examining how beaches formed, and in turn, how materials were spread across the ancient lake-scape.

Lake Agassiz's waves carried an immense force. Smaller materials like sand and gravel were light enough to be easily carried to shore and settle into linear banks. The materials were further sorted in situ. Larger materials settled into a layer below the surface, while smaller aggregates and sands rose to the top. These materials would erode further by the lapping of waves over time. Sometimes, forming very fine sands. Materials, like tiny particles of silt settle slowly, and do not easily form embankments. However, once they reach the lakebed, they join it, forming into layers of the clay.

The icy lake swells also had the power to throw boulders around. The weight of the boulder would determine whether they would remain settled at the lake bottom or be thrust to shore. These boulders are refereed to as erratics, due to their irregular placements. Erratics were left in place by the glacier as it receded. Some erratics have not moved since. Contemporary soil composition, quality, and drainage in the region is deeply related to these sorting actions. The low laying clay lakebed became informed by marshes and tall grasses, while upland areas remained well drained, and less homogeneous in their material makeup. The beaches from the lake became important for the movement and spread of plants, animals, and eventually people.

With good drainage and linear forms, beach sites acted as trails for thousands of years, allowing Indigenous people, and early settlers to move across parts of the province. They also allowed for easy access to resources like stone, gravel and sand, and provided sites for well drained burial grounds.

To this day many beaches are still used as the foundations of roads, railways, or paths. Upland areas, being informed by more nuanced glacial forces, remain more diverse in their soil compositions, and surface texture. While the low laying areas of the former lakebed, with rich clay soils, have been drained for agriculture.

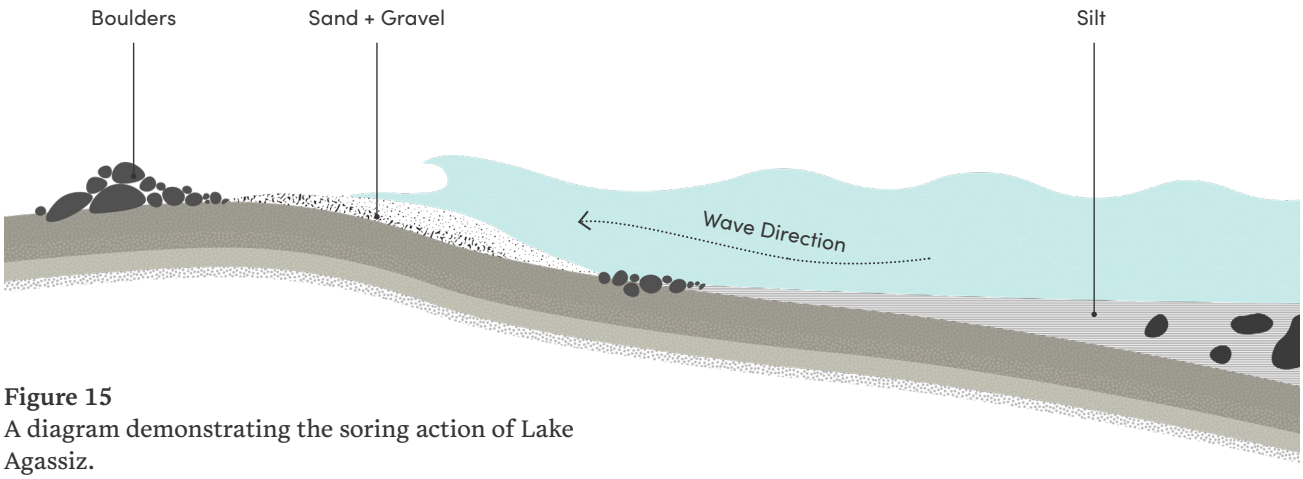


Figure 15
A diagram demonstrating the soring action of Lake Agassiz.

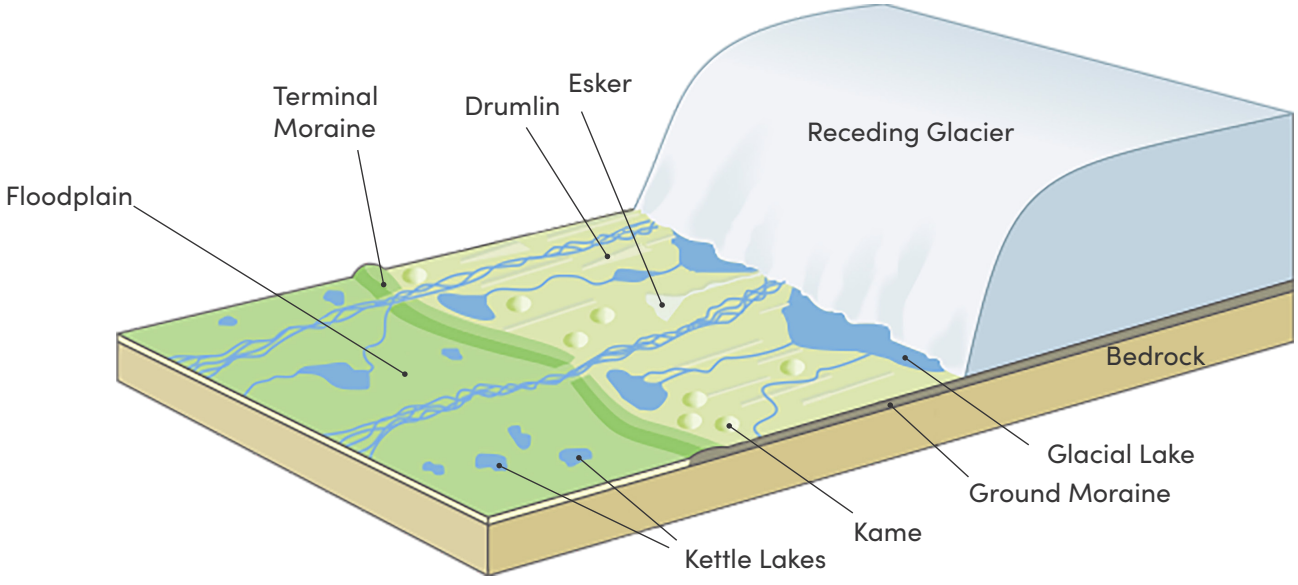
Glacial Wonders

Areas not directly influenced by the sorting action of Lake Agassiz were shaped by glacial forces. The forces of the glacier also sorted materials, but in a more chaotic fashion. When glaciers were growing in size, they would plow materials in front of them, like a big shovel. As the glacier, a liner mound would be left behind - this is known as a moraine. Where the glacier touched bedrock, it eroded and ground the layers of preexisting landscape. This created immense amounts of gravel, sand and silt. In some areas, the glacier would leave behind a chunk of ice. If the ice floated on the surface of a glacial lake, it may form striations or scrapes on the clay lakebed. If it was left buried under till, this ice would then melt and form a small round lake. These are known as kettle lakes. In areas where the bedrock was exceptionally sturdy, it would remain and be shrouded in till. As the glacier left, the till would form over the bedrock into a hill known as drumlin. Within the ice of the glacier, rivers flowed and moved materials internally. As the glacier receded, these stream beds would rest into linear mounds on the surface. These are called eskers. Where the streamed fanned out of glacial tunnels, they would form deltas. Sometimes pockets of materials would be left in place, later forming hills known as kames once the glacier melted.

Though they existed many centuries ago, the impacts of glaciation and Lake Agassiz are foundational to understanding how this landscape has emerged and developed over time. Glacial landforms and material deposits have influenced our use and understanding of the landscape.

We have them to thank for the placement of our fields, the locations of forests, the revealing of ancient limestones, and the depositing of unique materials. The locations of highways, trails, and rail lines, burial grounds, towns, and some of the best places for recreation in the province. Under everything we have built, everything we have placed within the landscape, are the soils, sands, and tills left by the glacier; sorted into an order in which we now rely.

Figure 16
A diagram demonstrating the soring action of Lake Agassiz. © Hans Hillewaert / CC BY-SA 4.0



Manitoba's Material Palette

The material palette of Southern Manitoba is underscored by its geology and glacial history. Deposits of sand, clay, erratic boulders, and areas of revealed bedrock throughout the region provide many human uses, specifically in construction.

Sand
At the turn of the 19th century a glass making factory near Beausejour used the fine silica sand deposited in the area to produce glassware, like jars and bottles. The resulting glass had a greenish hue, characteristic of the local sand. There is no longer any production of local glass in Manitoba.[15]

Clay
The silt from the lakebed has also proven to be a fine material for creating bricks. Many brick manufacturers once existed in the province, with each resulting brick having its own characteristics and hue relating to the local silt/clay it was sourced from. Though in modern times, there is no longer widespread production of clay bricks.[16]

Erratic boulders
The granite provided by erratic boulders have proven useful as a building material, in some older structures in the region.[17] However, its use was typically limited to local supply, as their placement is erratic throughout the landscape, as implied by the name.

Access to bedrock
In some areas, bedrock was revealed because of glaciation. These outcroppings of ancient stone have proven extremely useful for not only for material purposes, but also for examinations of the geological record.

The type of bedrock exposed depends on the region. Within the WMR, the dominant bedrock formations are those from the Ordovician period.

Dating back 460 million years, this layer houses the fossils of an ancient sea. Limestone in this layer, is made up of 4 formations - each representing a different time in history. The most prominent formation for building and cultural purposes is Tyndall stone. When cut, this type of limestone is rich with fossils, and texture. It has been used in buildings like the Manitoba Legislature, and the Canadian Parliament.

Figure 17
A diorama depicting the Ordovician sea.
Photo © Manitoba Museum, Winnipeg, MB.

Figure 18
A nautiloid cephalopod fossil, overlaid with an outline of the sea creature. These fossils are often found in the Ordovician formation.

Figure 19
Layers of the Ordovician geological record under Southern Manitoba. Adapted from Cross section of Manitoba, Government of Manitoba.

The Extreme Past

During the Ordovician period, southern Manitoba was the floor of a shallow sea. For centuries, debris from plant matter, corals and shells fell to the sea floor, where they gradually compressed into sedimentary layers. As millennia went on, these layers were hidden beneath the earth. Disruptions from glaciation revealed these layers. In southern Manitoba, deposits of this ancient past are accessible in Stonewall, Stony Mountain and Tyndall/Garson area.

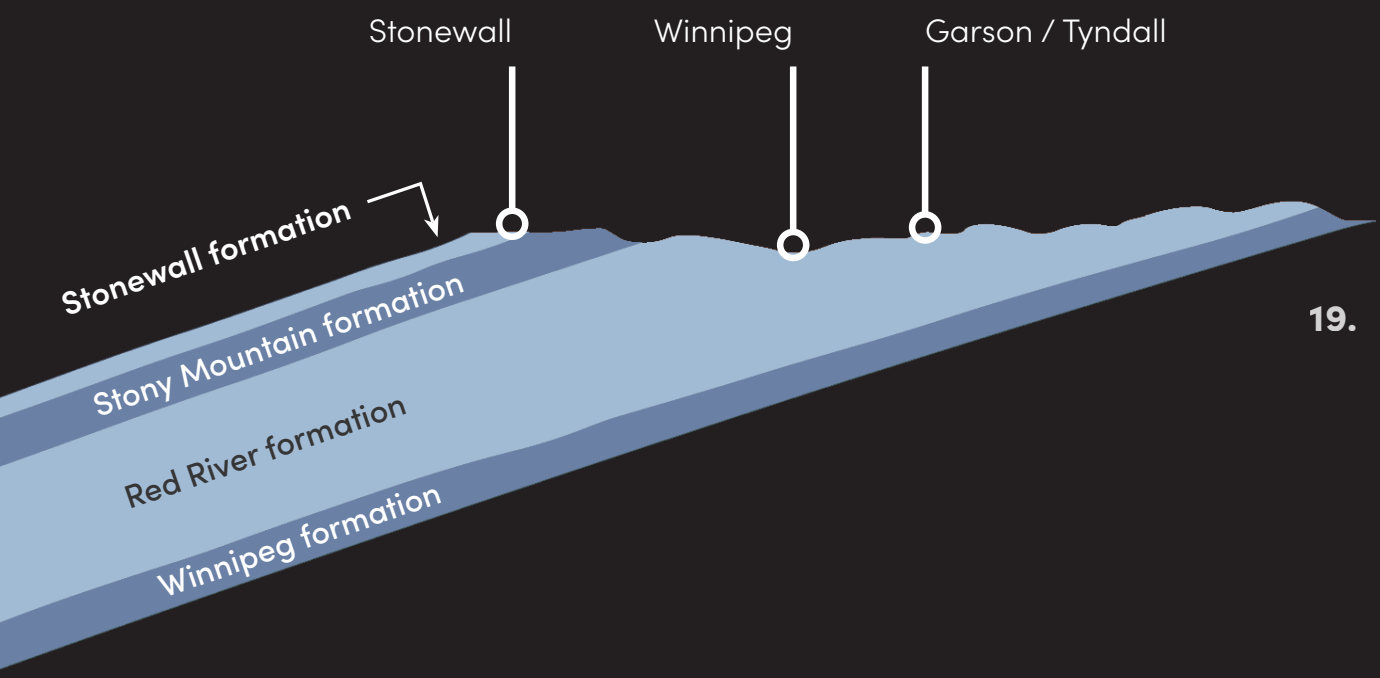


17.

Photo © Manitoba Museum, Winnipeg, MB.



18.



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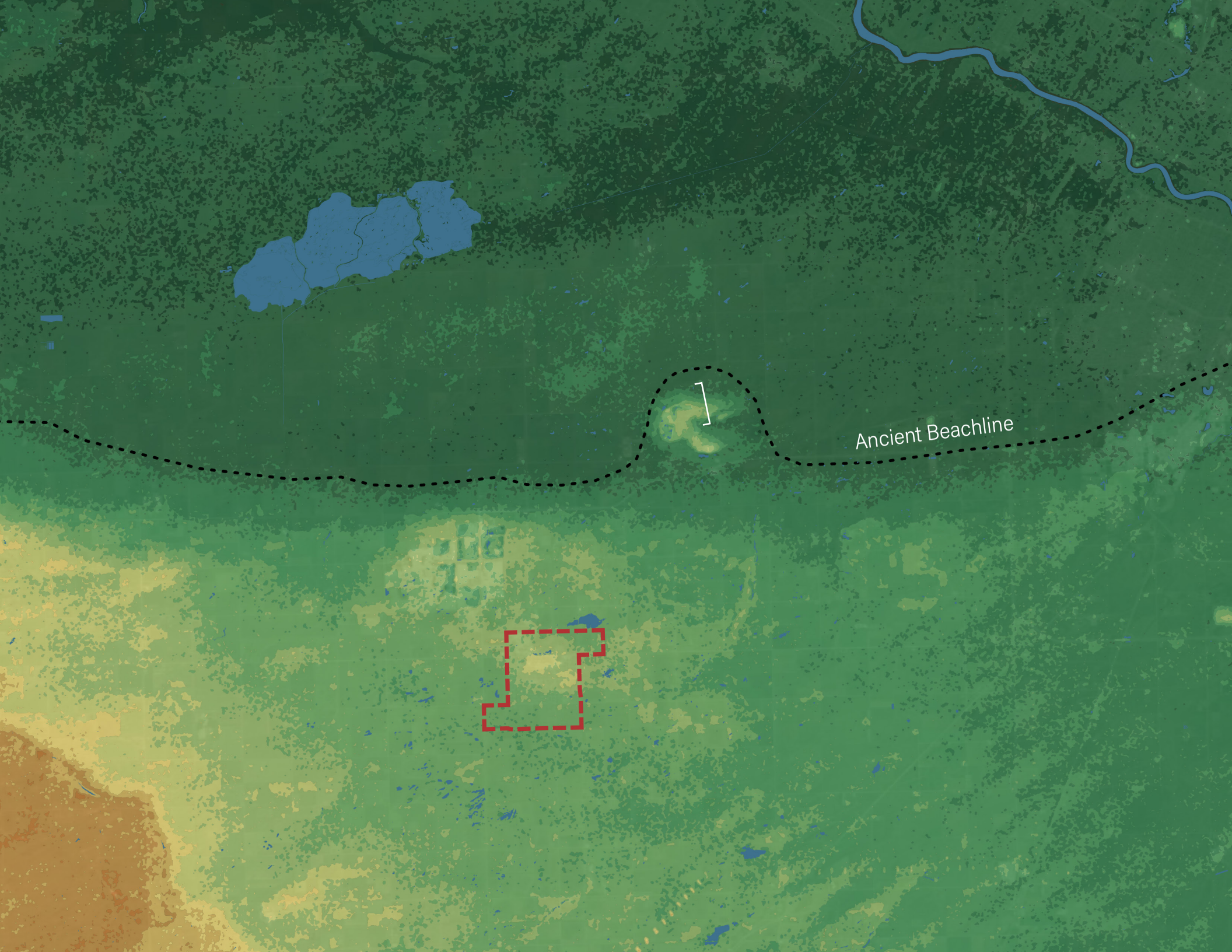
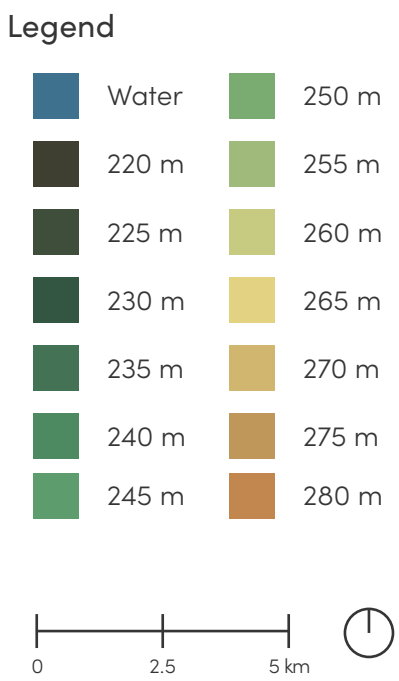

Ancient Beachline

Map 15 (left)
Relief map of Stonewall area, with annotations showing the ancient beach lines, and recorded limestone cliffs at Stony Mountain.



Within the context of Stonewall

The landscape around Stonewall is a great example of glacial forces, and their lasting influence. To the east of Stonewall, roughly following the path of modern Highway 7, is an ancient beach line, dubbed 'Gimli' beach, by Warren Upham, the first to create a map of Lake Agassiz's beaches.[18] This beach existed around 8000 years ago and carved a subtle ridge through the landscape running north-south.

Perhaps more interesting, however, are the limestone outcroppings present in Stony Mountain and Stonewall. These are likely the result of two glaciers colliding - albeit, very slowly. As the glacial forces met, their power was diverted away from grounding up the landscape, and instead, fighting the forces of the adjacent glacier. The result of this collision left the bedrock around 20 meters elevated, and exposed at Stony Mountain, and left outcroppings of exposed limestone at Stonewall.[19]

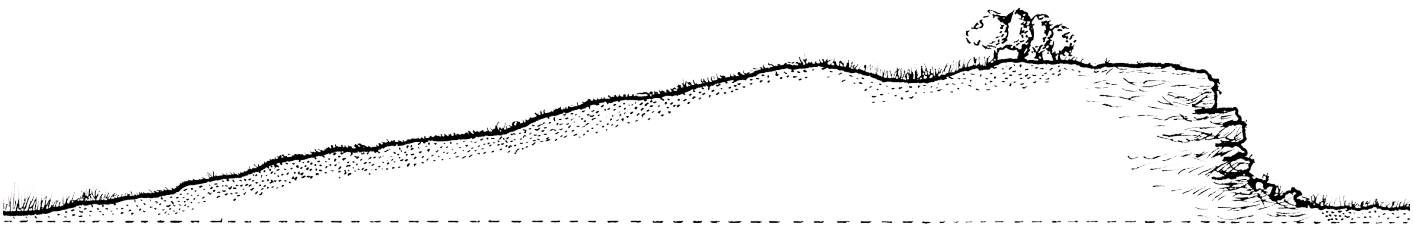
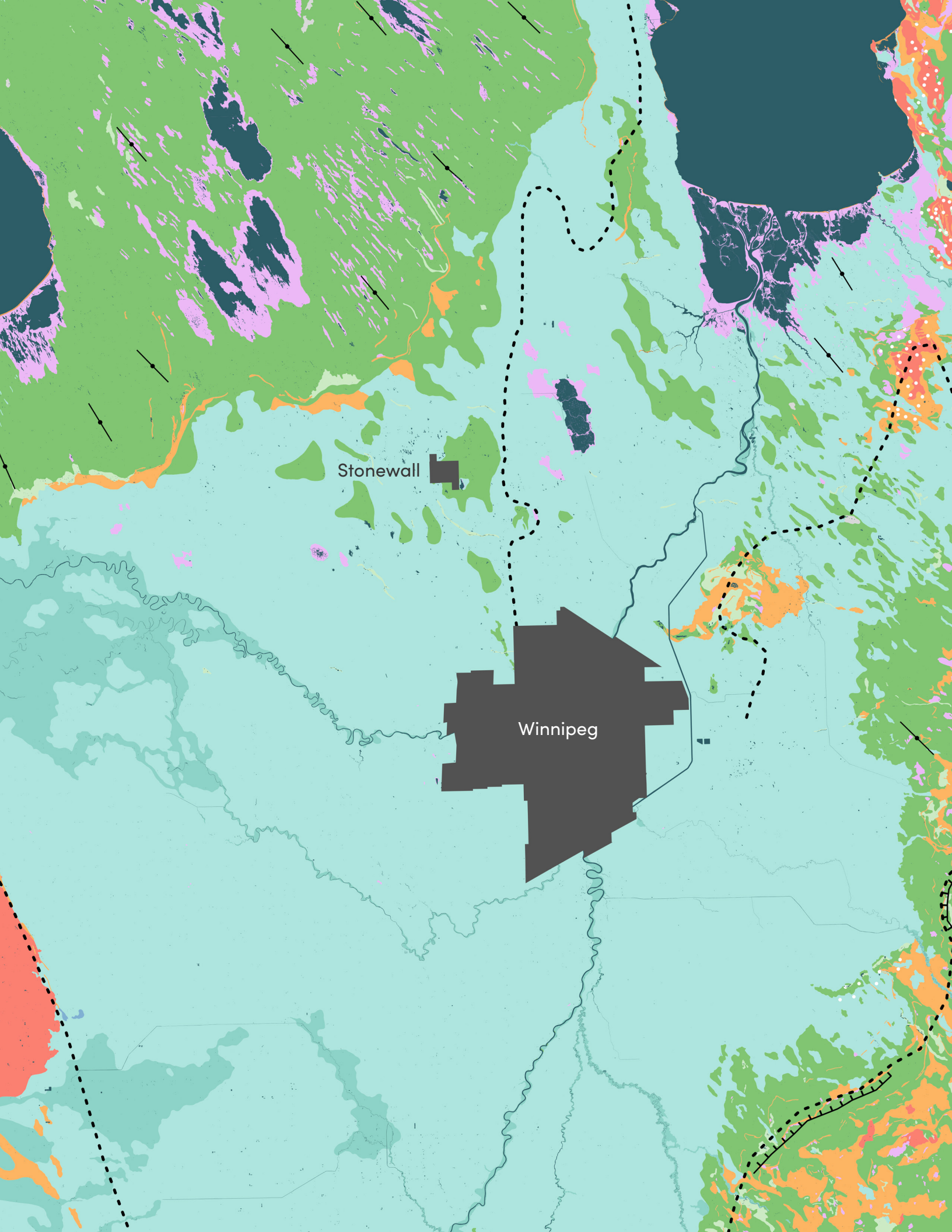


Figure 20
Cross section of Stony mountain. Traced Sketch. Adapted from Hinds Expedition Map. 1857.




Stonewall
Winnipeg

Map 16 (left)
Southern Manitoba's glacial imprints mapped. GIS map. Adapted from Matile et al. 2006. and Nielsen et al. 1981.

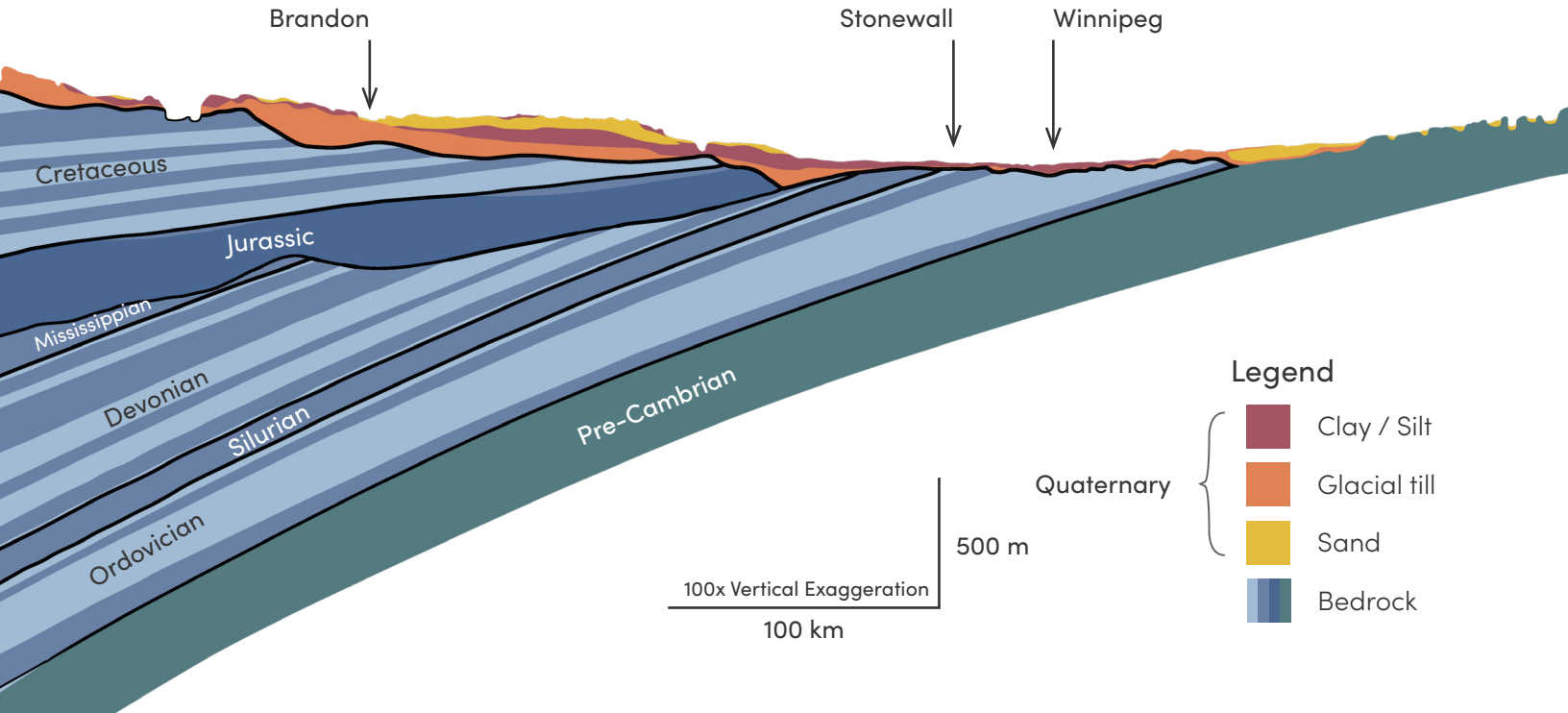


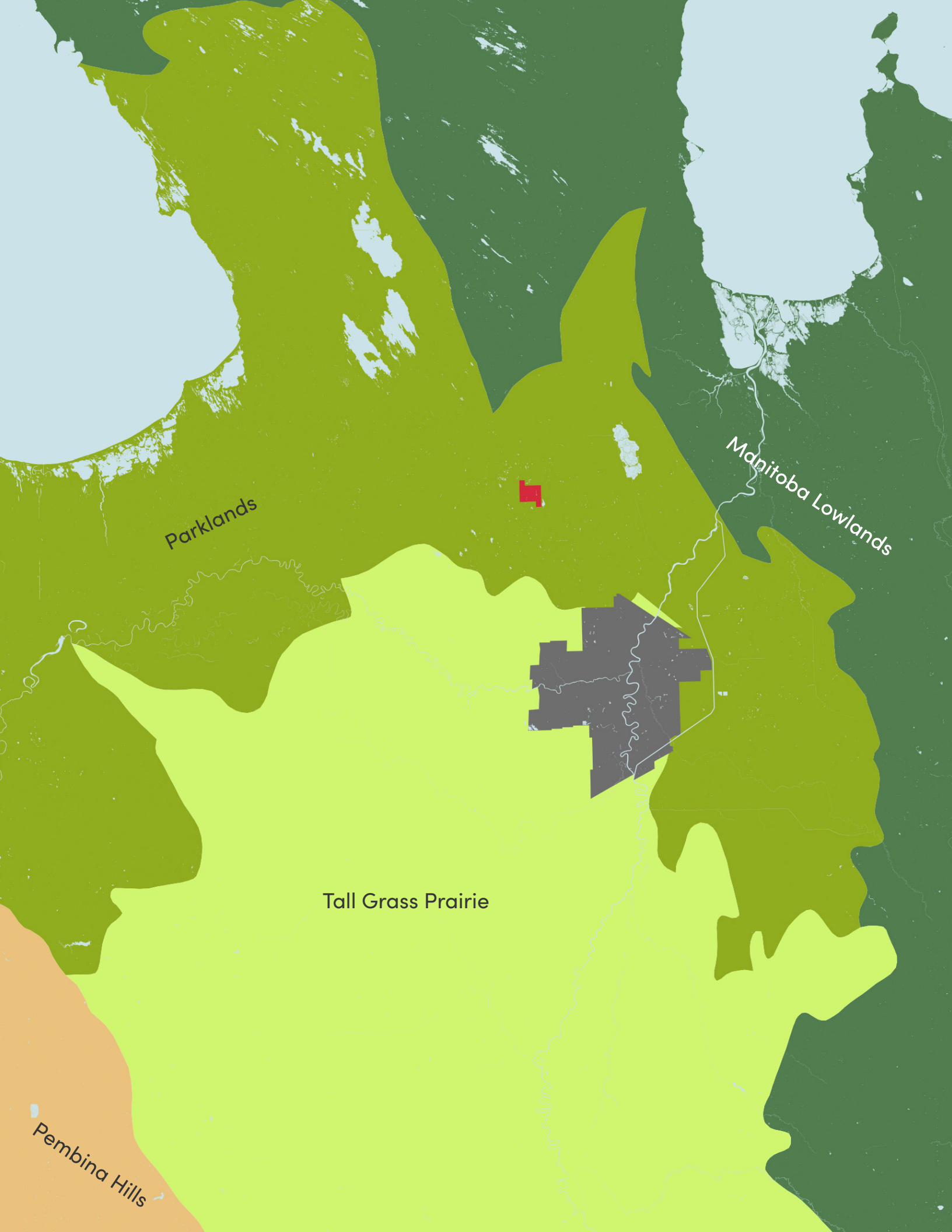
Lasting effects on the landscape

Though they existed many centuries ago, the impacts of glaciation and Lake Agassiz are foundational to understanding how this landscape has emerged and developed over time. Glacial landforms and material deposits have influenced our use of the landscape as well as our understanding of it.

We have them to thank for the placement of our fields, the locations of forests, the revealing of ancient limestones, and the depositing of unique materials. The locations of highways, trails, and rail lines, burial grounds, towns, and some of the best places for recreation in the province. Under everything we have built, everything we have placed on the landscape, are the soils, sands, and tills left by the glacier; sorted into an order in which we now rely.

Figure 21 (below)
Cross section of Manitoba from the Saskatchewan Border to the Ontario Border. Adapted from Cross section of Manitoba, Government of Manitoba.

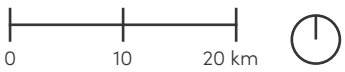



Parklands
Manitoba Lowlands
Tall Grass Prairie
Pembina Hills

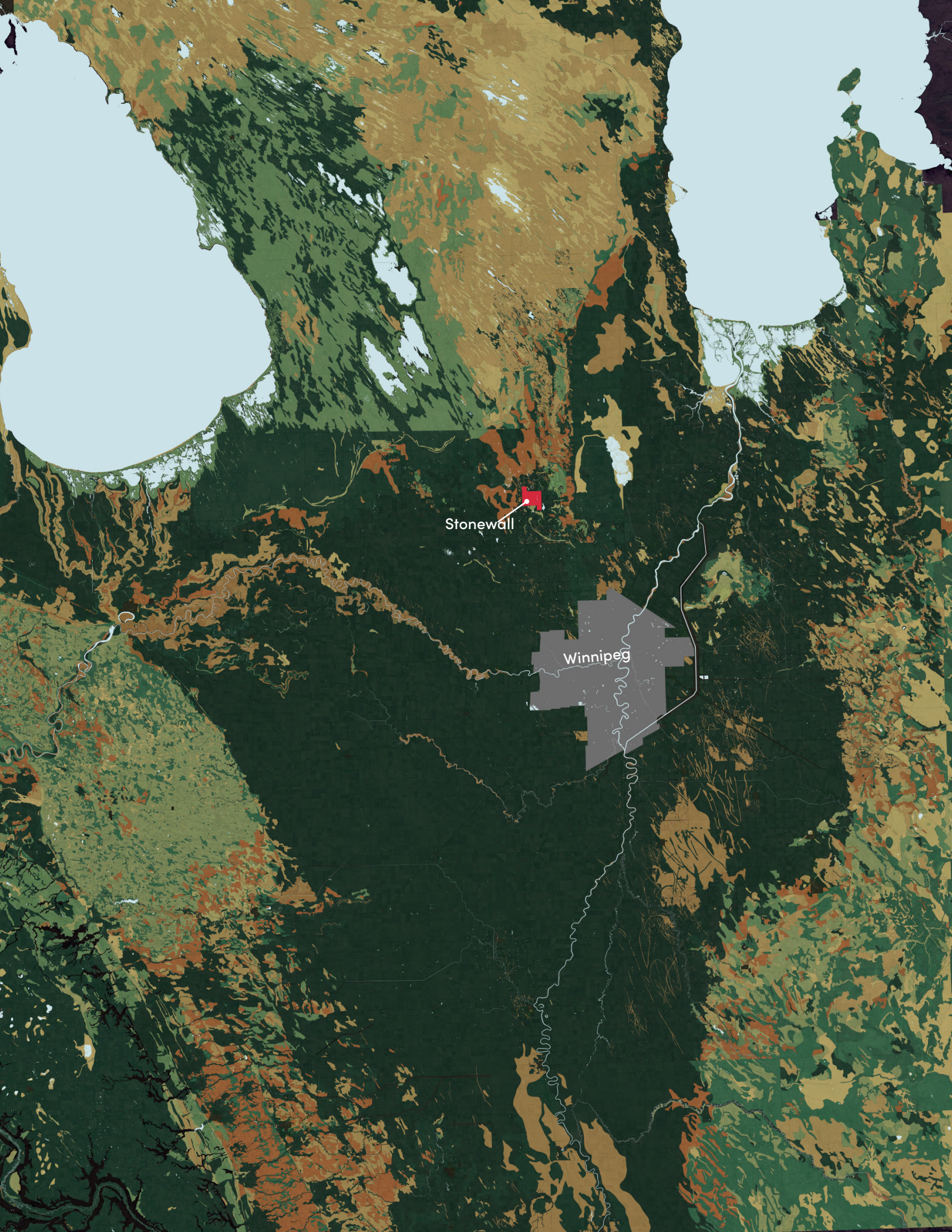
PALIMPSEST RESEARCH

Layer 2: Emergence of Ecosystems

Stressing the Importance of Soil
Upland and Downstream
Mosaics of habitats
Creatures of the Plains
The landscape near Stonewall
Selection of Local Species



Map 17 (left)
Natural areas of the WMR.
GIS map, adapted from the Government of Manitoba's map of natural regions.


Stonewall
Winnipeg

Stressing the Importance of Soil

The materials deposited by glacial forces and sorted by Lake Agassiz became the foundational feature of the landscape. The resulting surface texture shaped the region's drainage regime, and its suitability for inhabitation by flora and fauna. Surface texture is measured using the soil texture triangle. This triangle is a visualization of the relationship between the tiny particles that make up soil; clay, sand, silt. The mixture ratio of these materials informs the soil texture, and thus its drainage quality and suitability for cultivation..

Clay
These are the tiniest particles. They easily stick together and retain water due to the proximity between particles. When dry, clay becomes hard and cracks. Clay is very dominant in the Red River Valley and is often colloquially referred to as 'Manitoba Gumbo'.

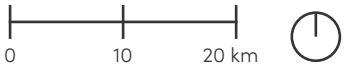
Sand
Being the largest particles, they have more irregular shapes and spacing. Acting like tiny rocks, their coarse nature provides sand with very good drainage.

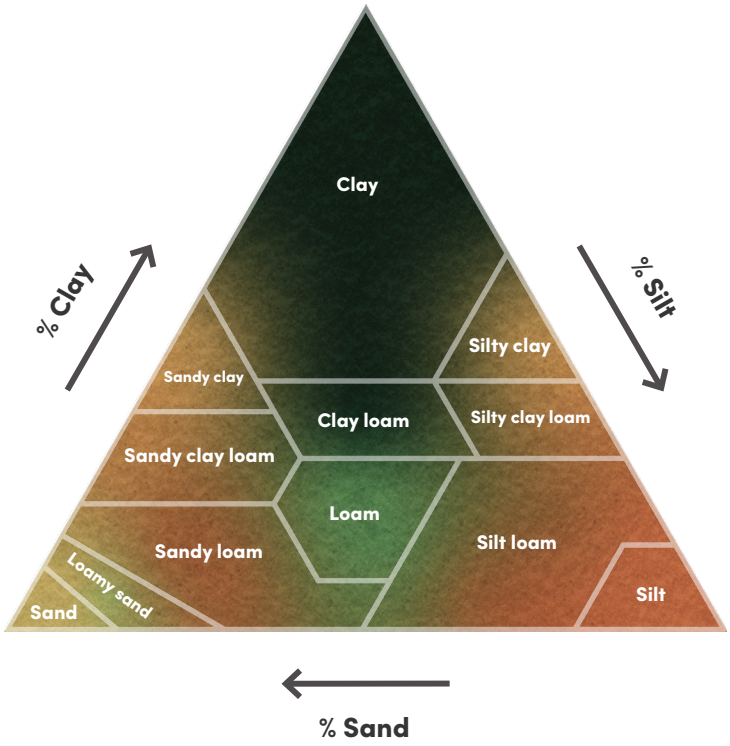
Silt
Less prevalent in the region, silt particles are of an intermediate size and have fair drainage and water retention. Silt is powder like when dry and is often the byproduct of floods.

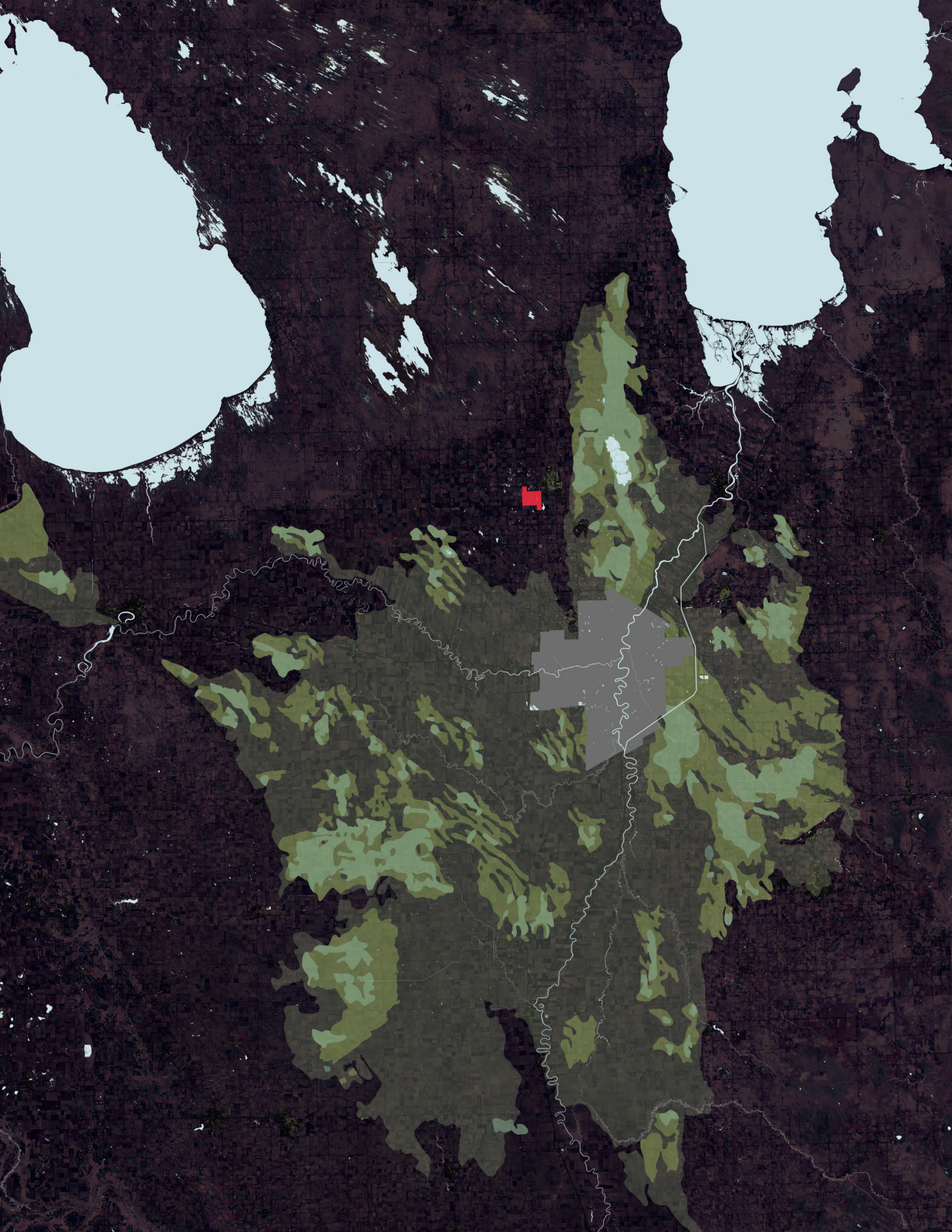
Loam
This is an equal mixture of multiple particles. Loamy soils allow for even drainage, and nutrient retention for plants. Loam is often considered the best soil type for cultivation.

Depending on the mixture of these materials, the resulting soil will have different qualities. Most of the Winnipeg Metro Region is defined by clay and clay loams that were deposited by Lake Agassiz.

Map 18 (left)
Soil composition of the WMR. A soil pyramid is provided as both a legend, and a diagram representing the makeup of each soil.
GIS map.







Upland and Downstream

The first habitats to take advantage of these freshly sorted soils were tundra's. Over time forests and grasslands took hold. In upland areas, forests thrived in the cool glacial air that defined the end of that last glacial maximum. While in low laying areas within the bed of Lake Agassiz became inundated and formed into wetlands.

However, as the glaciers continued northwards, and the climate of the region warmed, many forests gave way to species better suited to the new conditions. This left a region defined by wetlands, prairies, and parklands. The relation between drier upland areas and downstream wetland areas are critical in defining the movement, and availability of water in the region. Over centuries, the relationship between topography, drainage, and soil texture matured into distinct regions and ecosystems. Upland areas, with different soil textures and drainage created room for mixed grass prairies, and parklands to take hold.

Map 19 (left)
The former extent of wetlands in the Red River Valley. GIS Map. Adapted from Bossenmaier et al. 1974.



Downstream areas, like the Red River Valley were defined by wetlands or "Wet Prairies" as author Shannon Studen-Bower terms it.[20] The clay soils, flood events and low topography created a complex of permanent, semi permanent, and intermittently wet areas. Intermittently wet areas would have shared qualities of both and were defined by tall grass prairies.

Mosaics of habitats

The region is a part of the Tall Grass Prairie Ecosystem. This system once stretched across North America, from Southern Manitoba to Texas.[21] Today, much of this ecosystem has been replaced by agriculture, and human development. Within Southern Manitoba, this system allowed for unique forms of habitat to take place. Defined by drainage, soil texture, and access to water, 3 main habitats are nested within the Tall Grass Prairie Ecosystem.

Grasslands
In upland areas, where soils are well drained, and access to moisture is more limited, mixed grass prairies thrived. Species like Little Blue Stem and Prairie Dropseed, and Coneflower called these areas home. In intermittently wet areas near wetlands tall grass prairies took hold. Species like Big Blue Stem, and Porcupine Grass thrived, Reaching up to 10 feet in height, these grasses were able to grow tall due to their access to moisture. Prairie grass species dig themselves deep into the earth to access as much moisture as possible. Grazing by bison herds would compress prairie soils and reduce the grasses to stubs. In dry times, fires would break out and engulf grasslands. Both of these events would introduce additional nutrients

to the soils.[22] The deep root systems ensured the grasses would always comeback. Where soils in prairies were loamy, they allowed species like Badgers and ground squirrels to dig burrows. Once a burrow was abandoned, they would be used by other species like Burrowing Owls.

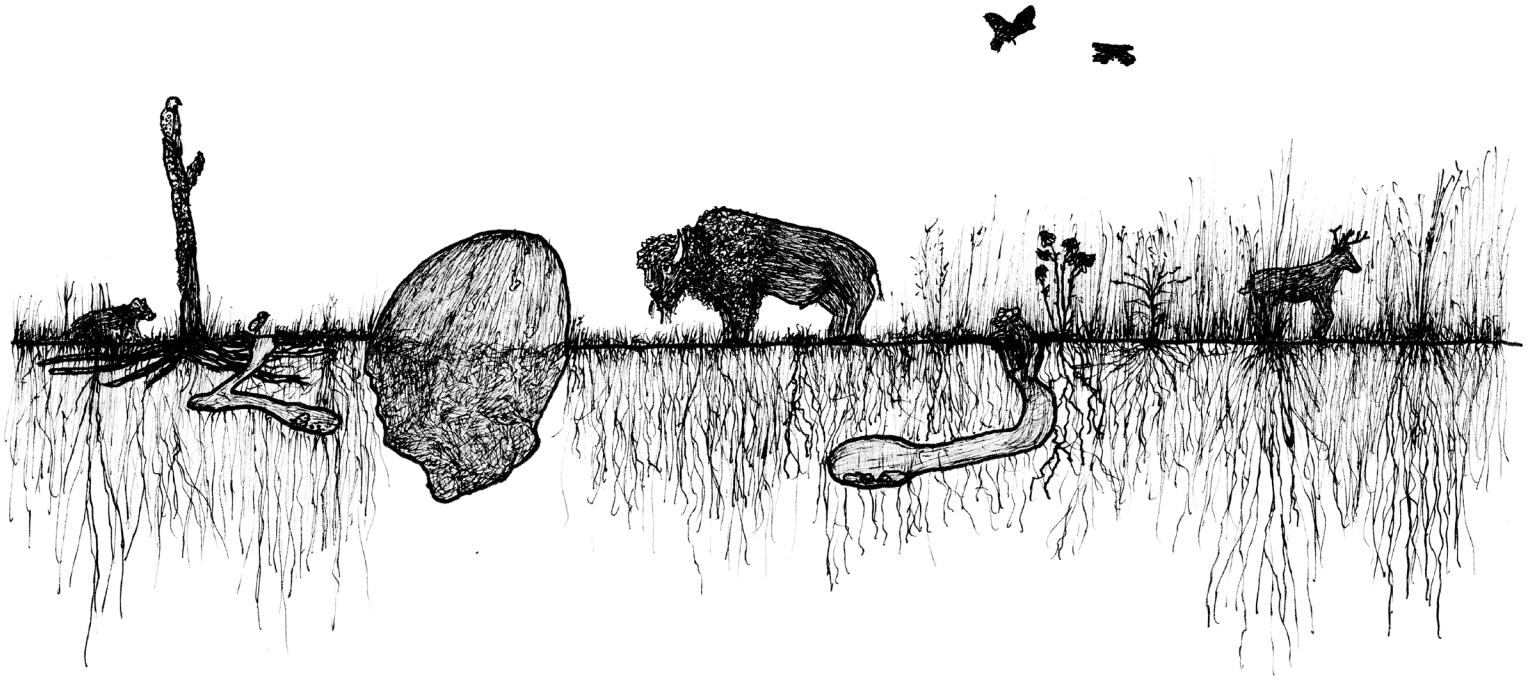
Wetlands
In areas with clay soils, and low laying topography, water is easily retained. These areas create wetland habitats, like swamps and marshes. Wet meadows and wet prairies thrive on their peripheries. In wetlands, species like Sedges, Cattails, and Willows thrive. Wetlands provide habitat for many species of birds, like ducks and migratory birds. The interplay of water and land allows for amphibians like frogs and salamanders to develop. Within their waters, aquatic species like fish are able to find breeding grounds. Wetlands also allowed for many insects to thrive. Smaller insects like mosquito provided a base in the food chain for larger Insects like dragon flies and Damselflies. Invertebrates like snails and mussels also thrived in wetlands.[23]

Wet meadows and prairies on the peripheries supported many wildflowers and would attract butterflies and other pollinators.

Parklands
Some areas, with fair drainage, were not as heavily influenced by fires and grazing. This created Parkland areas. In these areas stands of trees would be able to take hold. Intermixed with grasses, they formed into lightly forested savannas, with patches of Aspen and Oak. These areas provided shelter to species like bison during intense winter storms. Parkland areas typically acted as a transition zone between forests and grasslands.

Forests
Along creeks, streams and rivers, the passage of water influenced the formation of habitat. With seasonal floods, terraces would form on the banks, creating space for riparian forests to take hold. These forests

Figure 22 (below)
Cross section of grassland / tall grass prairie ecosystem. Hand drawn by author.



include species like Cotton Wood, American Elm, and Manitoba maple. These species are large, and create a shady canopy, accommodating a dense, bushy under story. The layer below the terraced forest, accommodates the meandering watercourse. Marshes and wetland areas can form in forgotten bends of the creek. Species like beavers would take advantage of these stream complexes to build dams and lodges.

Creatures of the Plains

A diverse array of species have called Manitoba home since it was revealed by the receding glaciers. In the distant past, ancient species of mastodon (relatives of the elephant, and mammoth), giant beavers, giant sloths and giant armadillos roamed these lands. These species likely went extinct during the quaternary extinction event. Their demise was likely a result of climate change and increasing human influence in the region.

In more recent times many species of animals call this region home. Ranging from bears to turtles, squirrels to eagles. But perhaps the most influential of these species is the bison and the beaver. These two mammals acted as keystone species, with their actions influencing habitats, and hydrology in the rest of the region.

Beaver
Beavers tended the water, its quality and its quantity. Water can be scarce in the region during hot summers and times of drought. Beavers would retain water in stream complexes by building dams. Beaver dams could occur as many as 12 times per kilometer of stream in ideal conditions.[24] Their dams

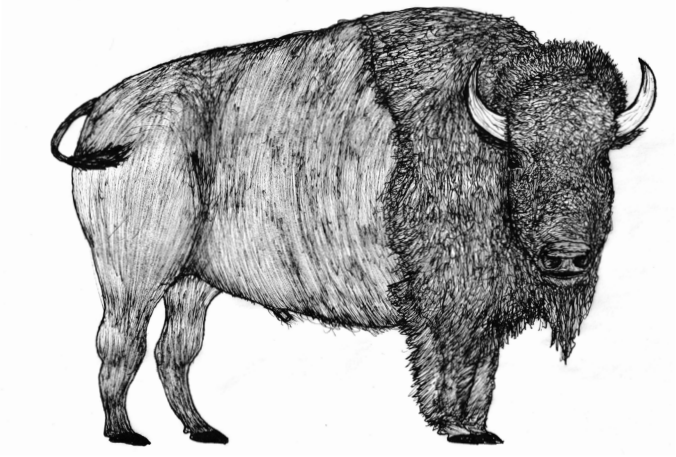


Figure 23
Bison. Hand drawn by author.



Figure 24
Beaver. Hand drawn by author.

and pond complexes retained water upstream, allowing for a slow release into the landscape. This also allowed for filtration of water, and habitats for aquatic species.[25]

Bison
Bison tended the grasslands through large scale grazing, and compression of the soils by their hooves. Their excrement and urine provided nutrition to grasses.[26] The disturbed of grasses grew back stronger and larger. The movements of bison were influenced by the changing seasons, with bison summering in the prairies, and wintering in valley complexes and parkland edges, to avoid the harsh prairie winters.[27]

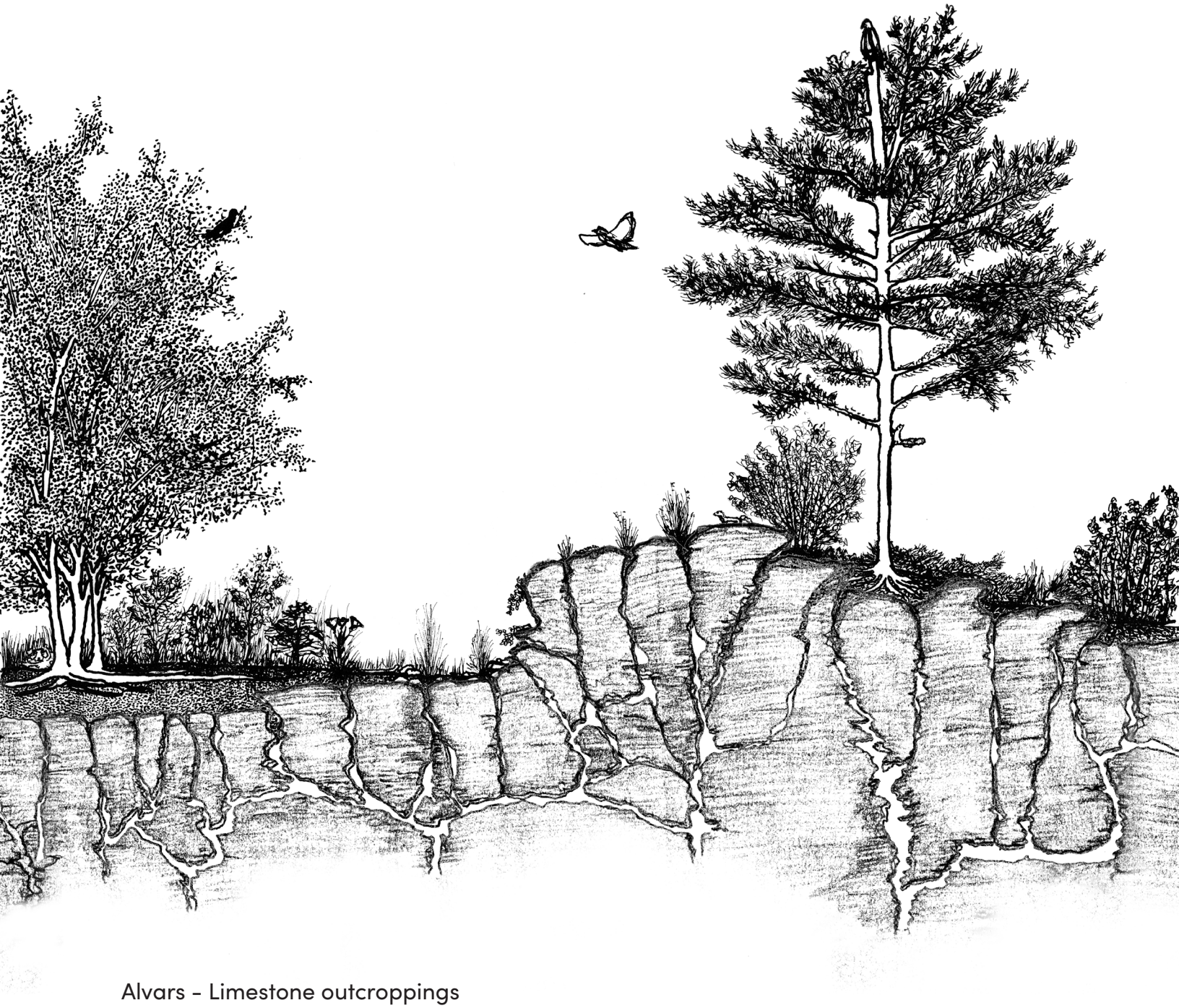


Figure 25
Cross section of an alvar ecosystem. Hand drawn by author.

The landscape near Stonewall

Before settlement, the Stonewall area was surrounded by a mixture of prairies, marshes, forest patches and aspen parkland. The geology of the Stonewall area is unique and formerly supported a specialized habitat - Alvars.[28]

Alvars are plant communities that develop on surface level limestone. Taking advantage of the cracks in the limestone, plants can take hold. First, species of mosses and lichens move in. Over time, these provide a bed for other species to seed. Eventually, enough biomass has accumulated for larger, woody, species to move in. Depending on the amount of biomass, alvars can range from pavement-like areas to woodlands. If inundated, wetland alvars form. Below the surface, the limestone base of alvars is porous and cracked. This creates a complex of small underground areas for animals to take refuge. Creatures like Gardner Snakes will often use limestone passages and caves to hibernate over winter.

Specialized species have formed in alvar communities. Now endangered, these rare species include Gastony's Cliffbrake, Smooth Cliffbrake and the globally rare Grimmia Dry Rock Moss.[29] Species of liverworts, previously undocumented in Manitoba were recently discovered in the Interlake region.[30] This highlights the growing interest and research in Manitoba's alvar plant communities.
Records show that before settlement the Stonewall area was home to maples, poplars, spruce and oak. Species of willow scrub, and grasses were intermixed with edible species like pin cherries, choke cherries, wild plums, hawthorns, hazelnuts.[31]

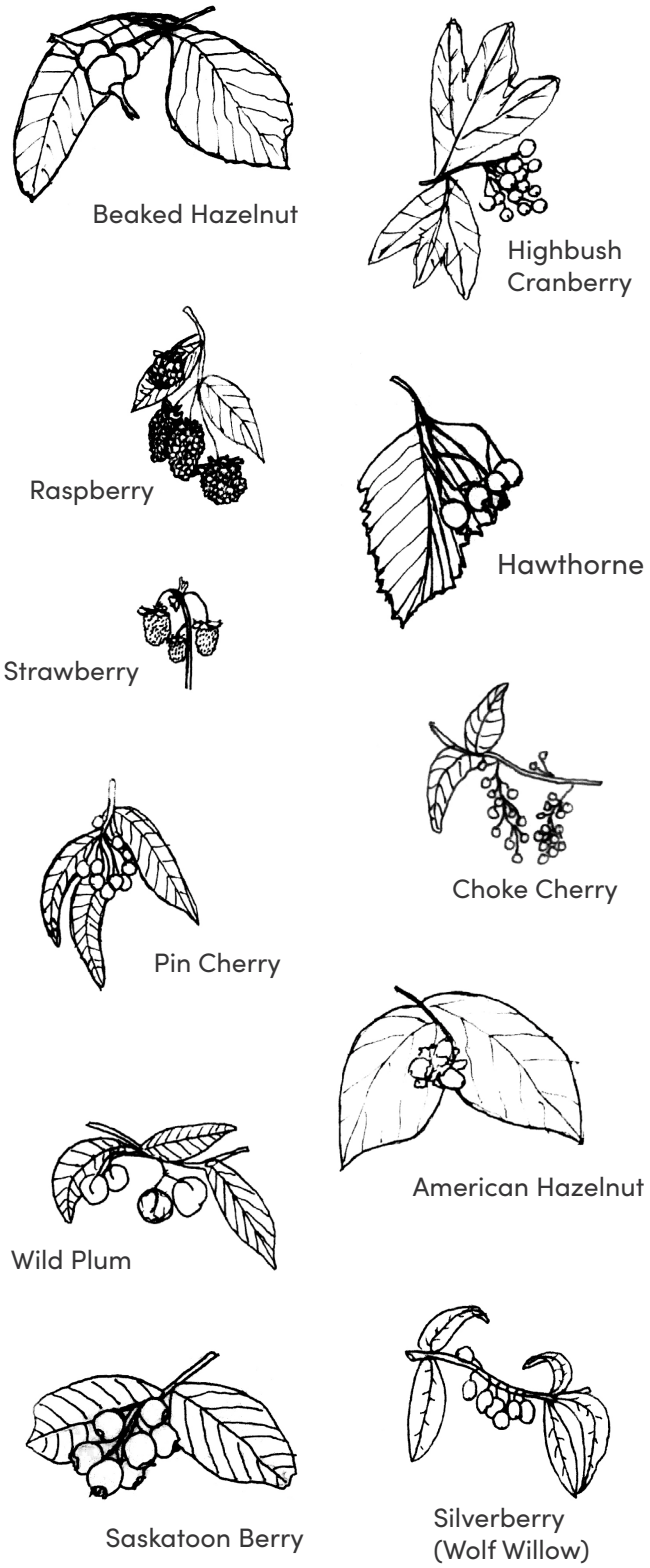
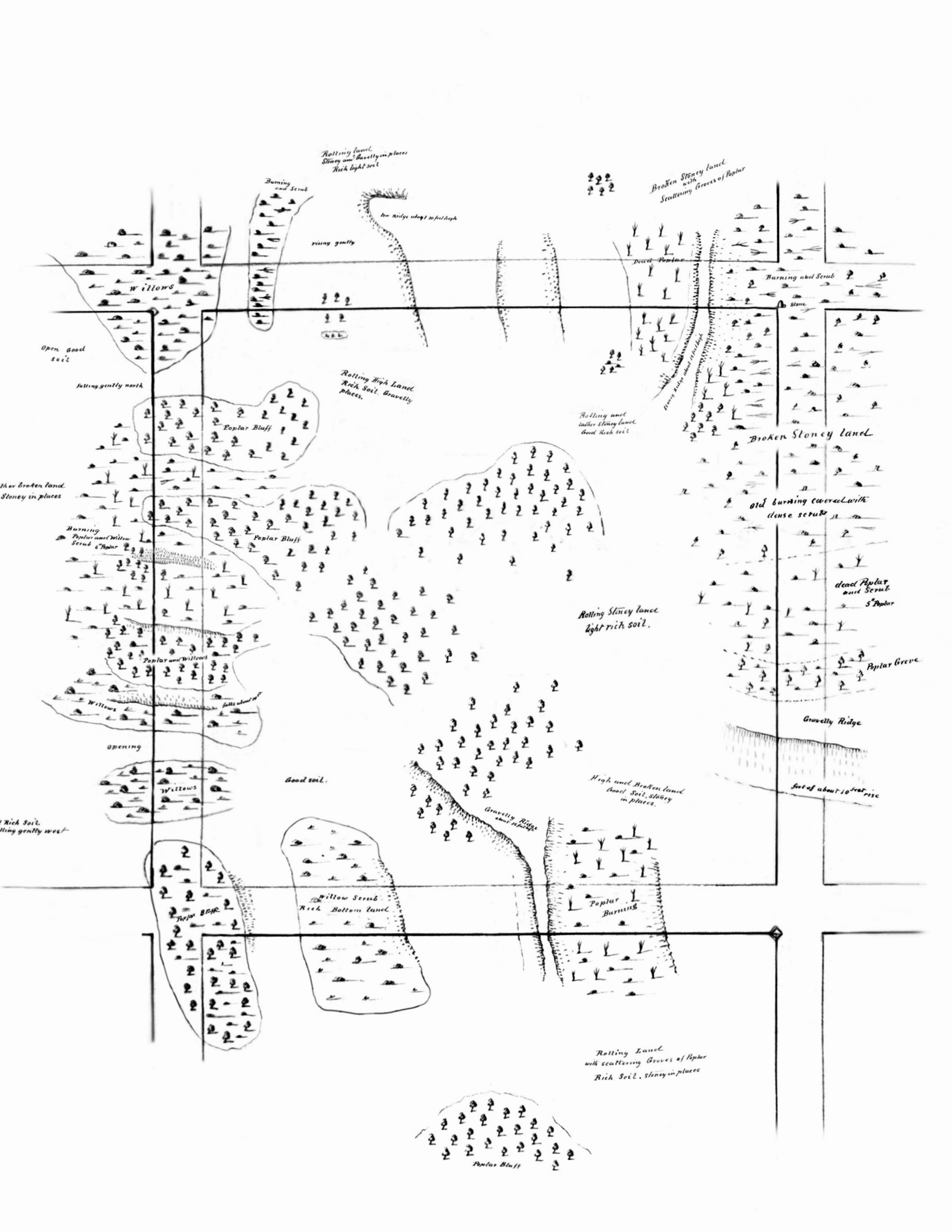


Figure 26 (above)
Sketches of edible species in the Stonewall area. Hand drawn by author.

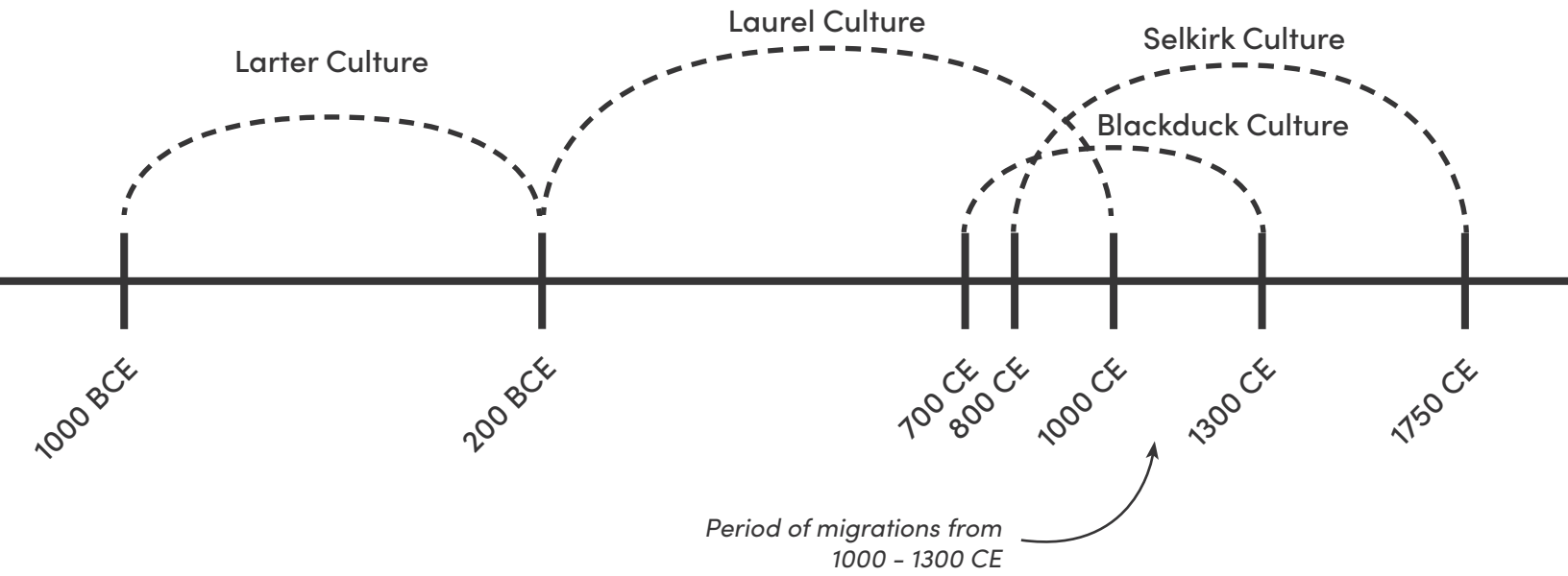

Rolling land
Stoney and Gravelly in places
Rich light soil
Burning and Scrub
Low Ridge about 10 feet high
rising gently
Broken Stoney land with Scattering Groves of Poplar
Dead Poplar
Burning and Scrub
Stone
Willows
Open Good soil
falling gently north
Rolling High Land
Rich Soil. Gravelly
places.
Poplar Bluff
Rolling and
rather Stoney land
Good Rich soil
Broken Stoney land
Old burning covered with
dense scrub
Dead Poplar
and Scrub
5" Poplar
Poplar Bluff
Burning
Poplar and Willow
Scrub 6" Poplar
Rolling Stoney land
Light rich soil.
Poplar and Willows
Willows
falls about 8'
Poplar Grove
Gravelly Ridge
Opening
Willows
Good soil.
High and Broken land
Good Soil, Stoney
in places.
Gravelly Ridge
about 10 feet
Willow Scrub
Rich Bottom land
Poplar
Burning
Poplar Bluff
Rolling Land
with scattering Groves of Poplar
Rich Soil. Stoney in places
Poplar Bluff

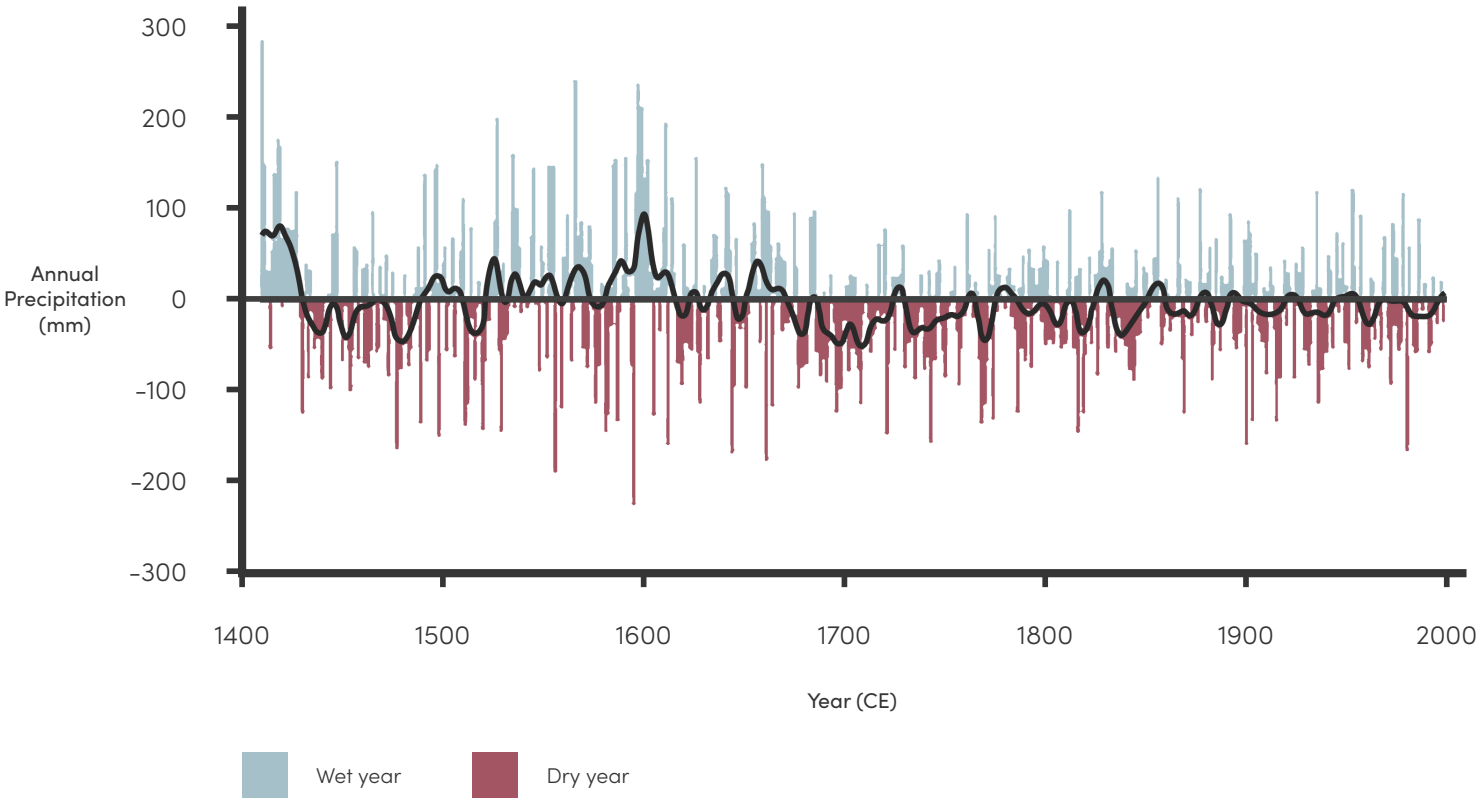
PALIMPSEST RESEARCH

Layer 3: Early Humans & Indigenous Peoples

Climate Fluctuations
Early Humans on the Prairies
First Places of Habitation
Indigenous people of the Red River Valley
Stonewall: The Thunderhills

Figure 27 (left)
Township map of Stonewall in 1872 before settlement. Adapted from Archives of Manitoba, NR 0157 Land surveyors field books, GR1601, Survey notebook #105. Township 13 Range 1E. Henry Lawe, 1872 G 14337.


Larter Culture
Laurel Culture
Selkirk Culture
Blackduck Culture
1000 BCE
200 BCE
700 CE
800 CE
1000 CE
1300 CE
1750 CE
Period of migrations from
1000 - 1300 CE


300
200
100
0
-100
-200
-300
Annual Precipitation (mm)
1400
1500
1600
1700
1800
1900
2000
Year (CE)
Wet year
Dry year

Climate fluctuations

The region was in a glacial period until around 12,000 years ago, when the climate began to warm. Around 6000 years ago the climate stabilized to just below 0 ℃ on average. However, During the last 6000 years, the climate of the region has seen regular fluctuations between wetter and drier periods.[32]

Before 200 BCE, the climate was wetter and cooler, allowing grasslands to take hold. However, around 500 CE the climate became warmer, and more like that of today.[33] A severe drought was recorded in 1160 CE. Around the 15th century, another shift in the climate occurred, causing longer winters and shorter summers. The climate fluctuated once again, with a very wet period occurring in the 16th and 17th centuries. At the end of the 17th century and the beginning of the 18th century, an extreme and prolonged drought began.[34]

Early Humans on the Prairies

Humans have been in North America for thousands of years. The first people to come to North America likely took a route along the Siberian-Alaska-BC coast or traveled by way of a land bridge from Siberia over the Bering Strait, and south through a gap in the glaciers along the Rocky Mountains. There is also evidence that Polynesian seafarers also made it to South America by way of the ocean.[35]

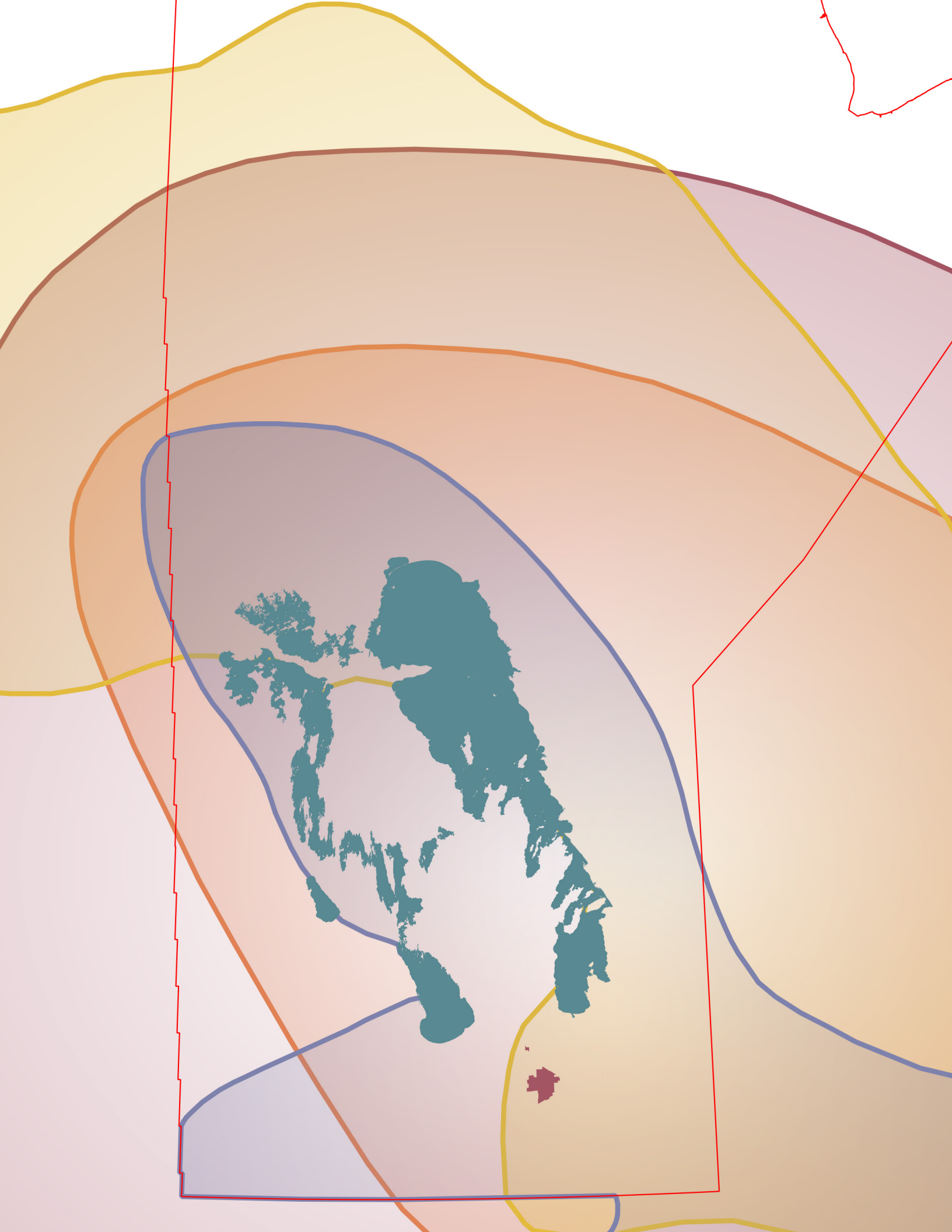
However, as the climate stabilized, the region began to see migration. Much of the Canadian prairies, specifically Manitoba, was still covered by glaciers and vast lakes. Archaeological findings show that people camped near Lake Agassiz, with evidence of a tool-making site on one of its shores.[36] However, western archeology estimates that people did not establish long-term populations in the region until around 1000 years ago.[37]

The first documented culture in the region is the Larter culture. The Larter culture entered the region around 1000 BCE.[38] This culture was largely hunter gatherer and hunted the ample bison in the region. There is no evidence of them after 200 BCE.[39] Around the same time, the Laurel culture entered the area. Different from the Larter culture, the Laurel culture was likely less nomadic, as they produced coconut shaped pottery. Less dependent on bison herds, the Laurel people were more generalist hunter gathers. They also ate the wild rice's that grew in the wetlands of the region. The drought of the 12th century likely caused the Laurel culture to leave the region.[40] It is not known what happened to them.

Around 700 CE. the Blackduck culture was present in the area.[41] It is likely that the Blackduck culture migrated from communities to the east, on the shores of great lakes. The Blackduck also created pottery, but this pottery was more ovular, and vase shaped.[42] This culture had a similar diet to the Laurel culture. In the 9th century CE, the Selkirk culture was also established in the region.[43] Like the Blackduck culture,

Figure 28 (top left)
Timeline of peoples in Manitoba from 100 BCE to 1750 CE.

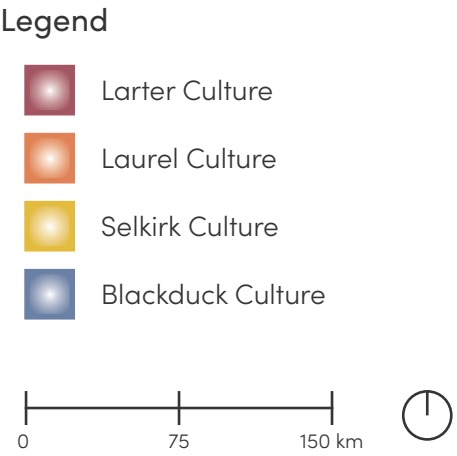
Figure 29 (bottom left)
Chart depicting wet and dry periods in Southern Manitoba since 1400 CE.
Adapted from S. St. George et al. 2001.



they created pottery. Their pottery, and other artifacts distinguish them from Blackduck culture. Both seem to be a continuation of the Laurel culture to some degree.[44]

Around this time, large civilizations had formed on the continent, like Cahokia near modern day St. Louis, Missouri. Large trade networks expanded north into the Red River Valley. Archaeological evidence also shows that both the Blackduck and Selkirk cultures participated in this complex ancient trade network.[45] After 1300 CE, the Blackduck culture disappears from the archaeological records. The Selkirk culture are likely the descendants of the Cree peoples.[46]

The Laurel, Selkirk and Blackduck cultures buried their dead in mounds.[47] Mound sites and burial sites are well documented from this era in the broader region. Looking at archaeological work from Minnesota, North Dakota and the other Canadian prairie provinces shows a gap in the archaeological work. With the archaeological record being limited in Manitoba, there are few documented sites, and the data on these sites is scarce.



First places of Inhabitation

Some of the first places to see inhabitation by humans were those close to water. However, with a limited archaeological record in Manitoba, much of the physical evidence extracted has been located near Lockport and the forks of the Red and Assiniboine Rivers.

Lockport was likely chosen by these first people, due to the revealing of limestone bedrock. This bedrock jutted out of the Red river and created a series of rapids that stretched for 16 kilometers. These rapids created a crossing point on the Red River for people, and particularly, herds of bison. The rapids played host to fish and allowed for fish harvesting.

This region was so successful that evidence of ancient farming has been found dating from around 900 CE until sometime in the 1400's.[48] These farmers likely built their gardens in marshes, on levee like structures. Evidence of corn has been found, but they likely also grew squash, beans and sunflowers. There is speculation as to who called this farm settlement home, with many suggesting they were an offshoot of the farming cultures on the Missouri River who moved northwards. They likely left due to the drought conditions of the 15th century.

As the years went on, groups began to develop practices and identities that were closely related to the landscape. At the time of contact with Europeans, distinct cultures had formed that exist to this day.

Map 20 (left)
Map of ancient cultures in Manitoba from 1000 BCE to 1750 CE, that overlap with Stonewall.



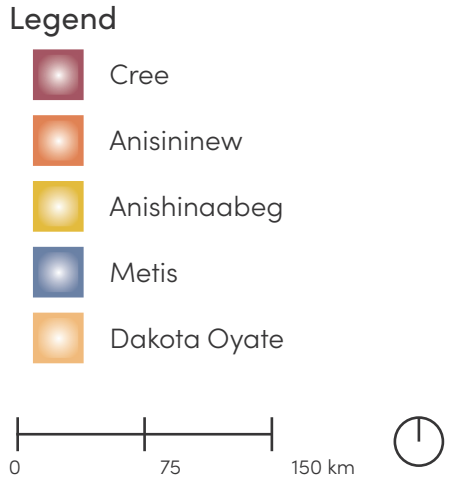
Indigenous people of the Red River Valley

By the 17th and 18th centuries, distinct groups were present within the Red River Valley. These include the Cree, Anishinaabe, Anisininew, Dakota and Metis people.

Cree
The Cree likely descended from the Selkirk culture. Known as "Ndooheenou" (Nation of Hunters) they relied on the seasonal migrations of animals. Cree hunters harvested moose, caribou, bear, rabbits, geese, ducks and fish.[49] Cree communities near the prairies also participated in the bison hunt. Being nomadic, Cree lived in tipis and wigwams covered in animal skins.[50]

Anishinaabe
Also known as Ojibwe, Salteaux and Chippewa, this is a large cultural group that stems from the great lake's region. Migrations on the 1700s saw movements of Anishinaabe people westwards, towards the edges of the boreal forest and into the Red River Valley.[51] Traditionally, Anishinaabe communities relied on a variety of food sources, like wild rice, maple sugar, fish, and horticulture of the corn, squash and beans. Traditionally, they resided in wigwams clad with bark or in tipis. Their skills with bark working can be seen in the craftsmanship of their birch-bark canoes.[52]

Map 21 (left)
Map of Indigenous traditional territories that overlap with Stonewall. Adapted from Native Land Digital.



Anisininew
Previously referred to as Oji-Cree, the Anisininew are very similar to both their Cree and Anishinaabe relatives.[53] Sharing similar ways of life, relying on fishing, hunting and gathering. They also lived in wigwams. Anisininew people would winter as groups of families. In summer months, they would split up and camp in smaller units.[54]

Dakota
The Dakota is part of the larger Sioux Nation. This nation stretches across the plains and traditionally held territories in the region since the 1200's.[55] Dakota people relied on the hunt of the Bison, and would follow the migration of the herds, camping in tipis. They also held semi permanent villages where they participated in horticulture of corn, beans and squash, and the collection of wild rice. The introduction of horses in 1700s was very influential to the Dakota, and they became known for their equestrian abilities.[56]

Metis
Metis people share ancestry with both Indigenous people and Europeans. Historically, this was the result of French fur traders marrying Indigenous women. This cultural fusion means that Metis people share many aspects of European and Indigenous traditions. In Manitoba Metis people have been living on the banks of the Red and Assiniboine rivers for centuries. Many Metis people

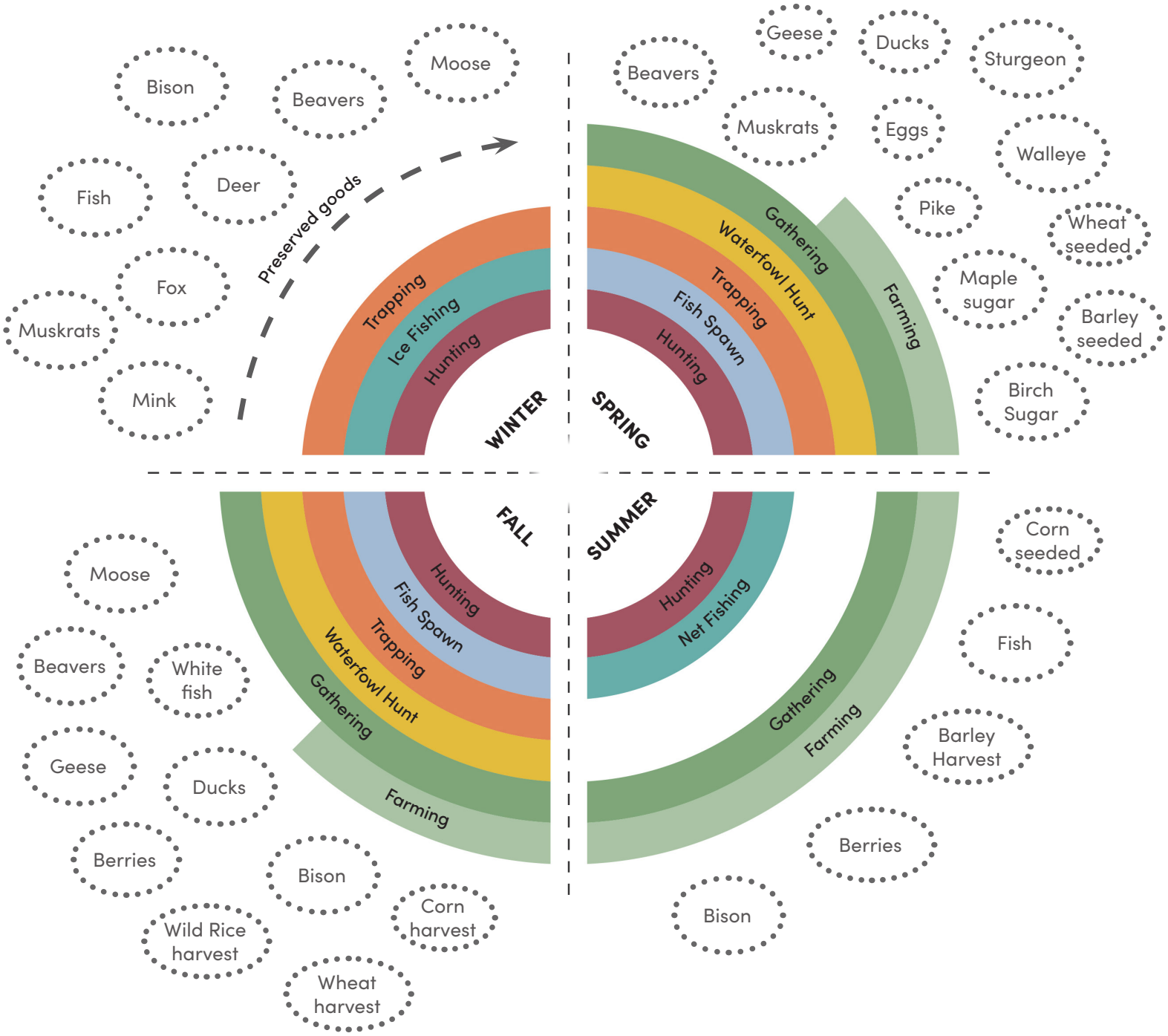


Figure 30 (above)
Metis seasonal harvest practices in the Red River Valley, 1850's. Information from the Indigenous Peoples Atlas of Canada.

participated in the Fur trade. Their systems of harvest were broad and shared similarities with all of their Indigenous relatives.

In the Red River Colony, Metis relied on the bison hunt as a source of food, and trade material. Pemmican is a combination of bison meat, lard and berries. This preservation, and the nutrient load it carried meant it was a valuable commodity to traveling fur traders. Metis people often settled on river lots. Inspired by the French 'Seigneurial' system of lots. These lots fronted the river for 200-250 m and had a depth of about 3 km.[57] They included with areas for fields, housing, and a mill. The skinny lots allowed for many people to have access to the river - which was akin to a roadway. Metis people lived in structures ranging from

log cabins, tipis, and Wigwams to tents and shacks.[58]

The relationship that formed between the landscape and Indigenous communities is rich, and created a reciprocal relationship with the land, and its inhabitants. Indeed, this relationship still exists to this day.

Stonewall: The Thunder Hills

Though not many records are available from before European settlement, Indigenous communities are known to have used the Stonewall area. Blackduck pottery was said to have been found in the area of quarry park during excavations. Stonewall is known as the 'Thunder Hills' by Indigenous people.[59] Nearby Stony Mountain is known as the Snake Indian Hills in Metis culture.[60]

The ridges of Stonewall and Stony Mountain were used to scout game, and escape from floods. Many ancient trails passed through the area. The most prominent of these was a fork in the trail southeast of Stony Mountain.[61] These trails branched north and west, with the western trail passing south of Stonewall and continuing to St. Laurent MB, and further into Northern Manitoba. The northern Trail would have loosely followed the ancient beach ridge, where modern Highway 7 is today.

Old maps of Stonewall reveal that a gravel ridge covered in bush ran northeast across the centre of Stonewall, from the intersection of Centre Avenue. and Main Street to Balmoral Road.[62] The area had many trails, all along the sides of ridges and hills. These areas would have also provided ideal, sheltered camping grounds. An excerpt from a 1978 historical chronology of the area tells of an Indigenous camp to the southeast of town, in the 1880s.[63] This settlement was located near the wetland on Winfield road and was home to a large family.

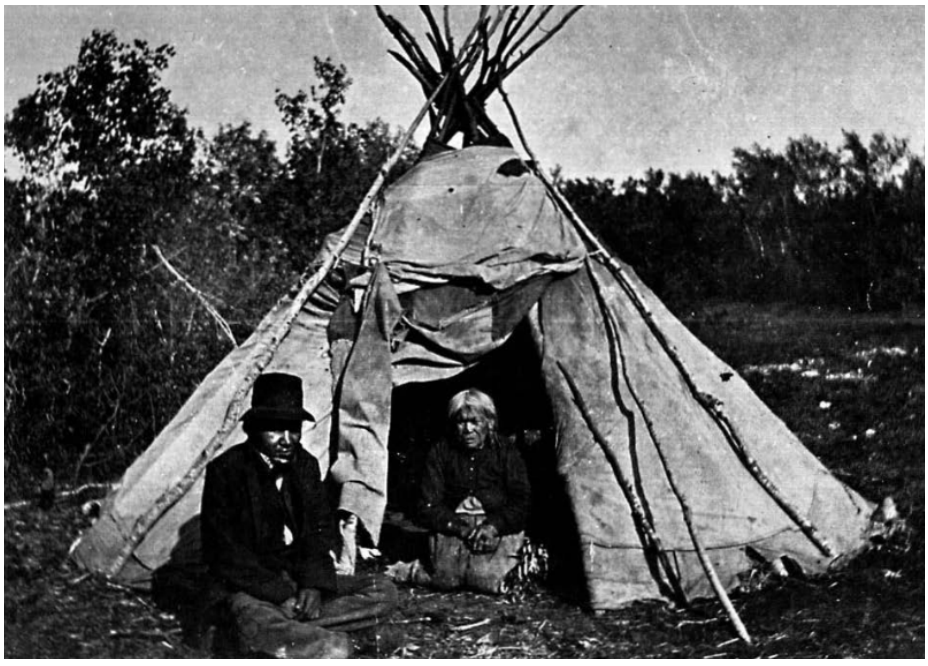
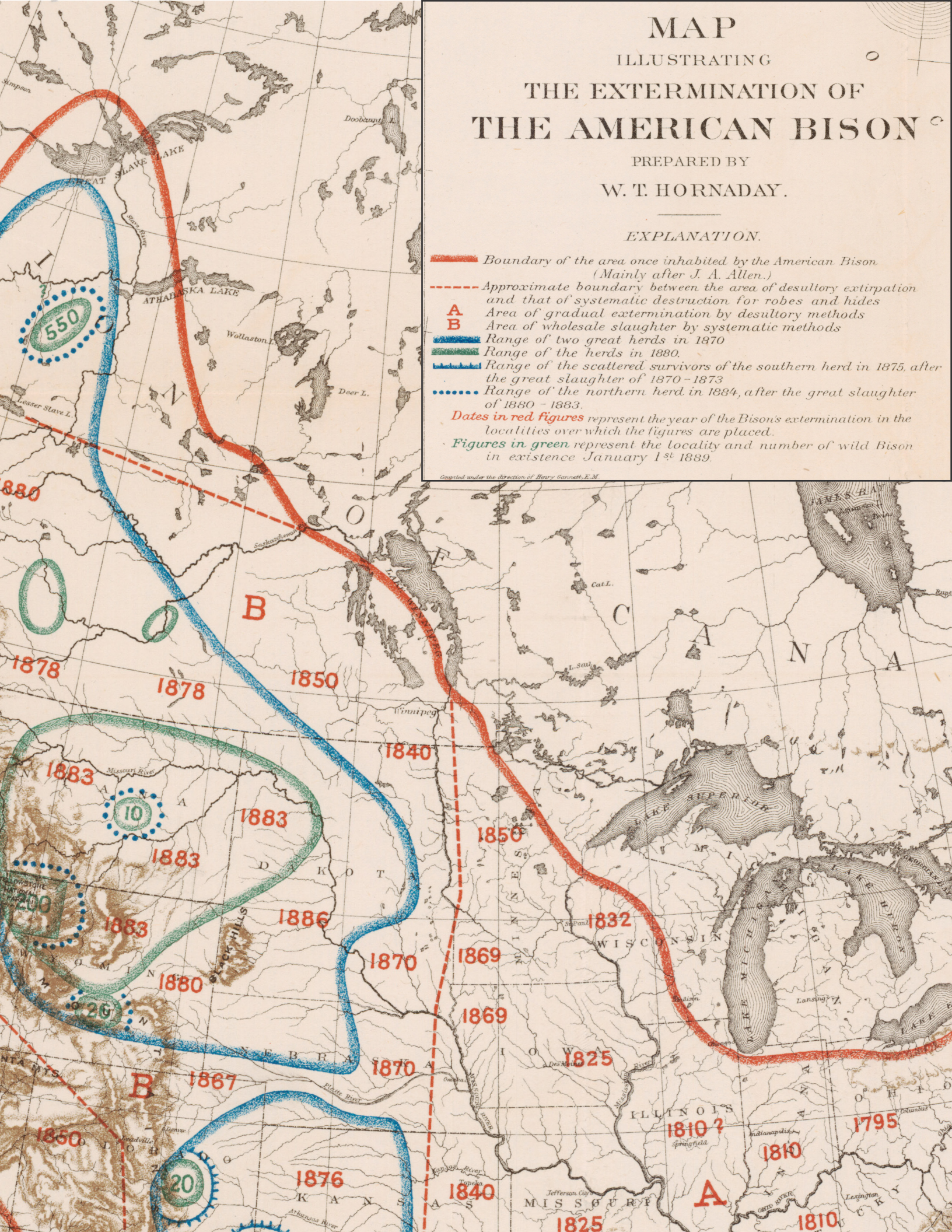


Figure 31
Indigenous community members at camp southeast of Stonewall. Their identity is unknown. (Circa 1879). Image from Stonewall: Turning a Century. Plate 9.


MAP
ILLUSTRATING
THE EXTERMINATION OF
THE AMERICAN BISON
PREPARED BY
W. T. HORNADAY.
EXPLANATION.
Boundary of the area once inhabited by the American Bison (Mainly after J. A. Allen.)
Approximate boundary between the area of desultory extirpation and that of systematic destruction for robes and hides
A Area of gradual extermination by desultory methods
B Area of wholesale slaughter by systematic methods
Range of two great herds in 1870
Range of the herds in 1880.
Range of the scattered survivors of the southern herd in 1875, after the great slaughter of 1870 - 1873
Range of the northern herd in 1884, after the great slaughter of 1880 - 1883.
Dates in red figures represent the year of the Bison's extermination in the localities over which the figures are placed.
Figures in green represent the locality and number of wild Bison in existence January 1st 1889.
Compiled under the direction of Henry Gannett, E.M.
GREAT SLAVE LAKE
ATHABASKA LAKE
Wollaston L.
Deer L.
Lesser Slave L.
Doobaunt L.
Simpson
Saskatchewan
Winnipeg
Cat L.
L. Seul
JAMES BAY
LAKE SUPERIOR
LAKE MICHIGAN
LAKE HURON
Missouri River
Platte River
Kansas River
Arkansas River
Mississippi River
Lansing
Springfield
Indianapolis
Columbus
Lexington
Jefferson City
Omaha
Des Moines
Tapeka
Denver
Leadville
BLACK HILLS
550
10
20
B
A
1878
1850
1840
1883
1886
1870
1869
1832
1825
1867
1876
1810 ?
1810
1795

PALIMPSEST RESEARCH

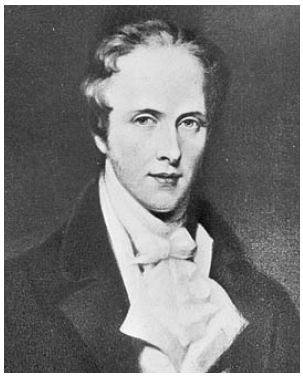
Layer 4: Colonization

Early Trade and Furs
Red River Colony
Early 19th Century
Formation of Manitoba
The Treaty System
Subdivision of the Prairies
Stonewall's Early Settlers

Figure 32: (left)
Map Illustrating the Extermination of the American Bison.
Created by W. T. Hornaday / Julius Bien & Co. Lith. 1889.

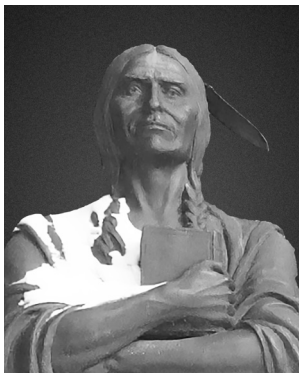


Figure 33 (left)
The first treaty between Selkirk, Cree, Anishinaabe and settlers, 1817. Map from the Manitoba Archives.



Lord Selkirk
1771 - 1820

Figure 34
Thomas Douglas 5th Earl of Selkirk. Image from the Library and Archives of Canada.



Chief Peguis
1774 - 1864

Figure 35
Photo of the Chief Peguis monument in Kildonan park Winnipeg. Image by Wtshymanski. Edited by Author. Licenced under CC BY-SA 3.0.

Early Trade, and Furs

The North American fur trade began in the 1600s. With the French and British empires seeking to expand their influence into the North American continent, both formed fur trading ventures and sent explorers deep in land.

In 1670, The Hudson's Bay Company (HBC) was established by the British empire. A royal decree, granted the company 'ownership' over all of the land that drained into the Hudson's Bay, refereed to as Rupert's land. This section of land was designated solely for HBC operations. However, this did not stop rival traders. In 1779, a conglomerate of fur trading ventures formed The Northwest Company (NWC). Created in response to the HBC's growing influence, the company was run by Scottish Immigrants living in Montreal. Much of the workforce, and fur traders themselves were of French-Canadian descent.

In 1732, the first Europeans entered the Red River Valley.[64] After this point, explorers, and traders began to trickle in. Both the HBC and the NWC entered the region. Forts were built at key locations, especially along the Red, and Assiniboine Rivers. These companies formed relationships and alliances with Indigenous communities to help facilitate their trade networks. In 1776, a flood hit the region which was devastating but not well documented. This flood caused some forts in the region to be abandoned.[65] Neither

company achieved the monopoly they had hoped for. By the 1800s, tensions were quickly growing between the companies.

Red River Colony

In the 1812, the beginnings of the Red River Colony were founded by Lord Selkirk, a Scottish aristocrat. He sought to help displaced Scottish farmers establish colonies in North America. After setting up two other colonies elsewhere Canada, he bought into the HBC and was given a large grant of land in the Red River Valley. This grant was known as Assiniboia. By 1812, Scottish settlers were establishing themselves in the area. Adopting a similar system to the Metis seigneurial system, they established river lots along the red river, with modern day Highway 9 (Main Street, Winnipeg) being the spine trail.[66] In the early years, things were hard for the colonists. Chief Peguis, who was an Anishinaabe chief provided much assistance to the settlers. Helping them adjust to the region's climate, and harvest cycles.[67]

In 1816 the rivalry between the HBC and NWC became violent. The result was the Seven Oaks Massacre, and the dispersal of the colonists.[68] After other incidents of violence, the two companies were determined to resolve the conflict. By 1817, the colonists were returning to the region. To strengthen the legitimacy of the colony, Selkirk sought to create a treaty with 5 local Indigenous groups. Chief Peguis lead the negotiations with Selkirk. The resulting treaty provided annual payments or 'gifts' in exchange for allowing them to homestead in the area.[69] Selkirk had hoped to gain more signatories from other Indigenous nations. However, he died unexpectedly in 1820, leaving the regions first treaty to be nearly forgotten. In 1821, an act was signed by the British Parliament merging both companies' operations. The Hudson's Bay Company name was retained.

The Early 19th Century

With unfortunate start, the colony continued to face challenges. Droughts from 1816 until 1819, paired with an increase grasshopper populations influenced the viability of crops in the fledgling colony.[70] The region experienced the largest flood on record in 1826. This flood devastated the colony, destroying almost all buildings.[71] In 1836, the colony's ownership was sold back to the HBC, from Selkirk's estate. The Hudson's Bay Company established the Assiniboia counsel to govern the region.

During this time, bison was relied on as a source of income, food, and ultimately survival for many Metis people. Bi-annual bison hunts would be conducted, where communities would gather, and hunt in massive party's of nearly 2000 people.[72] This time period saw the foot trails of old become solidified into cart trails. Red River ox carts were a preferred method of transporting goods in the region from the 1820s until the arrival of railways. In 1846 another crop failure occurred and in 1852, the region had its second largest flood on record. Then years later in 1861, another large flood swept the region.[73] Despite hardships and conflicts, the culture and society of the region had grown into a diverse, multiracial community.
By the 1860s, the Fur trade had begun to fade. Colonial ambitions in the prairies were taking root in the east, where Canadian colonies sought to expand into Rupert's land.

The Formation of Manitoba

In 1867, the Dominion of Canada formed when the British east coast colonies signed into confederation. This was the beginning of the modern Canadian state. With colonial desires, and fears of American encroachment onto the prairies, the new Canadian government sought to obtain Rupert's land as its own colony.

The residents of the Red River settlement were dealing with more hardships in the form a pestilence and drought in 1868.[74] In 1869, Rupert's land was sold to the Dominion of Canada. The members of the community were not consulted in this sale. They wanted fair representation, and this clashed with Canadian colonial desires. Louis Riel, a Metis man from the Red River settlement was instrumental in seeking a fair deal for the province. Forming a provisional government in 1869. Riel and other elected members sought to amend this oversight. This caused tensions with some community members who were loyal to the new government. This also upset the Canadian authorities, who labeled the government illegal, and Riel a traitor. Tensions boiled further and lead to the Red River Resistance of 1869-70. The execution of a man named Thomas Scott was a pivotal moment in the resistance.[75] Scott was loyal to the Canadian government, and his death caused outrage in the east. The Canadian authorities eventually conceded and gave into the conditions of the provisional government. However, Riel was not given amnesty and being pursued for treason, he fled the region.[76]

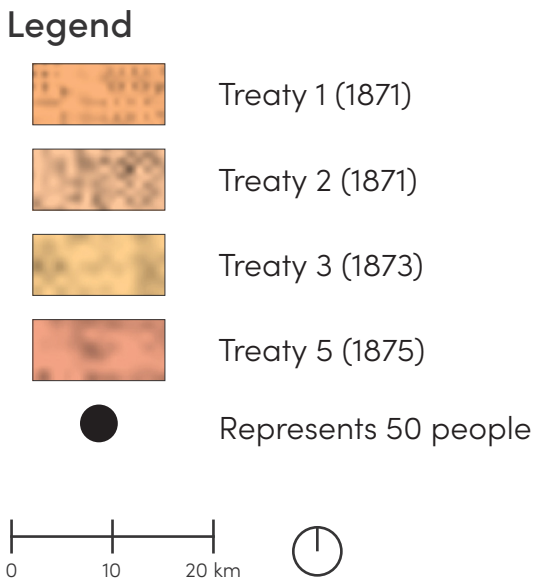
Louis Riel
1844 - 1885

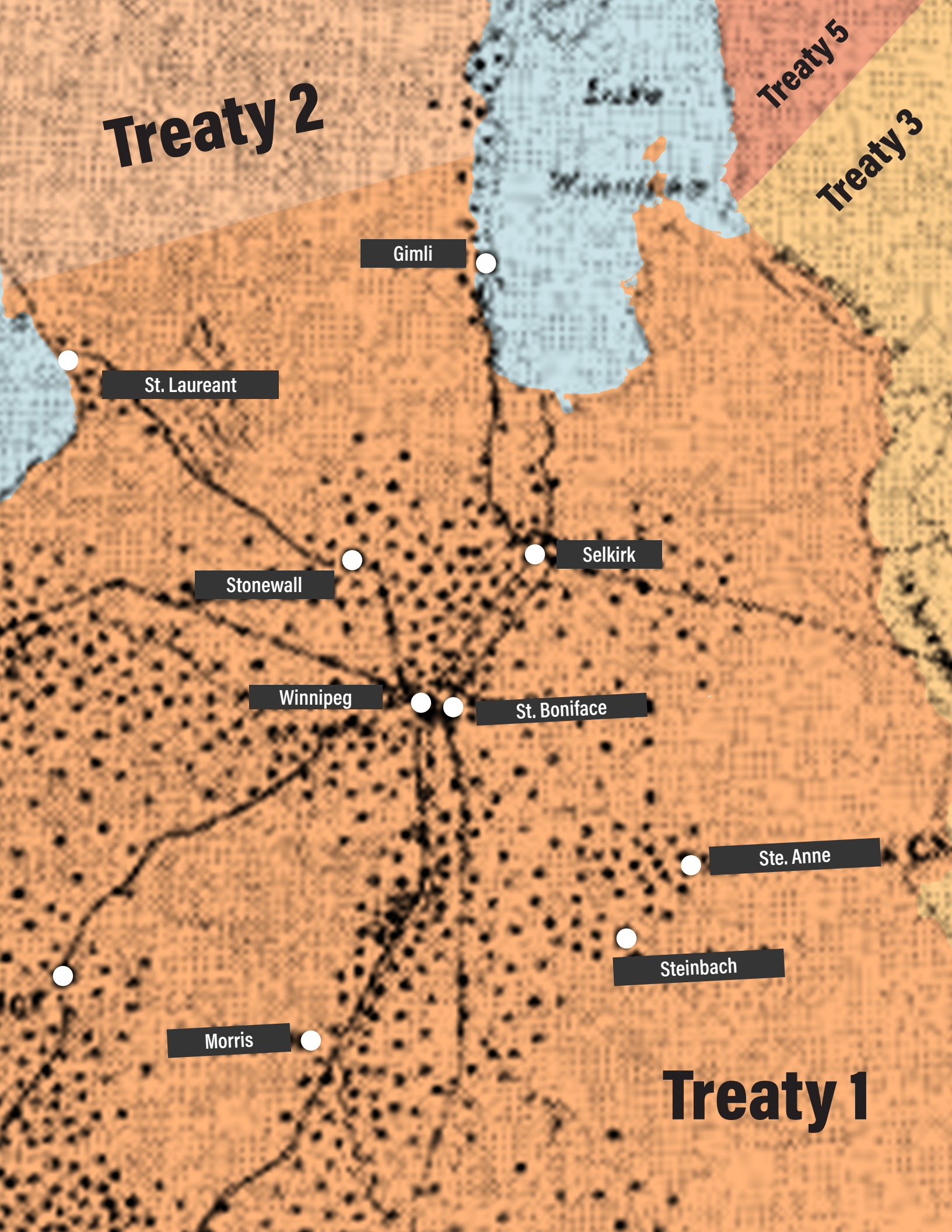


Figure 36
Image from Wikimedia commons.

In 1870, the province of Manitoba was established. The province was smaller than many had hoped, and much of the public land rights were held by the Federal government. Nearly 200,000 hectares of land were to be preserved for Metis people.[77] However, many other Metis people migrated west after Manitoba was formed, being disadvantaged under the new system.

Map 22 (right)
Map depicting the numbered treaties of the 1870's that were signed in the region. A 1881 population map is overlaid, from the Manitoba Historical Society.




Treaty 2
Treaty 5
Treaty 3
Gimli
St. Laureant
Selkirk
Stonewall
Winnipeg
St. Boniface
Ste. Anne
Steinbach
Morris
Treaty 1

The Treaty System

Indigenous people had been advocating for treaties since the 1850s, including Chief Peguis. With the spirit of the original Selkirk treaty in mind, Indigenous advocates were envisioning sharing the land and fostering a beneficial relationship with each other. The federal government saw the Treaties as a way to secure land for railway development and colonization.

In the 1871, the numbered treaty system began with Treaty 1. This treaty encompasses the entire Winnipeg Metro Region and includes Stonewall. Treaty 1 was signed between Anishinaabe, Cree, and Canadian officials. The Treaty promised to grant land to Indigenous families, provide annual payments, and maintain schools. In return, Indigenous people were to "surrender" much of the land in the southern bounds of the treaty territory, including the Red River Valley.[78]

The concept of surrendering land is something that does not exist in Indigenous language, as land is viewed as a shared resource.[79] The Canadian government took advantage of differences in language and culture to create an overly favorable deal for themselves.[80] The resulting treaties had the effect of pushing many Indigenous people northwards to reserves. The introduction of the Indian Act saw intense regulation of Indigenous communities. Government agents restricted the movements of Indigenous people. Indigenous children were forcefully taken from their home communities and placed into residential schools.

By the 1880s, bison herds were disappearing, and the widespread extermination of the bison for profit was well under way. Communities who relied on bison had to seek alternatives. Other game meat was also becoming sparse, with the looming effects of the fur trade still evident in game populations. This had the effect of inducing starvation on many Indigenous communities. The government had arranged food deliveries to these communities, but due to corruption, and mismanagement, much of the food arrived very late, and often spoiled beyond consumption.[81] Records show that the withholding of food was likely intentional, with Prime Minister John A. McDonald stating:

> "I have reason to believe that the agents as a whole … are doing all they can, by refusing food until the [Indigenous Communities] are on the verge of starvation, to reduce the expense…"[82]

His contemporaries in opposition government were quick to point out that McDonald was creating: "a policy of submission shaped by a policy of starvation".[83]

Had the spirit of the treaties been different, Indigenous people would have been able to establish themselves, thrive, practice their own culture, and determine their own futures. Instead, a cycle of generational trauma, ensued, which led to social illnesses, homelessness, and addiction issues. We still live on treaty land to this day.

Figure 37 (right)
Diagram explaining the prairie mile-to-mile grid system.

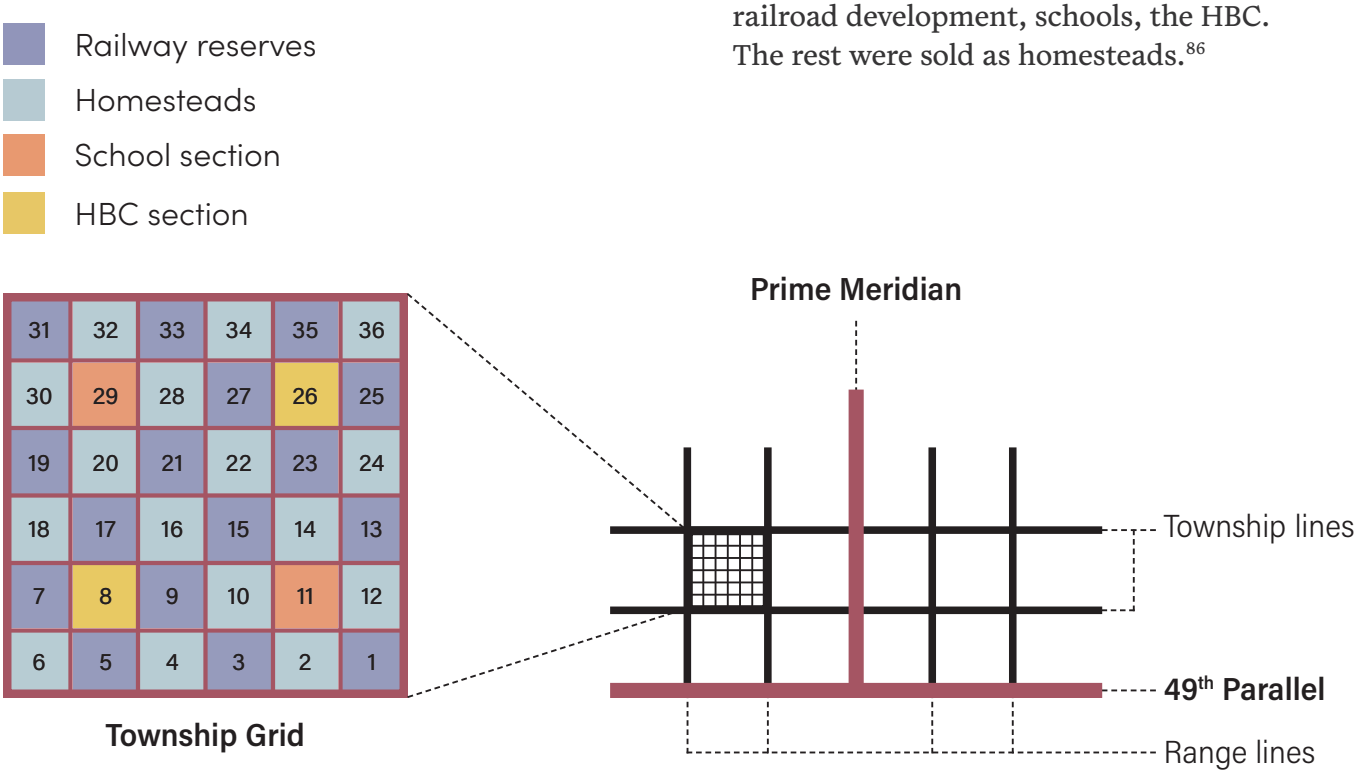
The Subdivision of the Prairies

The treaties cleared the way for the government to subdivide and sell the land. In 1872, the Canadian government passed the Dominion Lands Act (DLA). Inspired by the American Homestead Act of 1862, the Canadian act allowed for the federal government to transfer land in Manitoba, and the newly acquired territories of the west.[84]

Worried that the Americans would try to claim the Prairies, the DLA sought to secure Canada's claim to the region by surveying lands for settlement and providing space for railway development in the region. Before 1870s, agriculture was a small piece of the landscape in Manitoba, mostly contained to the rivers in the region. The resulting survey of the Canadian prairies changed this by dividing the land into a massive mile by mile grid network.

The surveying of the prairies resulted in the immense documentation of the pre-settlement landscape. Standardized from the top-down surveyors observed the landscape and recorded it onto pre-made base maps of township grids. The records from surveys are most detailed the accompanying survey notebooks. These notebooks included observations on: water quality, flow and availability; timber availability for construction and fuel; Species of fauna; mineral deposits; and elevation differences.[85]

The logic behind this grid was developed with 19th century techniques and technology, and its accuracy is remarkable for the time. Starting at the 49th parallel, the survey lays a grid consisting of Base lines, and Township lines. These lines created a grid of 6x6 mile townships. Townships are further subdivided into 36 1x1 mile grids. Road allotments were left between the grids. Within each township, parcels of land were categorized based on who they would be made available to. This included lands to be reserved for railroad development, schools, the HBC. The rest were sold as homesteads.[86]



Each mile-to-mile grid can be further divided into quarters. Quarter sections can be divided further, into quarters again or into sixteenths. Lands that were reserved for railways, schools and by HBC was often sold to settlers to gain cash. To avoid land speculation by settlers themselves, the government ruled that a habitable residence needed to be present on the land within three years. This led to many temporary houses, like Sod / mud houses, before more permanent accommodations could be afforded.[87]

The land transfer system was set up to accommodate to European settlers of agrarian backgrounds, enterprises, railways, religious groups and municipal groups. The act also set parklands aside that later became national parks. This resulted in different systems for Indigenous and Metis people. Indigenous groups who participated in the treaties were granted reserve lands just prior to the DLA. Reserve lands that were granted to Indigenous communities were often not well suited for agriculture or industry and were seen as 'leftover' land by the Government. In the Winnipeg Metro region, the largest of these reserves was the St Peters reserve, located just north of Selkirk, along the Red River.

Due to the provisions in the Manitoba act, lands were reserved for Metis people. Metis people were offered scrip as a voucher that was redeemable for a land title, or payment. The scrip system was inefficient and created room for exploitation by land speculators.[88] Artificial restrictions limited where Metis people could claim land. When scrip was redeemed for cash, Metis people were often underpaid for their scrip or cheated out of their scrip

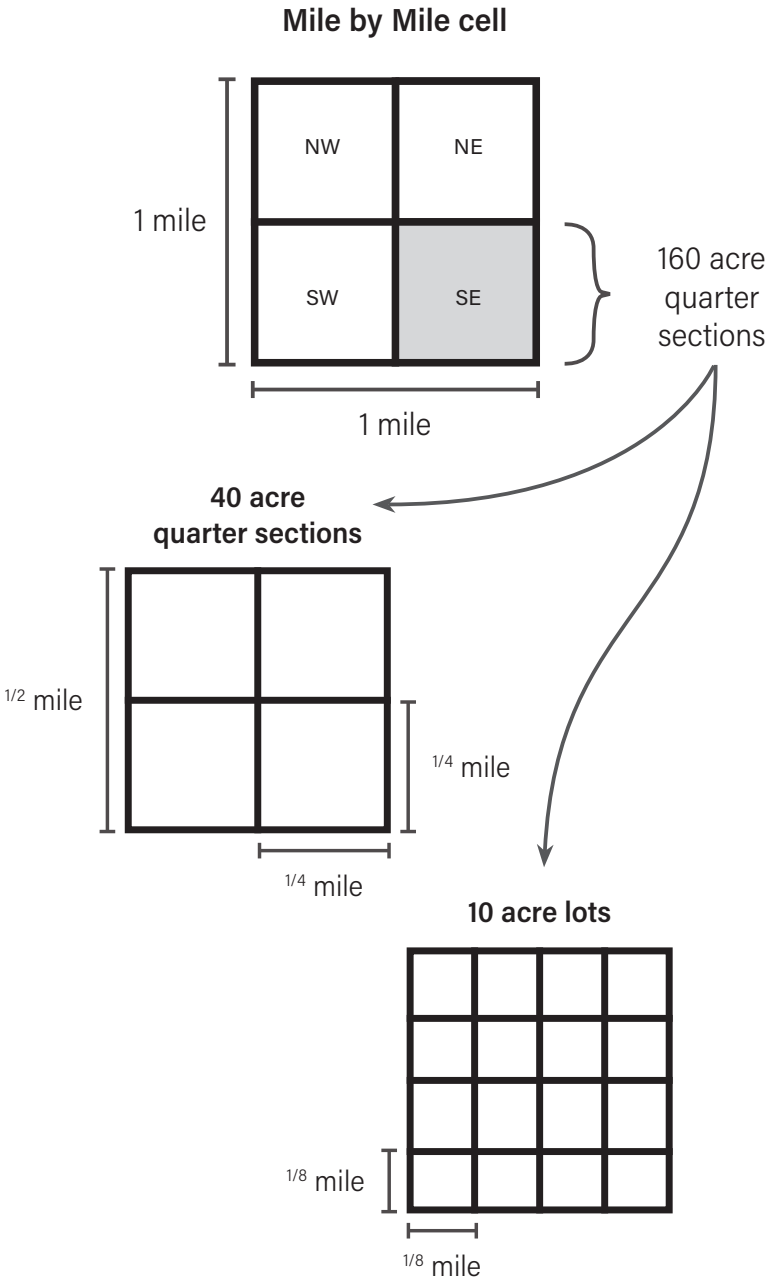


Figure 38 (above)
Diagram explaining the division of a mile-to-mile cell within the mile-to-mile grid.

Figure 39 (left)
Cropped map of the Province of Manitoba in 1871. Dominion Lands Branch, Department of the Interior: J. Johnston, Chief Draftsman.

through fraud. People who identified as both Metis and Indigenous were forced to choose to between treaty status, or scrip. This red lining, and precision carving of the landscape laid the way for railways, and white settlers to establish homesteads across the region.



1871
REFERENCES:
Woodland
Swamp or Muskeg
Prairie and Meadowland
[Metis] Lands
Menonite Dº
Land Districts
Nº1 Nº2 Nº3
Land Offices
Range Numbers I. II. III. IV. V.
Township Dº 1. 2. 3. 4. 5.
Section Dº 1. 2. 3. 4. 5. 6. 7. 8. 9.
STONEWALL
Victoria
Woodlands
Rockwood Post Office
Stony Mountn
Oak Point
St Laurent
SHOAL LAKE
Principal Meridn
Poplar Point
BAIE ST PAUL
ST FRANCOIS XAVIER
HEADINGLEY
ST CHARLES
ST JAMES
WINNIPEG
KILDONAN
ST PAULS
ST ANDREWS
ST CLEMENTS
INDIAN RESERVE
ST PETERS
Springfield
Sunnyside
R.C. Church Property
ST BONIFACE
ST VITAL
Third Correction Line
Third Base Line
Red River
SAINT AGATHE
GREAT HIGHWAY
CANADA PACIFIC
Principal Meridian

Stonewall's early settlers

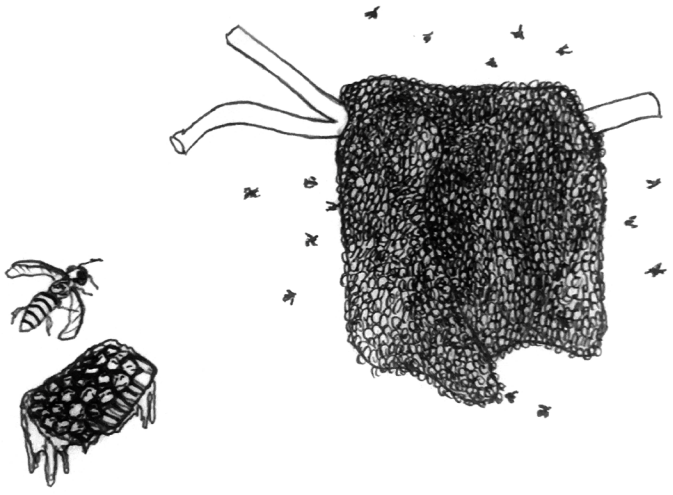
In the 1860s and 1870s, European settlers began to arrive in the Stonewall area. Traveling 32 kilometers from Winnipeg, they would go northwest towards Stony Mountain along a wagon trail known as both the 'Whiskey' and 'Faith' trail and complete their journey into Stonewall.[89] The land that is now Stonewall was undeveloped and consisted of limestone ridges and forested trails. Small homesteads had begun, but since there was not any access to well water at the time, many relied on Grassmere Creek, and other pockets of wetland around the area. To the southwest of Stonewall, a cattle farm operated by the Boyd family was present in the area for a few years prior to the community's establishment.

As the community developed, many of the trees were cleared for fuel and construction material. The community cleared about two acres at a time, with the pioneers removing around 6-7 trees a day.[90] The cleared land would be used for farming where the soils allowed. However, farming implements were expensive, and many would pool their resources and share the work. These early days were hard, hunting and forging were required to supplement the settlements diets. The introduction of beekeeping also allowed for settlers to make honey. Crop losses due to pests and wildfires were also issues. But the town was able to diversify early on and scaled up the production of lumber. A lumber mill was established at the current day corner of 1st street west and Centre Ave.

As the 1880s approached, the region was rapidly attracting interest from railroad companies and speculators, and change was on the horizon.

Figure 40 (right)
1870s map of the region surrounding Stonewall. This map was adapted from 53. Range 1 East (020, 023) and Range 2 East (021,024) 1872-1873, located in the Manitoba Archives.

Figure 41 (below)
Beekeeping was introduced to the NW Winnipeg Metro region by settlers. Hand drawn by author.




Stonewall Region – 1870s
Modern town boundaries
DRY OPEN PRAIRIE
ROLLING PRAIRIE
OPEN PRAIRIE
PRAIRIE LAND
OPEN PRAIRIE
HAY LAND
POPLAR
STONEWALL
BRANCH C.P.R.


SADDLER

PALIMPSEST RESEARCH

Layer 5: The Boom Times

Railways Head West
A Period of Immense Growth
The Founding of Stonewall
Stonewalls Quarries
Emerging Economies
WW1 and the Roaring 20s

Figure 42 (left)
Main Street Stonewall Looking South from Centre Avenue. 1910.
Postcard, Internet Archive.

Railways Head West

One of Canada's main ambitions in the west was to expand the country to the Pacific coast. In 1871, British Columbia agreed to join Canada, under a series of conditions, including that a transcontinental railway be built.

Informed by the treaty process, planning on the transcontinental railway began in the 1870s. Surveying work was done by Sir Sanford Fleming and the original route was to pass through Selkirk, Manitoba, and continue northwest through the Narrows of Lake Manitoba.[91] This northernly route was chosen due to the assumption that much of the southwest prairies were too arid for agriculture.

The choice to build a bridge over the Red River at Selkirk was based on its protection from floodwater. However, political scandal and turmoil delayed the transcontinental railway.[92] By 1873, the Red River Colony near the Red and Assiniboine River had established itself as the City of Winnipeg. The northern portion was established as the town of Selkirk in 1882.

By 1878, the first railway entered Manitoba. This route, known as the Pembina Branch, traveled from St. Paul, Minnesota, north across the US border to Winnipeg, and East Selkirk.[93] This line enabled the creation of colonization railways, and spurred land speculation even further. The same year, a federal election shifted the planning of the transcontinental line even further.

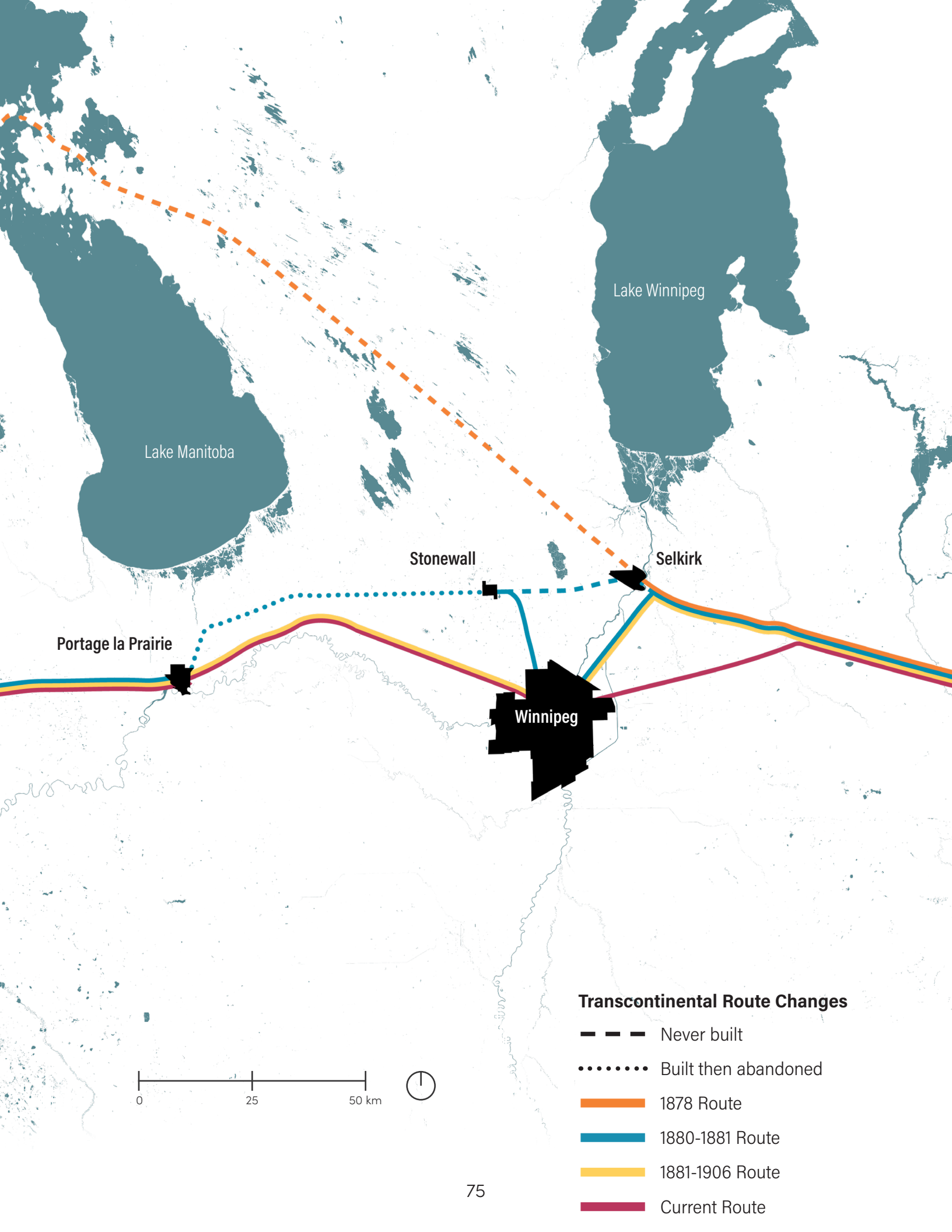
Underscored by the political desire to limit American influence, the new route would pass through Selkirk and heading west to Portage la Prairie via Stonewall. Pressure and financing from Winnipeg saw the construction of a railroad bridge in Winnipeg, and a spur line connecting Winnipeg and Stonewall. The portion of track between Stonewall and Portage la Prairie, was constructed and in operation for one year. The portion between Stonewall and Selkirk was never constructed.[94]

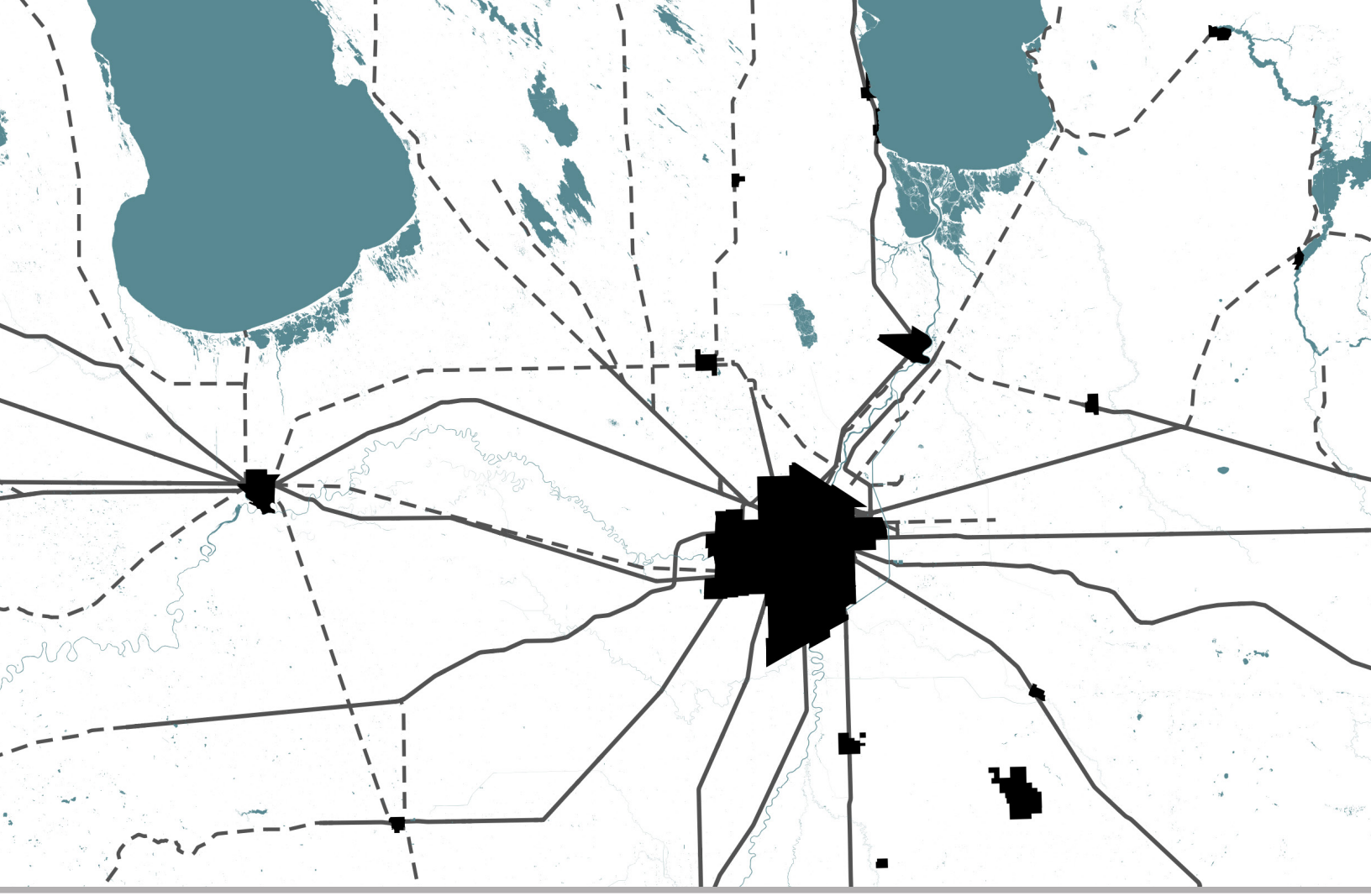
Lobbying from Winnipeg, and speculators altered the position of the line further south. By 1881 the portion of track between Stonewall and Portage la Prairie was removed, and replaced with a direct right of way, just north of the Assiniboine River.[95] The people of Selkirk were outraged after nearly being connected to the main line. They too tried to lobby for a crossing to be built at Selkirk. But, after the many shifts in planning, and being unable to raise funds for the bridge, the Selkirk crossing was forgotten.

That same year, in 1881, the Canadian Pacific Railway (CPR) was officially incorporated. Corruption was rampant in Ottawa with construction of the railways, and the CPR got a lot of government money to develop the transcontinental railway. Most of the construction was done by Chinese foreign laborers. The conditions were poor, and many died in its creation.[96]

The railway became tied to the sale and transfer of land to settlers, and opened the Prairies to widespread agrarian settlement

Map 23 (right)
Timeline of mainline railway construction in Southern Manitoba. Adapted from Greater Winnipeg Investigating Commission. Location of the C.P.R. in the Vicinity of Winnipeg


Lake Winnipeg
Lake Manitoba
Stonewall
Selkirk
Portage la Prairie
Winnipeg
0
25
50 km
Transcontinental Route Changes
Never built
Built then abandoned
1878 Route
1880-1881 Route
1881-1906 Route
Current Route



Map 24 (above)
Map of active and abandoned railway lines around the Winnipeg Metro Region. GIS map. Adapted from Active and Abandoned Railroads of Manitoba.

A Period of Immense Growth

The completion of the CPR transcontinental route in 1885 shifted the prospects for the Red River Valley, and its fledgling communities.

After successfully acquiring a position on the main route of the line, Winnipeg became a hub for railway operations in western Canada. During this time, Winnipeg and the region saw increased investment, from railway companies and Eastern Canadian entrepreneurs.

The railway industry also began to rapidly diversify. Over time, the CPR was able to assemble a vast trade network, stretching coast to coast. This allowed for trade and travel across Canada. The region's position on this trade network was lucrative, and its success influenced the prospects of southern Manitoba.

By the 1880s, electricity was available in Winnipeg. Around this time, a population boom began. Drought in the 1890s initially slowed settlement.[97] However, as the drought lifted,

and branch railway lines extending north from the USA were completed, settlement rapidly increased. From 1897-1910 a combination of low transportation rates spurred on by railway proliferation, and the success of the grain industry enabled an economic boom for the province.[98] Settlers from Eastern Canada, UK, USA, Ukraine, among others from Europe began to pour into the region and create homesteads.[99]

The founding of Stonewall

In 1871, Irish immigrant Samuel Jacob Jackson moved to Winnipeg from Ontario.[100] That same year, he worked on the survey crew that visited the Stonewall area. Jackson took an interest in the limestone formations in the area, seeing their economic potential. With the prospect of the CPR planning to pass through town, Jackson saw the opportunity to create limestone aggregate for railway construction.

By 1872, he was a successful business partner at a Winnipeg dry goods firm.[101] This success allowed him to purchase a plot of land from the CPR in 1875, which he subdivided into the future town of Stonewall. By 1876, Jackson was also homesteading a portion of land part time.[102] Though he was not a skilled



Samuel 'Stonewall' Jackson
1848 - 1942

farmer, he bought his own ox and tools and participated in plow sharing. In 1877, Jackson entered politics, serving as a city councilor in Winnipeg.[103] By 1878, Stonewall was established as a community. There were 4 buildings: a

Figure 43 (above)
Stonewalls town founder. Image from the Archives of Manitoba. Manitoba Legislative Assembly photo collection, "Fifth Legislature of Manitoba 1883-1886", Outsize 299 [cropped].

Figure 44 (below)
Stonewalls Main Street, looking south from Centre Ave, prior to 1900. Adapted from Stonewall: Turning a Century, 1878-1978, Plate 7.



log cabin, a mill, a house and a church. Soon after, Jackson financed the town's first limestone kilns.[104]
Jackson moved to town full-time in 1881, once the railway arrived. Around this time, other quarries were also opening in town. Jackson was elected as a provincial member of parliament in 1883 and held this seat until 1896. As an avid gardener Jackson also assisted in the acquisition and planting of 800 trees within the community. Some trees were even imported from as far as England. Jackson would offer land for free settlement, with the caveat that a nice house and trees be planted on the land. [105]

In 1885, the Northwest Resistance broke out in Saskatchewan. This resistance stemmed from the unfair land dealings with Metis people and worries about the future of Metis and Indigenous people in the west. Louis Riel returned to the region, to help lead Metis efforts. Jackson being a politician, and loyal to the British Crown, volunteered to fight in the Northwest Rebellion against Louis Riel the Metis, and their Indigenous allies. Jackson was Captain of the 95th Battalion D Company, which was sent from Rockwood to the front lines in Batoche.[106] The resistance was defeated, and hundreds of people were left dead. Louis Riel was tried for treason and hung in 1885.[107]

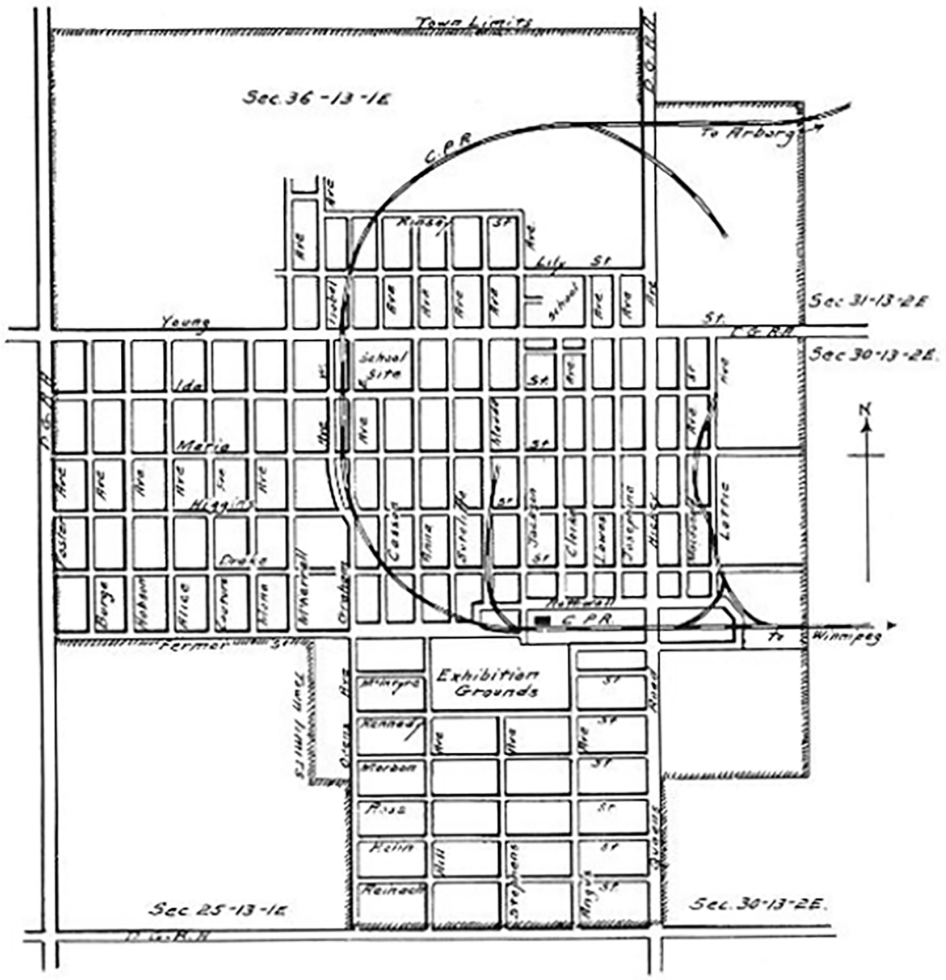
The towns name comes from Jacksons nickname: Samuel 'Stonewall' Jackson. Tradition has it that members of the survey crew he worked on called him 'Stonewall' due to his fondness for the American confederate general, Stonewall Jackson. He bestowed his nickname on the town, giving modern day Stonewall its name.[108]

Figure 45 (bottom left)
Main Street Stonewall, looking North between 1st Ave. S and 2nd Ave S. Circa 1900. Adapted from Stonewall: Turning a Century, 1878-1978, Plate 37.

Figure 46 (bottom middle)
Montgomery Block (359 Main Street). Built in 1878. upper floors lost to fire 1928. photo circa 1890. Adapted from Stonewall: Turning a Century, 1878-1978, Plate 13.

Figure 47 (bottom right)
Stonewall Anglican Church built in 1882 photo circa 1890. Adapted from Stonewall: Turning a Century, 1878-1978, Plate 17.





Town of Stonewall

APRIL 1922

Figure 48
Map of Stonewall in April of 1922. Map from Stonewall: Turning a Century, 1878-1978, page 5.

Community Established 1 August 1878
Village of Stonewall 14 August 1906
Town of Stonewall 1 June 1908





Stonewalls Quarries

Stonewalls first quarries were located on the north and east sides of town. Limestone would be baked in ‘pot kilns’ made from glacial erratics and other field stones. These kilns would cook the limestone into quick lime (Calcium Oxide), a product sought for many industrial, agricultural and construction uses. The kilns would take about 6-10 days to produce lime powder. In 1895 new draw kilns were constructed. These kilns were very efficient and were able to produce nearly 20 metric tons of lime in one day.[111]

First, the limestone and quicklime would be transported by horse to a railway platform for pickup. Later, railway spurs were built into quarries to allow for seamless exports. This integration of railways and quarries gave the town a step up in industry. In the towns eastern quarries, cut limestone for building construction was exported. Much of this was used for buildings in Winnipeg, and Stonewall.[112] Work in the quarries was dangerous and demanding. People often had chemical burns, breathing issues, broken bones, and worse – fatal accidents. In the early 1900's, there was a labor shortage which was compounded with a shortage of railway cars. The quarry industry in Stonewall boomed from 1895 until the onset of WWI.

Emerging Economies

Between 1881 and 1911 the population of Winnipeg boomed. Growing from 7995 people in 1881 to 136,035 people by 1911.[113] That is a population increase of nearly 6000%. Winnipeg quickly became the province’s leading city, accounting for over 50% of the population. The surrounding prairies also saw a massive increase in settlement. The province of Manitoba's population went from 62,260 people in 1881, to 461,394 people in 1911 - a 650% increase in population.[114]



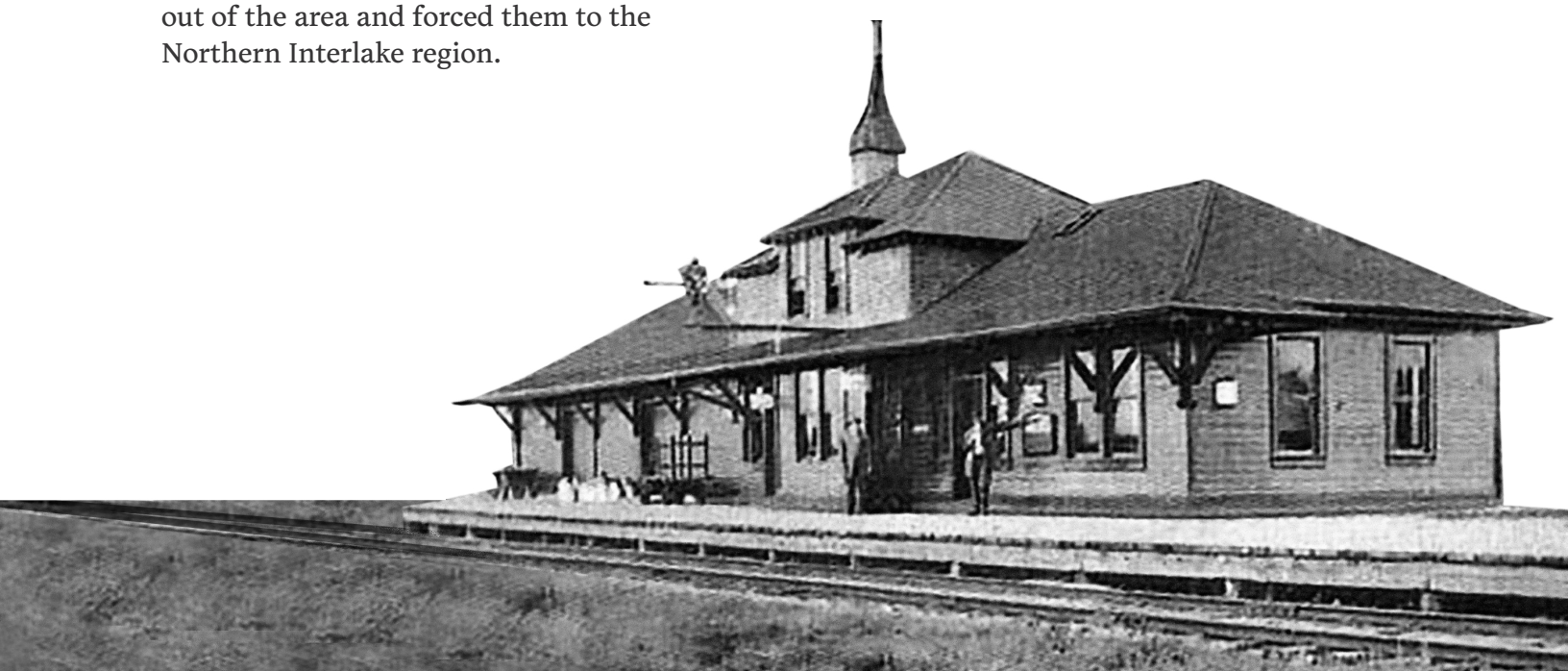
Railway lines continued to be extended, to accommodate the rapid population growth, and to ship grain out of the region. Grain elevators sprung up along prairies railways to accommodate the grain Industry. The railway in Stonewall extended north to Teulon in 1898, Komarno in 1907, and Arborg in 1910, where the line reached its end.[115] By 1906, Stonewall was officially incorporated as a village. By this year, the mainline had entirely shifted away from Selkirk, leaving any hopes of a trunk line passing through Stonewall, stifling any aspirations for a major railway boom. However, two years later, in 1908 Stonewall was incorporated as a town, reflecting its growing community and municipal identity.

The growth in settlement, and the booming agricultural industry also created social strains. The successful Indigenous farming community of St. Peters Reserve, North of Selkirk had grown from the band of Chief Peguis. Tensions with local settlers rose when they wanted the reserves farmland for themselves. In a fast turn of events, the reserve held an unrepresentative and skewed vote, which surrendered the reserve to settlers. This pushed the last remaining Indigenous community out of the area and forced them to the Northern Interlake region.

By the end of 1912, Stonewall had electricity.[116] In 1914, the signature prairie style post office at Centre Avenue and Main Street was completed. The railway industry continued to diversify their portfolios. Many began to build luxury hotels and offer first class accommodations by in sleeper cars. The hopes were to create a tourism industry to help support their trade and commuter passenger operations. This resulted in the construction of the Fort Garry Hotel in Winnipeg. In Stonewall, the Canadian Pacific Railway built a 3-story hotel on the corner of Main and 1st Ave south. In 1912, the town saw the addition of an interurban streetcar line to Winnipeg. This line terminated in Stonewall and had a transfer service via bus to Teulon.[117]

Figure 49 (bottom left)
Draw Kilns in Stonewall's North Quarry.(Quarry Park). Circa 1930. Adapted from Stonewall: Turning a Century, 1878-1978, Plate 42.

Figure 50 (bottom right)
Stonewalls CPR Station, Circa 1920's. Adapted from Stonewall: Turning a Century, 1878-1978, Plate 31. (Edited by author, left side expanded)



WW1 and the Roaring 20s

The region's growth was stunted by the effects of WWI, and the completion of the Panama Canal. By 1915, Manitoba had reached the peak of its railway construction, by mileage of track.[118] Soon after, many railway lines went bankrupt and were reorganized. However, railway development continued into the 1920s. Development of the region through railways and industrial agriculture had allowed for an efficient network of grain transportation to form. This spurred on new industries and trade opportunities. By this time, the importance of railways for economic and social development was inseparable from small towns. In 1923 the federal government founded the Canadian National Railway to compete with the dominant CPR.[119] Immigration into the region also continued with large amounts of immigrants settling in the region in the 1920s.[120] Winnipeg had begun its maturation into a cosmopolitan city. The grandeur of the Provincial Legislature completed in 1920 reflects the level of optimism for both Winnipeg, and Manitoba. Factories, banks and a grain exchange defined the cities' growing industries.

In 1916, Stonewalls had grown to a population of 1152 people, however, the effects of WWI were felt hard.[121] The town lost 102 men in the war, leaving a gap in the demographics, and families of the town. In 1923, only 21 men worked at the quarry, reflecting this demographic shift.[122] Though there were some positives. A skating rink was built on 1st Street East and the streetcar service allowed for flexible links to other urban areas. Better roads were also beginning to be developed, allowing transportation by motor vehicles.

This time of optimism, economic prosperity and technological advancement was brought to a halt in 1929 when the stock markets collapsed and sent the region into a depression.

Figure 51 (left)
Interurban electric streetcar. Circa 1920's. Adapted from Stonewall: Turning a Century, 1878-1978, Plate 81.



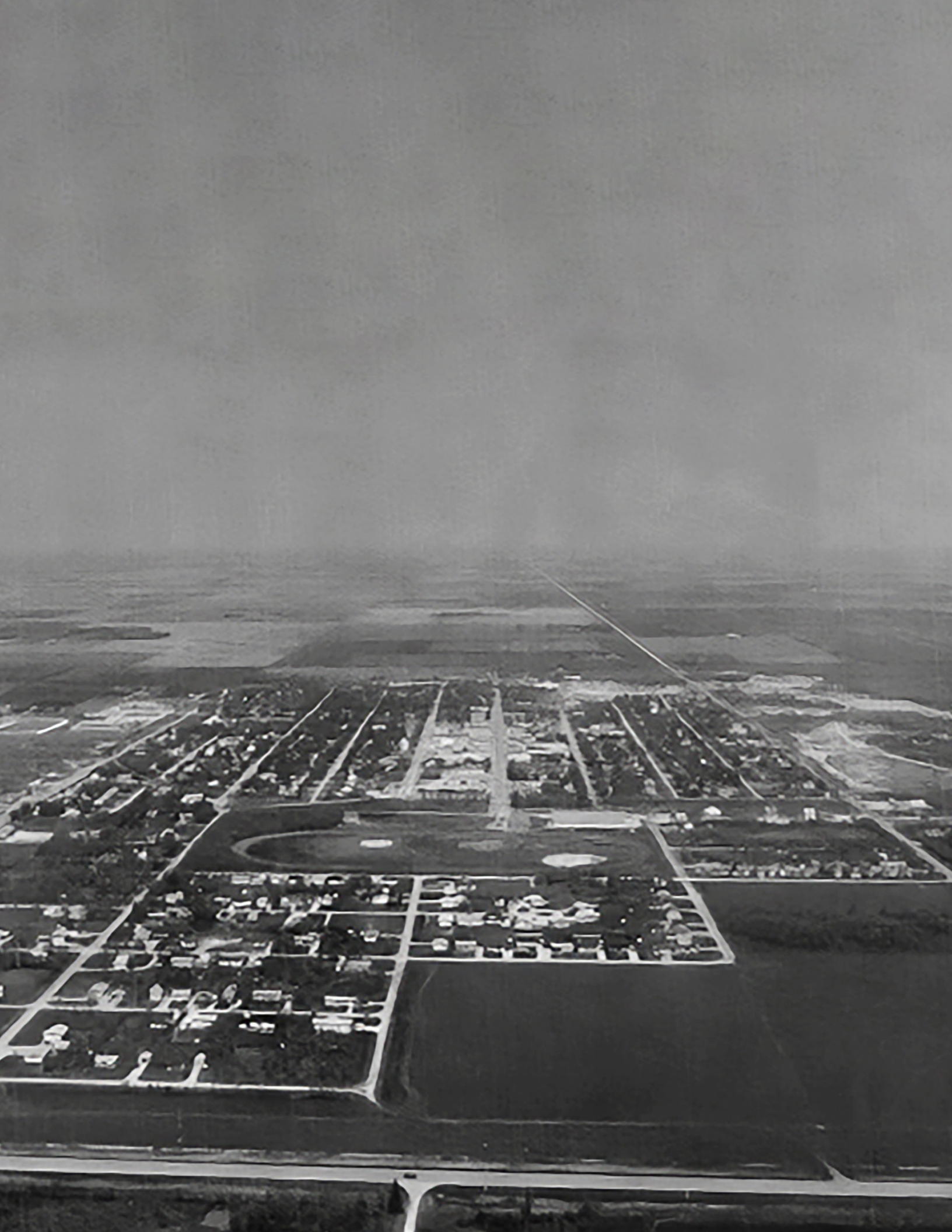
The Dirty Thirties

The economic crash of 1929 was felt globally and led to depression and mass poverty. The Great Plains region was hit especially hard, with the crash being paired by a major drought. These conditions wreaked havoc on farms leading to mass crop failures. Poor farming practices had also caused soil erosion. With the soil being loose enough to blow away, massive dust storms that swept across the plains. Dust caused illnesses and death, and diminished social conditions led to increased suicide rates among farmers and their families.[123]

In 1935, the Canadian Government established the Prairie Farm Rehabilitation Administration to mitigate the effects of the crisis. These programs introduced techniques to restore farmlands, retain water, and prevent further soil erosion. One of the major spatial outcomes of this program was the introduction of shelter belts. Shelterbelts are plantings of trees that act as a barrier for strong winds. These belts prevent soil erosion and have the added benefit of controlling drifting snow in the winter.
Even with government assistance, this drought marked the start of the slow decline of family farms in the region. The 1936 census shows that 500 farms were abandoned in Manitoba.[124] This trend continued into the 20th century. With Stonewalls industry being based in limestone quarries, it was not immune to the economic effects of the depression but was spared from many of the hardships faced by farmers. The community's population stayed consistent, which allowed them to thrive during this time. This is evident in the many community groups and clubs in town. These ranged from groups putting on plays to a snowshoe club. Another unique characteristic of the town's community was its bell tower. This tower was used as both a fire alarm, and to let children know when it was curfew hours. The bell was removed in 1946.[125]

The town's main street had matured into a wide, but charming stretch of interesting buildings and activated storefronts. Trees poked out from avenues and private properties, but there were no street trees on Main Street itself. In 1939, the streetcar connection to Winnipeg was removed. The company that operated it had hoped Stonewall to grow faster to accommodate the line, but this did not manifest during the economic downturn of the 1930s.[126]

By the start of the 1940s, the conditions in the region were improving, and the drought had eased. But just as things were getting better, WWII broke out.



PALIMPSEST RESEARCH

Layer 5: Modernity

The "Dirty 30's"
Effects of WWII
Shifting Demographics and Industries
Ecological Impacts
Recent Flood and Drought Events
Contemporary Times

Figure 52 (left)
Aerial view of Stonewall looking North. Circa 1978. Adapted from Stonewall: Turning a Century, 1878-1978, Plate 118.

Post WWII

World War Two altered the social and cultural fabric in Canada. Like WWI, the aftermath of WWII caused a demographic shift in many towns - Stonewall lost 73 men due to WWII.[127] However, the excess production capacity from wartime manufacturing led to the development of new technologies and spurred on a post war economic boom for both Canada and the USA. These demographic and social changes led to a 'baby boom' from 1946-1964, which increased the population.[128] During this period, cars became more affordable and accessible to the everyday person. This led to higher car ownership, and in turn major investments in highway infrastructure across the continent The urban planning of the period reflects the shifting focus, with many urban areas across the continent favoring freeways over communities. At the same time, a lack in investment in railway infrastructure, caused a decline in service, and the eventual abandonment of passenger service on many routes in favor of buses. The agricultural industry was also changing, with technological advancements allowing for more mechanized agricultural practices. This also meant less people were required to sustain a farm.

In 1950, southern Manitoba was hit with the most extensive flood that the Red River Valley had seen since 1861.[129] This caused mass evacuations and forced the provincial government to consider bold, new flood protection measures, like the creation of the Red River Floodway. There were also moderate droughts in the post war period, but the drought of 1961 stands out. It was short, but one of the most severe droughts on record on Southern Manitoba. Insignificant seasonal rainfall and excess sunshine caused

Figure 53 (below)
Main Street looking south east from the former bell tower. Early 1940s. Adapted from Stonewall: Turning a Century, 1878-1978, Plate 88.



crop failures and livestock selloffs. The drought was bad enough to cause the return of dust storms.[130]
Post war optimism also manifested within Stonewall, with the town continuing to see development, and new additions, such as the town's first movie theater beside Main Street, and a golf course on the western edge of town.[131]
In 1952, a hockey arena was built within the exhibition grounds, which were renamed to veteran's memorial park sometime in the late 20th century. However, less fortunate changes also occurred, with the town's final passenger railway service at the end of 1953.[132] This service was replaced by a bus service, which continued the connection between Stonewall and downtown Winnipeg.[133]
Starting in the mid-1950s the town began to see a sharp increase in population, reflecting the baby boom of the era. Social clubs and community organizations continued to thrive and advocate for the town's improvement. At this time, portions of the quarries north of town were becoming underused. With the help of the Stonewall Kinsmen club, the one of the derelict quarry pits was transformed into a swimming lake – Kinsmen Lake.[134]

The town saw continued growth into the 1960s, with the development of the urban fringes into new neighborhoods. In 1967, a new regional library was built on Main Street. In the same year, the town's main quarry closed for good.[135] Though small-scale quarrying still occurred around the area, the closure of the main quarry marked the end of a chapter for the town of Stonewall.

Figure 54 (below)
Main Street Stonewall, looking south from 1st ave north. 1940. Adapted from Stonewall: Turning a Century, 1878-1978, Plate 31.



Shifting demographics and Industries

As the 1960s faded, the 1970s brought new economic challenges. The oil crisis of 1973 demonstrated the modern reliance on oil for urban and societal function.[136] With it, there was a period of stagflation, with high prices and high unemployment. Railways saw a continued decline during this period, with many smaller lines being torn up to cut costs for railway companies.[137] These closures saw many small towns lose industry and employment. This paired with the continued decline of small farms through mechanization, and land consolidation created a much smaller population in many towns. The climatic conditions of the era were rather favorable, with no major droughts. The Floodway helped alleviate the effects of floods in the 1970s.[138] However, with these challenges, the broader economy continued to see growth.

The 1970s saw continued growth and expansion in Stonewall. New, auto-oriented housing was being constructed on the western side of town. And car-oriented shopping plazas and strip malls began to appear on Main Street. During this time, the town saw a loss of many historic buildings. This included the large CPR Hotel on Main Street. The town also saw changes in its amenities. The golf course that was created in the 1950s was redeveloped into the town's first retirement home - Crocus Manor.[139] This period also saw the establishment of a Nursing home, Rosewood Lodge. The town expanded its water and sewer infrastructure in 1976, providing a municipal water service.[140] In 1978 the town of Stonewall celebrated its Centennial anniversary. This event was memorialized through the Stonewall Carin, a limestone memorial at the southern end of the town's main street.

The town's population had increased to over 2000 people by the onset of the 1980s. With car centric infrastructure taking hold, Stonewall saw the end of the bus service to and from Downtown Winnipeg, ending a 100-year-old public transportation connection to Winnipeg.

In 1985, the town's former quarry site was transformed into Quarry Park, with trails, park space, camping and a museum/interpretive centre. This complimented the now well-established Kinsmen Lake and created a recreation destination for many in the region.

Living in an Altered Landscape

The late 1980s were defined by a long drought in the region. This drought 1980s led to decline of agricultural production and put strains on the provinces hydro power generation. It also caused wetland loss, which led to disease in the region's waterfowl populations.[141] Though the drought was intense, the region was able to avoid some of its most disastrous effects. Techniques and changes in soil management, and the standard practice of shelterbelts prevented large scale soil erosion and dust storms. The drought lifted in the early 90s, but further economic decline continued into decade and the region saw slow growth.

Car centric culture crystallized into the urban fabric of the region, with suburban developments as the accepted approach. Contrary to the economic

conditions, Stonewall experienced sharp growth in the 1990s, with the town growing by 37% from 1990-2000. This was paired with further suburban expansion of the town towards to west. In 1997, a massive flood shook the Red River Valley. Though the floodway was able to protect Winnipeg, the flood still displaced many people who were not protected by the floodway. Shortly following the flood was the onset of the new millennium, and expansive drought. This drought lasted from 1999-2004 and affected much of the prairie region. The drought was bad enough to cause some dust storms and increased the risk of fire in wooded areas. The regions economic and agricultural output to declined as a result. The end of the decade was defined by the global financial crisis of 2008.
During the 2000's Stonewalls population growth slowed and grew by only 15% between 2000 and 2010. However, this period still saw continued suburban infill between existing suburban developments. In 2007, a fire shook the town, and destroyed the Quarry park interpretive centre, and its museum. Though the centre has been rebuilt since, many records and artifacts were lost.[142]

The 2010s brought changes in the regions economic outlook. Diversification of industries and the regional economy allowed for a large increase in population growth within Winnipeg, and other urban areas. In 2011 flooding on the Assiniboine River led to displacement, as water was diverted into lake Manitoba. A year following the flooding, a drought began. This drought led to increased wildfires throughout the region. Drought conditions continued to fluctuate through the decade, with major dry spells in 2015 and 2017.[143] These droughts occurred throughout the prairies and caused wildfires. These fires produced massive amounts of smoke that posed a hazard to the region.

The 2020 COVID pandemic altered the social and economic fabric of the world, and its influence was felt in every community. Since this time, there has been an uncertainty in the



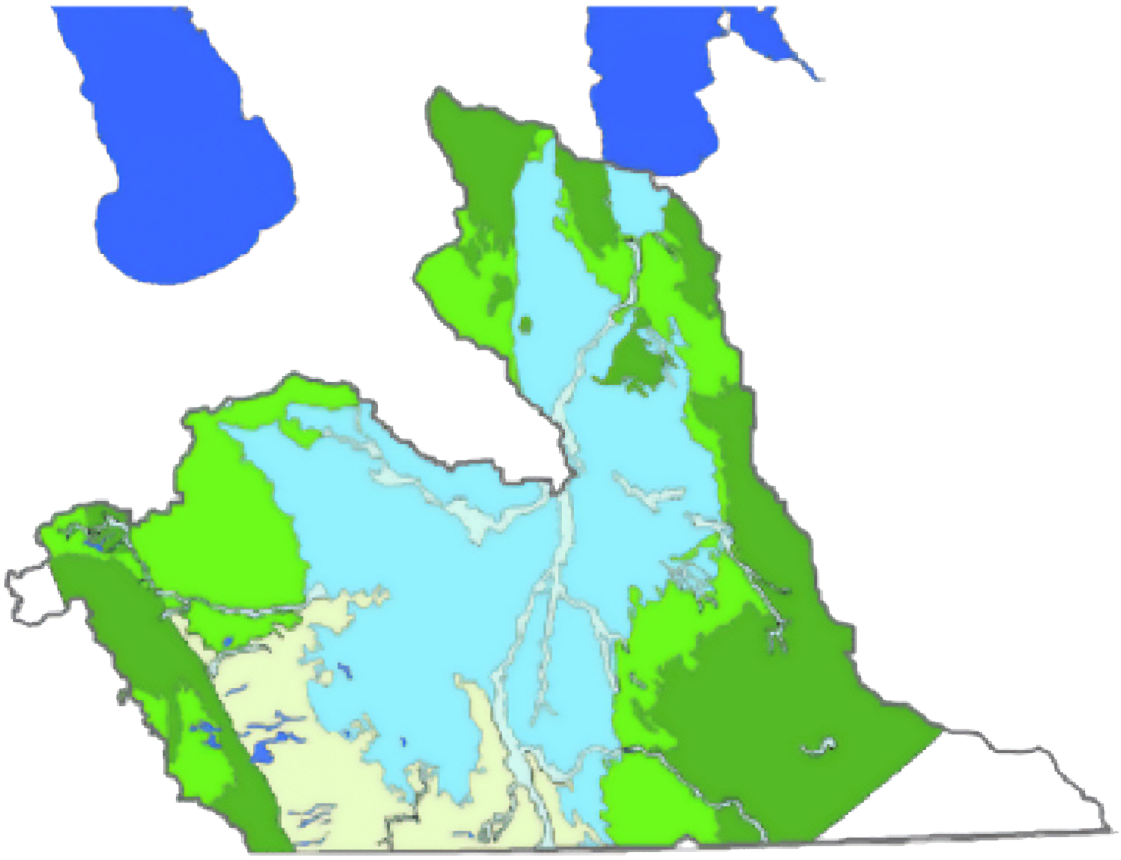
Figure 55
South end strip mall, opened in 1977. Adapted from Stonewall: Turning a Century, 1878-1978, Plate 119.



Figure 56
Suburban development on 7th avenue south. Adapted from Stonewall: Turning a Century, 1878-1978, Plate 123.

global economy, which influences business and industry in Manitoba. To make matters worse, in 2021, drought returned, and lasted until about 2023, with fluctuations still occurring.[144] Throughout this period the region continued to see steady growth. Stonewalls growth rate remained, at 15%, and in 2015, a new suburban development broke ground in the towns southwest. This development included a handful of car-centric multi-unit apartment buildings.

Today, Stonewall represents a pleasant small town. Many historic buildings, like the land titles building, the post office and the quarry towers now act as landmarks within town. The town aspires for growth and has already sought redevelopment options for its key recreational features, like Quarry Park, Veterans Memorial Park and Main Street. The town also expanded its wastewater infrastructure to accommodate urban growth. In 2020, the town outlined a report for growth, this report laid out the goal of doubling the towns population by 2050; To achieve this, the report suggested the town expand its legal boundaries to accommodate suburban growth. This expansion occurred in 2024.



Pre-settlement

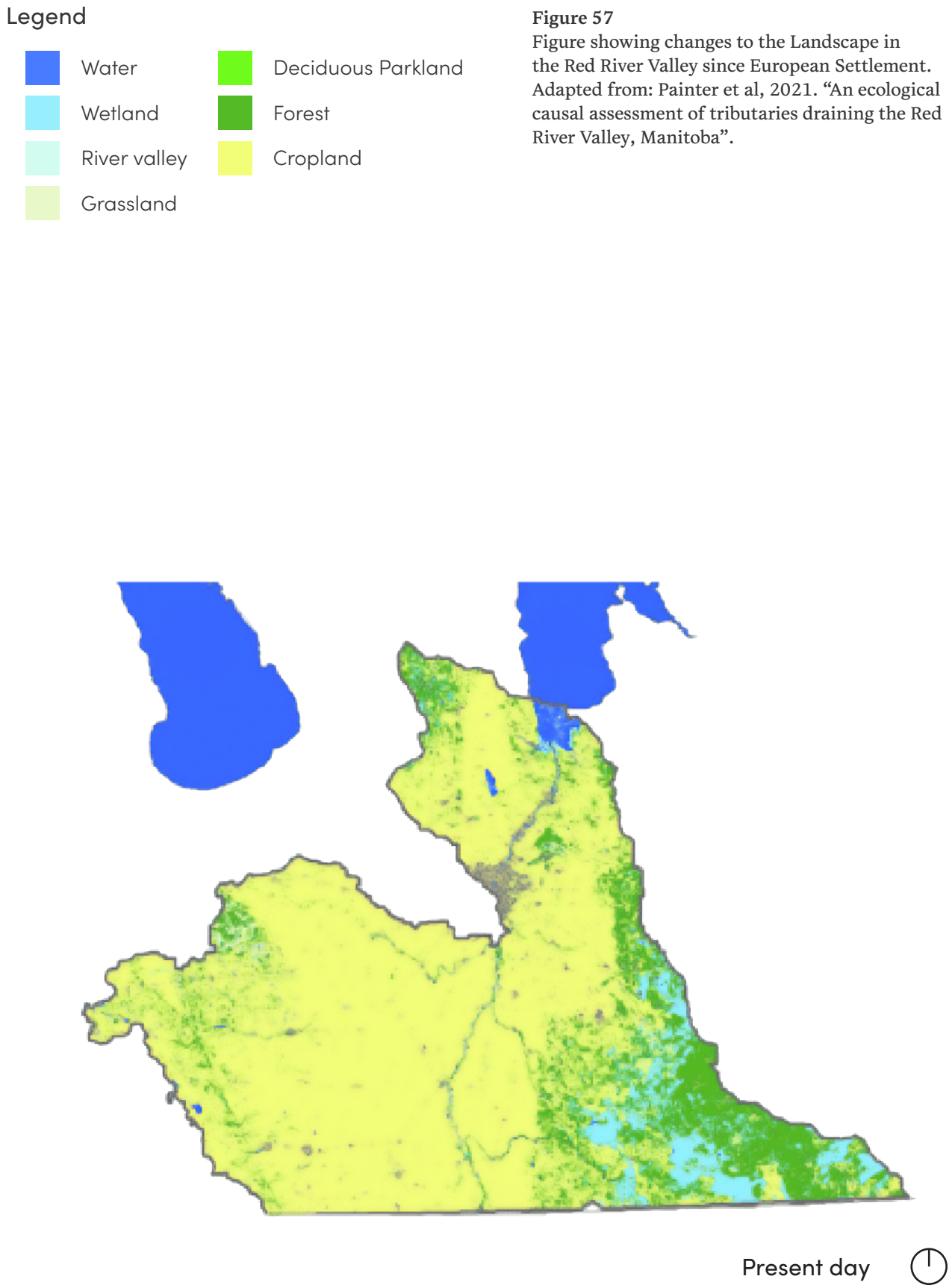


Figure 57
Figure showing changes to the Landscape in the Red River Valley since European Settlement. Adapted from: Painter et al, 2021. "An ecological causal assessment of tributaries draining the Red River Valley, Manitoba".


1875 — 1975
DEDICATED AUGUST 6, 1975
100 YEARS
OF SETTLEMENT IN THE
TOWN OF STONEWALL

Conclusion: Palimpsest

The landscape of Southern Manitoba, and Stonewall, have seen major changes since the last glaciation. With a shifting influence from different habitats, and animals, and eventually humans. Humans tended to the landscape in tune with its needs, weathering climatic changes. With the onset of colonization, these ecological, and human systems saw massive disruptions. With the removal of existing animals, people, and culture, the landscape was primed for division. The prairie grid system allowed for sale of land, and the railways allowed settlers to take advantage of this new land.

This division, led to the draining of marshes, the clearing of prairies, parklands, and forests, and the diversion of tributaries and streams. Though these changes allowed for the flourishment of economic output, and development, they have created massive challenges for the region as a whole. These alterations have removed many ecosystem services from the region, meaning that there is less capacity for water retention, pollinators, and ecosystem movement. The removal of these features has rendered the landscape less robust. This intensifies the impacts of future wet and dry cycles.

Figure 58 (left)
The Stonewall Carin. This monument was commissioned to mark Stonewalls 100th anniversary. Personal photograph. September 11, 2024.

As observed in layer 3, there is an existing record of climatic uncertainty within the region, with:

"The historical cycle of wet and dry periods assures that the return of severe drought to Manitoba and the Canadian Prairies is inevitable in the coming decades."[145]

When paired with the risks and impacts of climate change like warmer summers and changes in precipitation patterns, it is clear that drought, and ecological instability will be defining features of the region in the coming years.

As of 2025 Stonewall has reached a population of over 5000 people. The town has recognized the need to grow its population and housing stock due to shifting demographics. The large cohort of baby boomers are now steadily entering into retirement. Unless the town is able to retain a healthy demographic balance, there is a chance that there will be a loss of amenities, and services for those who wish to age in place. However, with a growing region, and the increased risks of climate change, Stonewall must be strategic with growth if it wants to see continued success into the 21st century.

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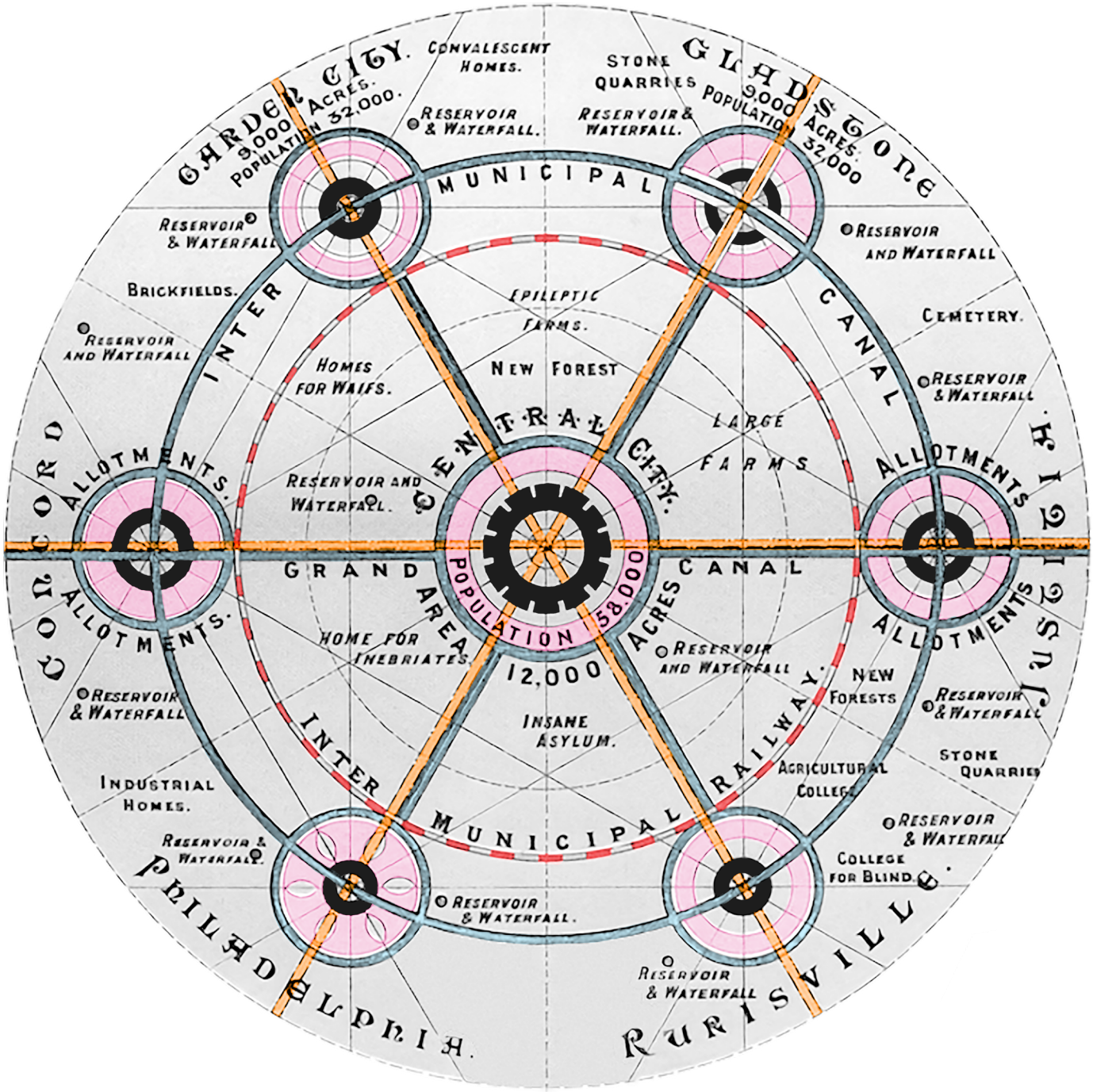
THEORY RESEARCH

Introduction

The challenges of demographics, population and climate change intersect with urban development, and social aspects of human infrastructure. This chapter will examine several theories that fall under the categories of Urban design and sociology. This allows for both the physical and social functions of the urban environment to be considered at various scales.
To better understand how these challenges relate to urban design and sociology, it is helpful to review how towns and cities evolved into their modern form.

Figure 59 (left)
Highway 67, south of Stonewall, looking West.
Personal photograph, January 13, 2025.



0 1 2 miles

Legend

- Road and rail corridors
- Residential areas
- Canals
- Roads
- Inter-municipal railway
- Municipal boundaries
- Urban cores

The dream of a Garden City and a Complete Community

Throughout human history, people have built urban environments. Though the form and function of these environments is deeply varied, they traditionally reflected the scale, functions and needs of humans. With a hierarchy of spaces for movement and commerce (streets) and places for inhabitation and business (buildings). As societies introduced new technologies, these hierarchies shifted in response, allowing for carts, carriages and wagons. This created additional complexity in urban areas, yet these forms of movement were able to coexist equally.

This hierarchy was crystallized for centuries until the onset of the Industrial Revolution in the 18th Century. With advances in manufacturing and transportation, many urban areas saw exponential growth. The introduction of public transportation and cycling shifted the hierarchy of movement further. However, its core logic remained the same: equal share of urban space for all forms of movement, with an emphasis on the pedestrian experience. This logic allowed for streets and public spaces to reflect all forms of movement.

This increased urbanization also came with costs. The onset of industry made cities soot ridden, cramped and unhealthy. Living standards were poor, and access to greenspace was limited to the rich. In 1898, Ebenezer Howard proposed the utopian concept of the 'Social City' in his book *Garden Cities of Tomorrow*.[146] The social city is made up of a central city, and a series of satellite cities, referred to as 'Garden Cities'. Howard envisioned garden cities as interconnected complete communities that contained space for civic, residential, industrial and recreation uses. One of the defining features of the garden city was its cooperative ownership scheme. Which would allow for workers employers to live in the same neighborhoods, within walking distance of employment. His plan calls for large boulevards and parks to connect and define different districts of the city, with major cultural buildings at the city centre. Each garden city would be connected by a ring railway, with access to both the central city and other garden cities. Surrounding the urban areas land set aside for agriculture, forests and other nature based recreational opportunities. This allowed residents of garden cities equal access to urban amenities, and rural leisure.[147]

Howard's intention with garden cities, and the larger social city was to help balance the growing divide between cities and rural areas by providing a middle ground between them. In practice, only a handful of garden cities were ever created under Howard's plan. These early garden cities were not planned as complete communities, and they did not follow the social and economic principles that Howard advocated for. Without local employment options and sustainable population balance, these garden cities were unable to reach their full potential and ended up becoming akin

Figure 60 (left)
Ebenezer Howard's diagram for a Social City. Image edited by author. Adapted from E. Howard, Garden Cities of Tomorrow, Diagram 7.

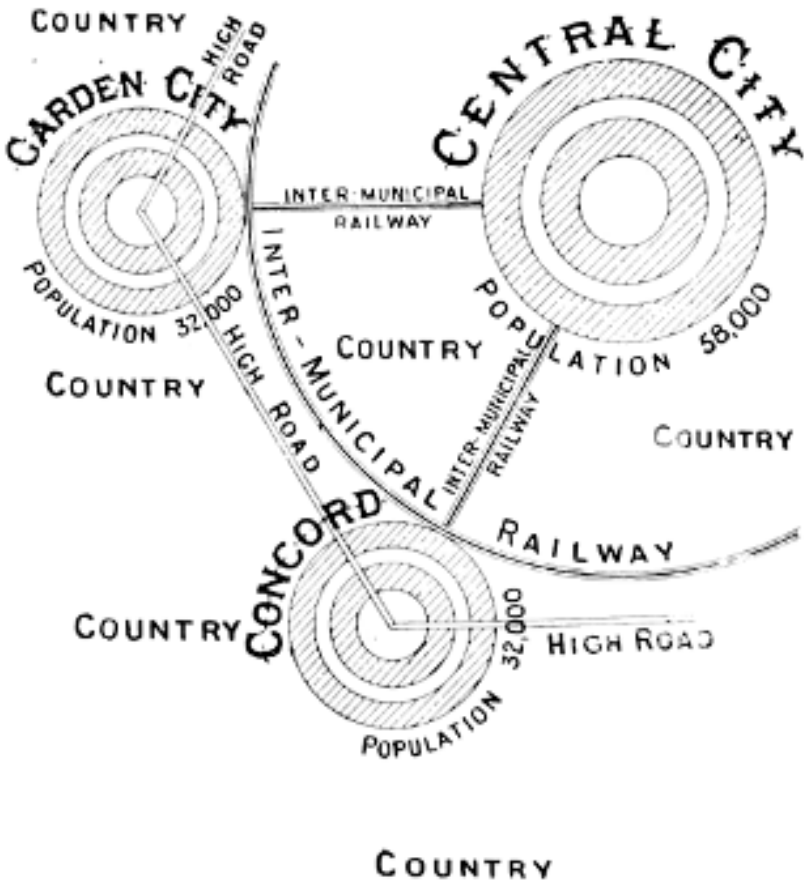
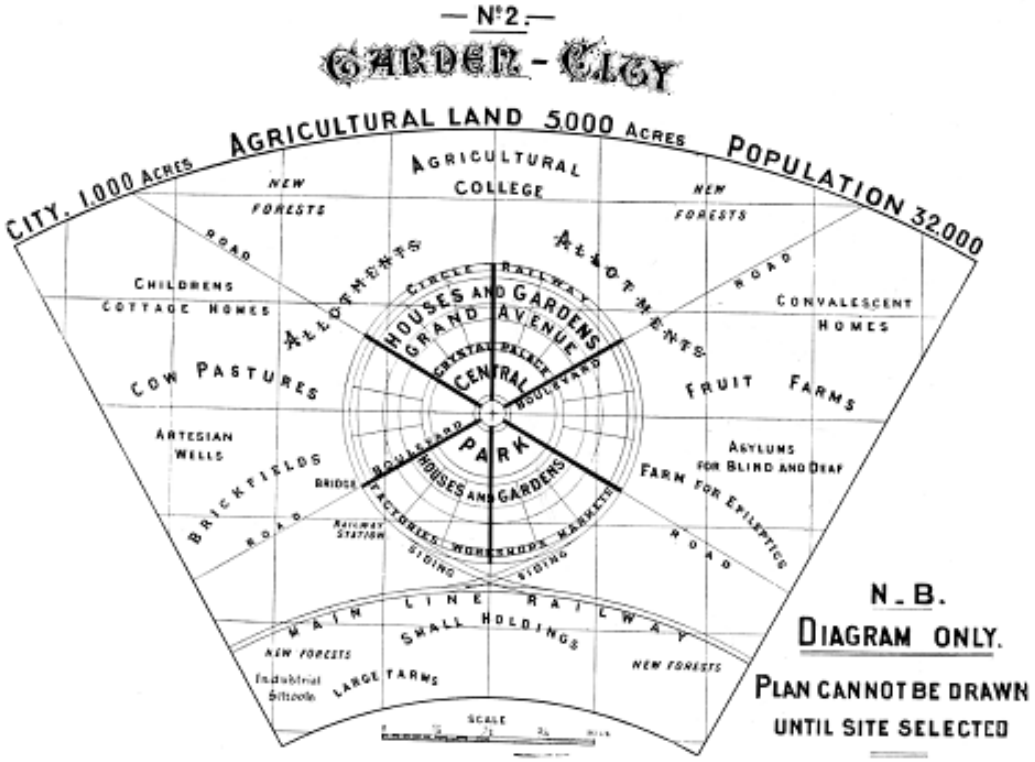


Figure 61 (left)
Ebenezer Howard's diagram the connections between Social Cities and Garden Cities. Adapted from E. Howard, Garden Cities of Tomorrow, Diagram 2.

Figure 62 (bottom left)
Ebenezer Howard's depicting a Garden City and its surroundings. Adapted from E. Howard, Garden Cities of Tomorrow, Diagram 5.

Note:
Though his diagrams reflect a circular city, he emphasized that the round form is purely diagrammatic, and that each garden city should respond to its natural environment.[149]



to suburban developments.[148]
As the 20th century wore on, the dominance of the automobile shifted the hierarchy of movement drastically, shifting away from an emphasis on the pedestrian, and towards a dominance of the automobile. This move towards car centric planning had massive reproductions for both cities and rural areas.

Howard's social city is successful in capturing the social and landuse needs of a small community. Each garden city represents a complete community – a place where one can walk to all their daily needs, and access cultural and recreational activities. Howard's scheme demonstrates a hierarchy of regional growth, with options for urban, rural and small-town living. Within the lens of the WMR, the social city can be understood as an ideal form and function for regional planning, with regional centres being interconnected by public transit, to each other, and to the central city – Winnipeg. This hierarchy of uses allows for agricultural and natural areas to be preserved for food production and recreation. Stonewall itself can take on these principles by strengthening its urban form to reflect this hierarchy. With an emphasis on the centre of its existing urban area, Stonewall could retain its status as a complete community as populations expand.

The Growth of a Ponzi Scheme

With the onset of automobiles shifting the hierarchy of movement, urban development deviated away from human scale planning. Urban areas began to reflect the scale of the automobile and were constructed and retrofitted in manners that favored efficient movement by vehicles. This means areas with large roads, ample parking lots, setbacks buildings, and detached commercial areas. This form of urban area discourages walking and makes driving the most convenient way to travel, even for short trips.

Car centric planning provides very few benefits to people, and results in a loss of human comfort, convenience and community. These developments strain local resources, and exacerbate environmental issues, like the urban heat island effect, and poor air quality. Knowing the issues posed by car centric developments, it is necessary to ascertain why urban areas continue to expand in this manner.

In recent years this pattern of car-centric development has been compared to a Ponzi scheme. A Ponzi scheme is a fraudulent tactic that uses the profits of new investors to fund the gains of early investors. This process encourages further risky investments and ultimately collapses, as its demand for infinite growth cannot be met.[150]

Charles Marohn, founder of the non-profit organization 'Strong Towns' argues that the car centric approach to growth has locked municipalities into a cycle of unsustainable growth that is akin to a Ponzi scheme.[151] In his 2020 article, "The Growth Ponzi Scheme" Marohn states:

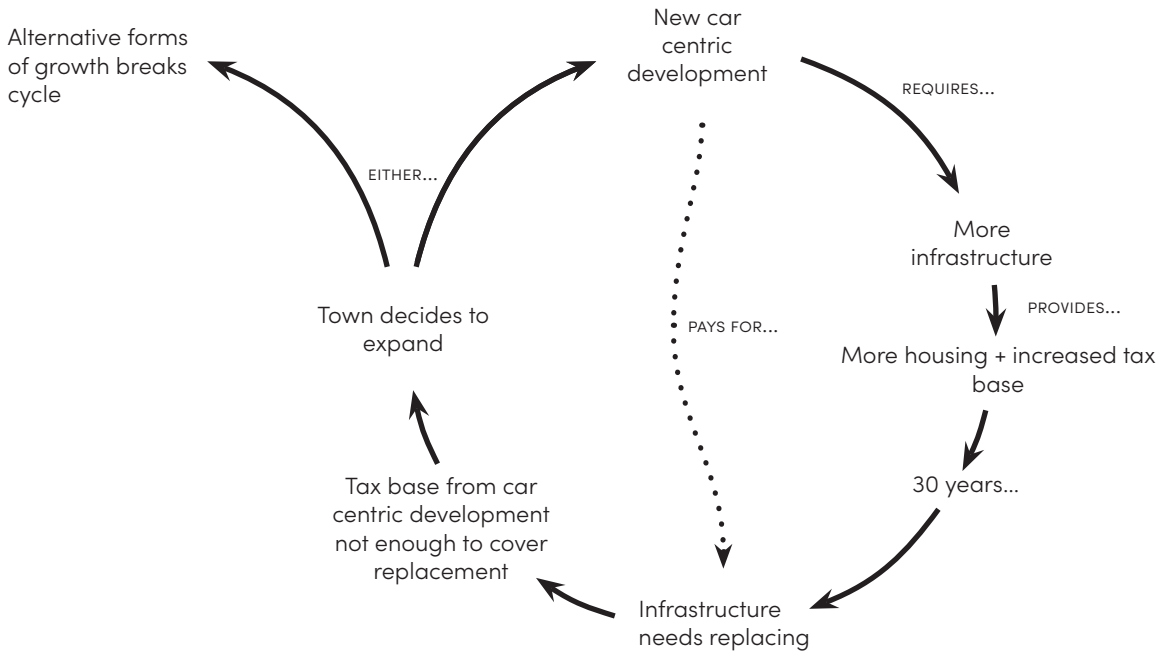
"The core problem is 70 years of unproductive growth, a pattern of building and assembling [North] America that has buried our local communities in financial liabilities."[152]

This cycle typically starts with a municipality being enticed by a developer to allow expansion through

car centric urban development. An agreement is made and new roads, water lines and infrastructure are built - paid for by the developer. In the short term, both the developer and municipality see profit. According to Marohn: "this exchange of near-term cash advantage for a long-term financial obligation—is one element of a Ponzi scheme."[153]

After about 30 years, the infrastructure that was built starts to require maintenance, and eventually replacement. The density provided by car centric development does not create the tax base to cover the costs of infrastructure replacement. This causes the town to make a choice: expand the tax base through urban expansion more or increase taxes. In most cases, politicians will avoid raising taxes and the result has often been to build more. If done through car centric development, the cycle will repeat. If new forms of development and urban growth are considered, then the cycle could be broken.

Contemporary research back Marohns assertion. In a 2011 paper "Unsustainable Development: Could it be a Ponzi Scheme?" Shobhana Madhavan and Robert Barrass explore the relationship between suburban development, and classic Ponzi schemes.[154] They conclude that the similarities between the two are striking. Though different in its timescale, the effects are the same: a large pool of willing and unwilling participants are enticed by perpetrators to buy into the scheme. Some participants are rewarded, while many others, including innocent people, are victims in the process. Madhavan



and Barrass also point to the element of self-deception, and unwillingness to recognize inconvenient truths as a similarity to historical Ponzi schemes.[155] Marohn's assessment is a successful way to illustrate the inherent flaws in our contemporary system of growth. Though there is a reasonable debate to be had about centering the conversation on fiscal frameworks, and not the qualities of human spaces. Marohn's focus on the fiscal benefits is enriched when paired with the other consequences of car centric development.

Conclusion:
Car centric developments have further costs beyond financially straining municipalities. Environmentally, the large, paved areas, like roads and parking lots retain heat and create urban heat islands. This is especially dangerous in a heat wave. This is not to mention the cars they accommodate, and the environmental issues they contribute to, like carbon emissions, and battery waste. The mass consumption of resources for simple trips is wasteful for the planet and creates wasteful urban spaces.
Socially, the separation of housing and commercial areas, and the lack of housing diversity means that people have fewer choices for lifestyle. This can especially affect people who cannot drive, and those who cannot maintain large suburban properties. With rigid separation of uses, there are less chances for natural interactions with other members of the community which can lead to social isolation.
The social and environmental factors that are influenced by car centric development are at play in Stonewall. With the town slowly growing westwards through suburban sprawl, there is a chance that this cycle will continue. If Stonewall continues to grow through car centric development, there is not only a financial and environmental risk, but also a risk that the towns' demographics will no longer support a complete community.

Figure 63 (left)
Diagram showing the car centric growth life-cycle.

A Greying Population

A sprawling urban area influences the social function of its inhabitants, and the resulting community, (or lack of community). Car centric developments are isolating in their nature. Their emphasis on movement by car makes them challenging places for community to form, as there is less opportunity for face-to-face interaction between neighbors.

This is especially challenging as a community sees its demographic profile age. Many people want to age in place, in their homes or within their home communities. But due to the isolation of car centric planning, it is becoming difficult for communities to naturally provide the social support and functions that allowed for aging-in-place. The World Health Organizations (WHO) has laid out eight criteria that communities and planners should consider allowing residents to age in place.[156]

Each of these criteria relates to the urban environment and its social functions:

Civic Participation + Employment Opportunities

Places for people of all ages to work, and spaces for celebration, protest, and community gathering.

Communication + Information

Promote local events and news in public spaces through signage and accessible resources. This allows for information to be shared with a larger contingent of people, that do not participate in online environments.

Community Support + Health Services

Places that let people look out for each other – like community centres with drop-in programs, or clinics with nurses and practitioners of various specialties.

Housing

Variety and quality housing is mindful of people's housing career.

Outdoor Spaces + Buildings

Places that provide adequate climatic comfort and allow for people to dwell and engage with public space.

Respect + Social Inclusion

Spaces that accommodate and respect the wants and needs of all ages.

Social Participation

Community gardens / landscape maintenance. Opportunities for engagement in the community for all.

Transportation

Ways for everyone to get around, no matter their physical abilities or financial means. [157]

Conclusion:
Tying these principles back to urban spaces allows planners to accommodate the needs of an aging population in a way that is holistic, and easy to understand. These principles also make it easier to achieve a healthy demographic balance. Age-Friendly Manitoba is an organization dedicated to implementing the WHO guidelines within Manitoban communities. Stonewall has been recognized by Age Friendly Manitoba as a milestone community, meaning they have committed resources and energy towards making Stonewall more age friendly. However, commitments need to be paired with discernible action. These principles alone will not solve the issues of demographic imbalance and climate change. There needs to be a vision and desire to implement concrete changes and imagine long-term solutions for urban life.

Dreaming a New Future:

If lucky, the average Canadian will live about 81 years on average.[158] In this brief time, the choices, decisions and actions made by individuals, or generations of people will have resounding effects. These effects cascade well past human life span and inform the foundations of future generations. This temporal complexity is often forgotten in decision making.

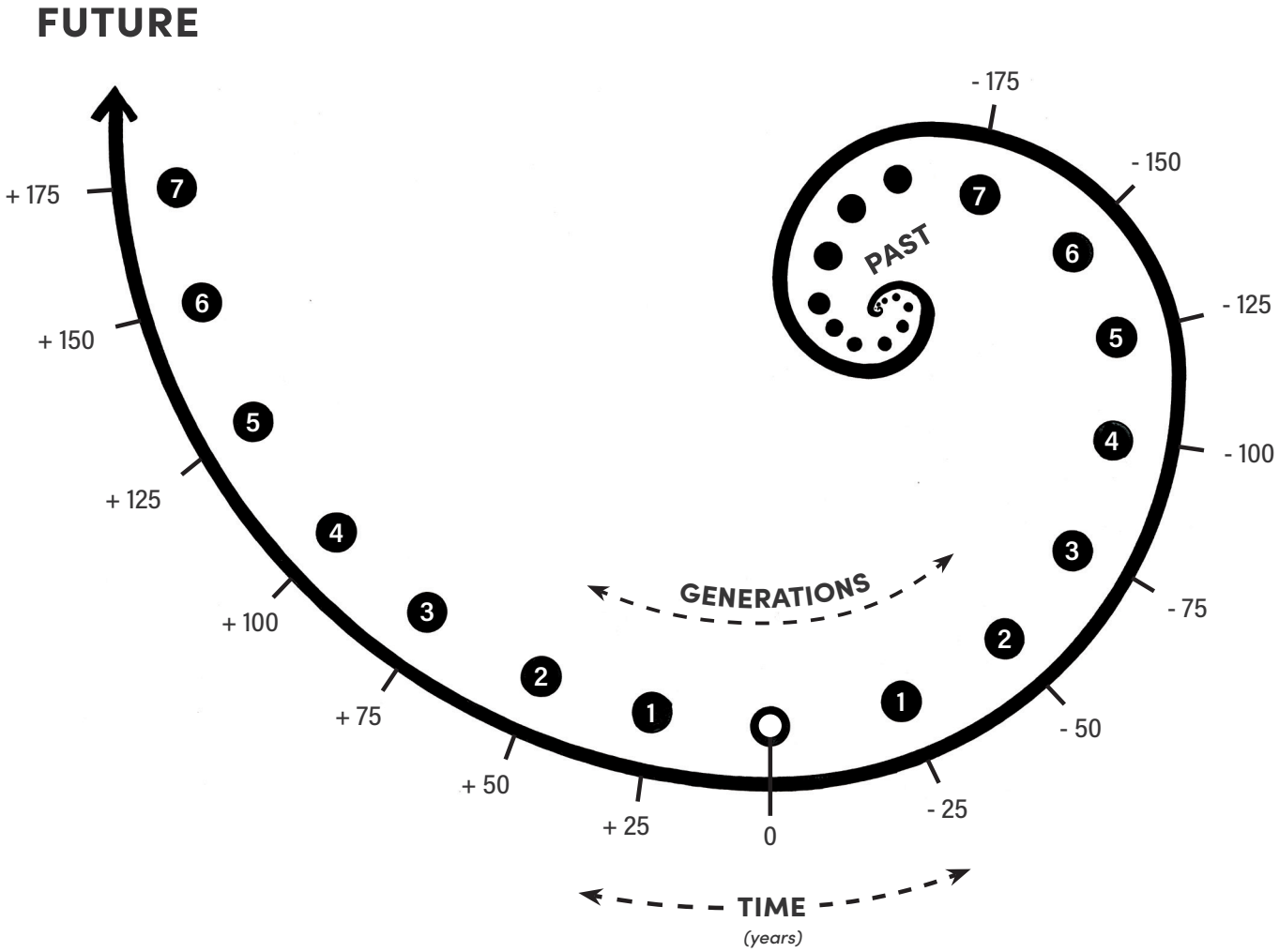
All too often, decisions are made with a lack of foresight, in favor of short-lived profits; even when it is shown that these decisions will be harmful to future generations. This approach to decision making is deeply informed by human's temporal biases. Which is the notion that humans are more inclined to 'discount' the future in favor of the present moment.

The 7th Generation Principle is a framework that embodies empathy for humans past and present. Its formal roots stem from the Haudenosaunee confederacy, which is an Indigenous nation with traditional territories in southeast Ontario, and New York State. Simply put, this principle is: "...to think of the 7th generation coming after you in your words, work and actions, and to remember the seventh generation who came before you."[159]

This means that decisions being made on all levels of existence – individual, family, and community consider the choices of those who came 7 generations before, to help inform how decisions could impact the next 7 generations.[160]

We exist today because of the choices made by those who came before us. Recognition of the efforts struggles and achievements of past generations can

Figure 64 (below)
Diagram illustrating the past and future in relation to generations and the present.



help frame decisions being made about the future. Without remembrance of the past, and empathy for the future, the choices made today could have negative consequences that influence those who come tomorrow.

Using the 7th generation principle as a basis for future planning is helpful. By framing change in this manner, a form of temporal empathy can help further inspire change. It reminds us of the humans that came before, and the future humans we are leaving our world to. Stonewall should be reminded of its rich history, and how contemporary developments and decisions will fit into its evolving story. This means that growth should be considered carefully – with an eye on how todays decisions will impact Stonewall tomorrow.

A Return to (New) Urbanism: Places for people

In the latter part of the 20th century, the auto-oriented approach to urban design was beginning to be questioned, as its many flaws were beginning to come to light. Modernist development destroyed neighborhoods in the name of roads, and uprooted communities in the name of cars. Authors like Jane Jacobs wrote of these failings in her work The Life and Death of Great American Cities, where she criticized modernist planning and its effects on the urban environment and its social functions.[161] With the conversation changing, many designers began to look back to the city. Some began to re-create walkable urban infill developments that confronted tabula-rasa planning. Others returned to traditional urban design practices by creating places that call back to successful historical neighborhood. This contested the form, function and aesthetics of modernist planning. Autocentric planning was also challenged by a new transit-oriented approach to development, providing a fresh look at the potential of public transportation. In 1991, architect and urban designer, Stefanos Polyzoides, coined the term New Urbanism to connect these three movements.[162]

In 1993, a group of seven planners and designers came together to found the Congress for New Urbanism (CNU).[163] Since then, the CNU have advocated for and enriched the meaning and execution of New Urbanism. The CNU defines New Urbanism as:

> *"...a planning and development approach based on the principles of how cities and towns had been built for the last several centuries: walkable blocks and streets, housing and shopping in close proximity, and accessible public spaces. In other words: New Urbanism focuses on human-scaled urban design."*[164]

The CNU also produced the charter for new urbanism, to capture the principles that the movement advocates for. They break the charter into three scales, to assist in guiding these principles throughout a broad are. These scales include the region, the neighborhood, and the street.[165]

The Region: Metropolis, City, and Town

- Metro regions have defined boundaries, with distinct urban centres, like cities, towns and villages. Metropolitan regions have become fundamental economic and social units in contemporary time,

and planning must reflect this.
- Metro regions have a delicate but essential relationship to the surrounding natural landscapes, and rural areas. “Farmland and nature are as important to the metropolis as the garden is to the house.”[166]
- Developments should respect the urban and regional boundaries, by encouraging infill within or adjacent to existing urban areas. If new towns are necessary, they must respect the existing urban areas and be integrated into their urban fabric.
- A broad spectrum of public and private uses to benefit people of all incomes and abilities, including affordable housing throughout the region.[167]
- The infrastructure of the region should be organized to allow for and reflect all forms of movement, including public transportation and active transportation infrastructure.
- Municipalities and urban areas within the region must share resources and work together to accomplish these goals and avoid destructive competition within the region.[168]

The Neighborhood, The District, and The Corridor

- The Neighborhood, district, and corridor are critical elements of metro regions, forming identifiable areas that engage citizens. Neighborhoods are compact, mixed use, human scaled and walkable. Districts also follow these principles when possible. Corridors connect neighborhoods and districts throughout a region, ranging from roads and rails to forests and watercourses.
- Activities for daily life should be within walking distance of residents. This allows for those who do not drive to have independence, while encouraging others to walk.
- A diverse array of housing forms, types and price ranges must be present, to allow people of all incomes, backgrounds and ages to be present in and enrich the community.
- Transit corridors and major roads should be planned to accentuate and enhance urban environments and not cause disruption to the urban fabric. A range of uses and a higher density of buildings is present to make public transportation more accessible, and attractive.
- Civic and public amenities like schools should be integrated into the urban fabric to allow people to easily engage and access them. Schools should allow children to walk or bike to and from safely.
- A range of parks, playgrounds and greenspaces should be integrated throughout the area and should connect into regional parks and natural corridors where possible.

The Block, The Street, and The Building

- Streets and public spaces are defined spaces that emphasize human scale and pedestrian activity. Cars and automobile uses, like parking should not impede on the accessibility and form of public space.
- Buildings should respond to each other and their surroundings, while providing inhabitants with adequate access to light, and outdoor space, as well as passive heating and cooling. Historical buildings and districts should be preserved and renewed to display the evolution of the urban fabric.
- Streets are safe, climatically

comfortable, and interesting at a human scale. When properly designed, they allow for enhanced social interaction, and a sense of security.
- Civic buildings and gathering spaces must be distinctive, to allow for the reinforcement of communal identity and the ideals of democracy.
- Trees, public gardens, parks and landscape designs reflect the local conditions of climate, culture and history.[169]

In the context of Stonewall, and the Winnipeg Metropolitan Region (WMR), the charter provides a framework to approach development from the scale of the street, to the scale of the region. Applying this framework, and plugging in its natural, historical and cultural features would allow for the establishment of complete communities, that enhance daily life and allow the natural social functions of urban areas to flourish. To understand how New Urbanism and its scaled principles may apply further, it is necessary to review the details of its foundations, starting with walkable infrastructure and transit-oriented development.

Planning for Movement: The Role of Walkable infrastructure

Movement throughout a region and an urban environment is foundational to New Urbanism and a successful complete community. Car-centric developments often lack adequate connections to public transportation, and lack of pedestrian infrastructure. This makes the connection to daily needs more cumbersome. To combat the dominance of car centric movement, different forms of infrastructure should be provided to make walking, cycling and public transportation preferable to driving. These forms of infrastructure can be sorted into two categories: Active transportation and public transit.

Active transportation infrastructure includes sidewalks, pathways, promenades, parks and plazas. It is a form of infrastructure that facilitates pedestrian movement, and movement by bicycle. However, it can also be the side of the road if no formal infrastructure is provided. To take advantage of existing active transportation infrastructure and roads, New Urbanists often look first to urban infill developments.[170] These forms of development allow for urban areas to maximize the use of existing infrastructure, while increasing density incrementally. Infill allows an urban area to densify naturally and support local businesses and new amenities. Infill development can occur on a vacant lot, or through the replacement of existing, under-performing buildings

Public transit infrastructure enables connections throughout a region and can range from local bus routes to regional transit corridors. Transit infrastructure can be often paired with transit-oriented development (TOD). This is a form of development that locates essential services and housing near public transit infrastructure. Urban designer and CNU founding member Peter Calthorpe, coined the term, and theoretical basis for transit-oriented development in his 1993 book, The Next American Metropolis: Ecology, Community, and the American Dream."[171]

In his work, Calthorpe defines a TOD as:

> *"a mixed-use community within an average [600m] walking distance of a transit stop and core commercial area. TOD's mix residential, retail, office, open space, and public uses in a walkable environment, making it convenient for residents and employees to travel by transit".*[172]

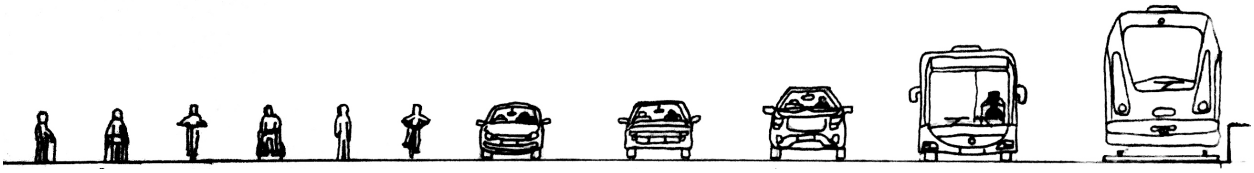
TOD results in walkable, urban precincts that taper out into their surroundings. They act as hubs for residents, and their density enables amenities and shops to provide services to the community. Dedicated transit rights-of-way allow for the efficient flow of people and provides an aspect of permanence that encourages denser development and long-term investment. Transit corridors can begin as a bus service and be incrementally improved as demand increases.[173]

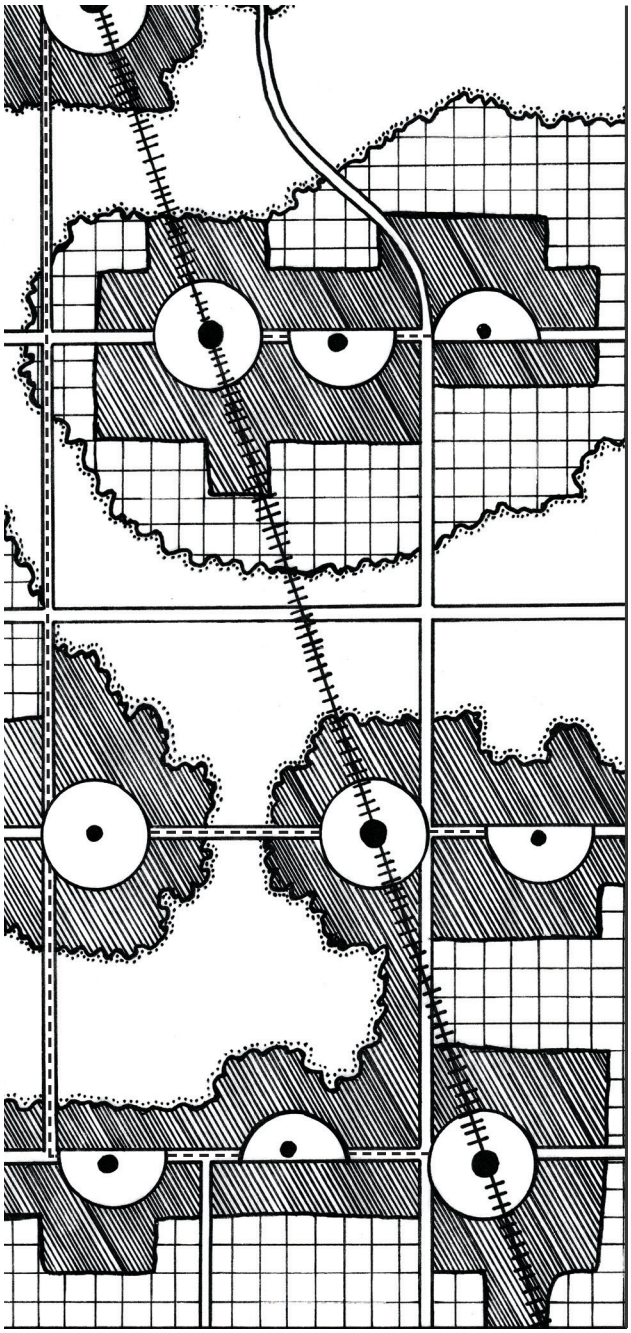
Transit-oriented development requires transportation infrastructure. This necessitates the need for regional planning and collaboration, to ensure that transportation can be provided across municipalities boundaries. Regions can create 'Corridor plans' which form a skeleton for regional development. These plans reflect the location of infill development on a regional scale, emphasizing and developing corridors in and around existing urban areas. This focuses development into and around existing urban areas and minimizes the impact on productive agricultural lands and natural areas.
There is a greater prerequisite to TOD than a lack of regional corridors, which is the quality of active transportation infrastructure. Calthorpe states:

> "*A healthy walking environment can succeed without transit, but a transit system cannot exist without the pedestrian*"[174]

Research also backs Calthorpe's assertion. A 2024 study examined the relationship between TOD, and active transportation infrastructure. Not only did their research show that a good pedestrian environment is critical in ensuring the success and viability of TOD, but that active transportation infrastructure decreases travel times in TOD's.[175]

Figure 65 (below)
Scale of different forms of movement. Hand drawn sketch by author.

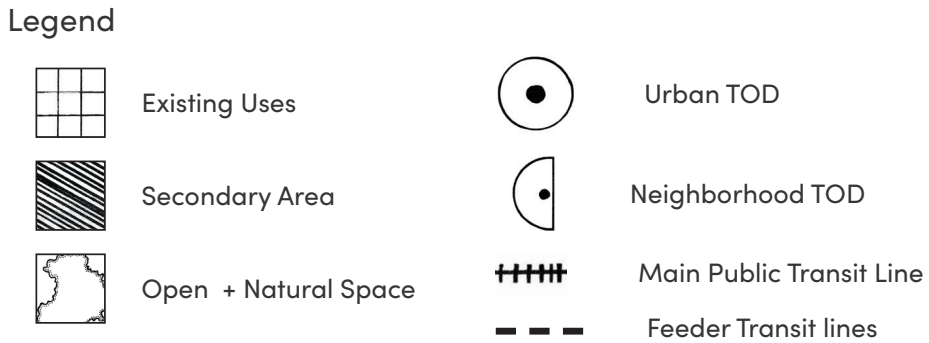




Their research also showed that car friendly infrastructure like parkades and parking lots severely hinder the benefits of active transportation infrastructure and TOD.[176] The relationship between these two forms of infrastructure is important, and mutually inclusive in a complete community. Pedestrian Infrastructure is a prerequisite for quality public transportation infrastructure. This can be accomplished through a progressive evolution of urban fabric.

Infill development, when successfully executed, increases density within an urban area. This increased density requires a higher quality of active transportation infrastructure. These two factors make the implementation of public transportation easier and enable a successful framework for future TOD. This form of development is not only successful but often desirable due to its built-in convenience and human scaled approach.

Figure 66 (left)
Diagram depicting regional corridors and TOD's. Hand drawn sketch by author. Adapted from diagram by Peter Calthorpe, 1993.



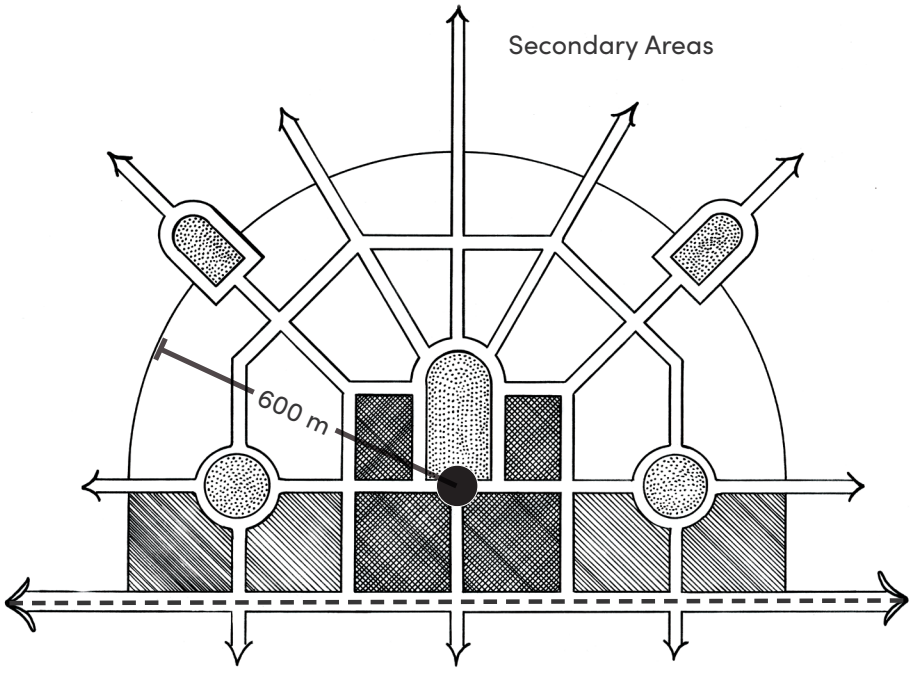
In the context of Stonewall, the application of infill development is essential in the short term. This allows for an incremental densification of existing land and buildings. This would create demand for more active transportation infrastructure. This form of development can and should begin before the arrival of public transportation. The more important part is that the urban area, its form, and its hierarchy of movement reflect the human scale.

In the long term, public transit is crucial. Stonewall can think about this today by reserving lands around future transit stations, like the south end of main street, and allow for higher densities within these areas. In the context of the WMR, public transport will be needed to help alleviate emissions from vehicles and provide an equitable transportation link between urban areas for people of all ages, abilities and backgrounds. Public transit corridors also free up car centric land for redevelopment or habitat restoration.

When successful Infill is paired with public transportation and TOD, it creates the basis for a complete community, but these principles are incomplete without considering the social, cultural and aesthetic qualities of complete communities.



Figure 67 (below)
Diagram depicting Urban TOD. Hand drawn sketch by author. Adapted from diagram by Peter Calthorpe, 1993.



Designing for Place: Materials and Culture

Urban areas often reflect local materials. The form and material qualities of buildings have historically echoed local environmental conditions and limitations. If there is a lot of wood present, a community may have many wooden buildings. If there is ample access to stone, a community may have a collection of stone buildings. This relationship has changed over the last century, with modern building techniques shifting the way urban areas are constructed.

The forms of many contemporary buildings reflect the scale of the automobile, with setbacks, curb cuts and drive-throughs. This change interrupts the rhythm and flow of urban areas and shifted how humans interact within them. A lack of walkability and human scaled buildings create less natural interaction between citizens and makes it harder for communities to form strong bonds.

Contemporary buildings and infrastructure projects often use materials that represent the lowest cost, and not the local conditions. Artificial building materials detach residents from the local environment. These buildings do not generate the same character or admiration that buildings made of natural materials do.
To ensure that urban areas are designed in a way that reflects the human scale, local conditions and natural materials, New Urbanists have often looked towards historical developments for inspiration.[177] These developments often reflect local material conditions, with the forms reflecting the human scale. Referred to as traditional urban development, this form of development looks to replicate the successes and lessons of historical developments, in contemporary times.

Traditional urban development occurs at the scale of a neighborhood or town, and reflects historical growth patterns, allowing for the incremental growth of a neighborhood. This form of development has the distinction of emphasizing material and cultural qualities. This can range from the use of materials, motifs and ornaments that reflect local conditions. This is not purely an issue of style, but of a genuine aesthetic and material feel that relates back to culture, the progression of society and the existing urban fabric.[178] An application of this principle in Stonewall would be the Main Street Architectural Tradition. This tradition encapsulates the manner in which main streets historically developed in North American towns.[179] This tradition is not tied to a particular style but tied to a set of spatial rules. Buildings along these traditional main streets display these rules though their heights and facades. The ground floor has a consistent pattern and flow that emphasizes storefronts.

Each storefront has a similar structure and window opening. Above, the signage is aligned to create consistency between buildings. Awnings and hanging signs can be added to provide a sense of comfort and navigation. The upper floors of each building align, with their windows creating a linear flow along the row of facades. Each buildings height, and architectural details differs, to allow each building to be both distinct and ordered. Building heights are limited to the width of the street to allow for ample sunlight. This tradition fell out of favour as auto

oriented infrastructure took hold. But it has seen a resurgence in small towns looking to renew their own main streets, and within new developments that are seeking to replicate the successes of Main Streets.
There is a distinction to be made between traditional urban development practices and historical developments. For example, Poundbury, in the UK, designed by Leon Krier, is a contemporary new-town development that has been designed from the ground up in a traditional English style.[180] Though the town has an attractive urban form, and quality local materials, the tabula rasa approach to its development inhibits natural urban growth. With strict style guides, it is not possible to redevelop or incrementally grow the town in ways that reflect changing culture. This results in an urban area frozen in time, detaching it from the social and cultural realities.

Stonewall should allow for incremental infill development to occur, as it historically did. This can be achieved by allowing for denser infill in key locations, where foot traffic is higher. The town should also look to the main street architectural tradition as a way to renew main street, and its cultural importance in the town. This can be done by encouraging quality buildings made from local materials, with human scales and distinct motifs. The width of Main Street can be used as a baseline for building heights, with some higher and lower than this baseline. New buildings need to respond and integrate themselves into to the existing rhythm of main street.

Stonewall's Main Street can be a material reflection of the town's successes and cultural attributes. However, the final aspect of a complete community is the social fabric, and its relationship to urban development and public space.

Figure 68 (below)
Drawing showing the Main Street Architectural Tradition. The Main Street Architectural Tradition © National Main Street Center, National Trust for Historic Preservation, 1995, All Rights Reserved.



Planning for Life: The Role of the 'Housing Career'

The social needs and characteristics of humans are complex. These needs range from the quality of housing to the quality of the social fabric. On paper, many of these needs can be accommodated through design, but the key ingredient is the people who live there.

Without a diversity of people, communities can risk demographic stagnation, or economic isolation. This is especially relevant when compared with the WHO Age friendly criteria. This lack of diversity is often tied to the availability of suitable housing. Though in contemporary times this has become a literal problem, with a national housing crisis, there is still a fundamental issue in the way housing has been developed since the post WWII period. There has been a continued emphasis on single-family housing, especially detached housing. This form of housing has formed a monoculture in contemporary North American cities. Not only do they take away from the qualities of urban areas, but they also inhibit social needs and changes. People may need or want to change housing for many reasons, and these changes are framed by life's ups and downs. A person's 'housing career' is a term used to represent the range of housing needs a person may require over the course of their life. The foundations of the concept were laid by sociologists in the late 20th century. However, these earlier studies were limited in their recognition of different family units and emphasized the linear movement from renting to owning, and a bias towards western social contexts.

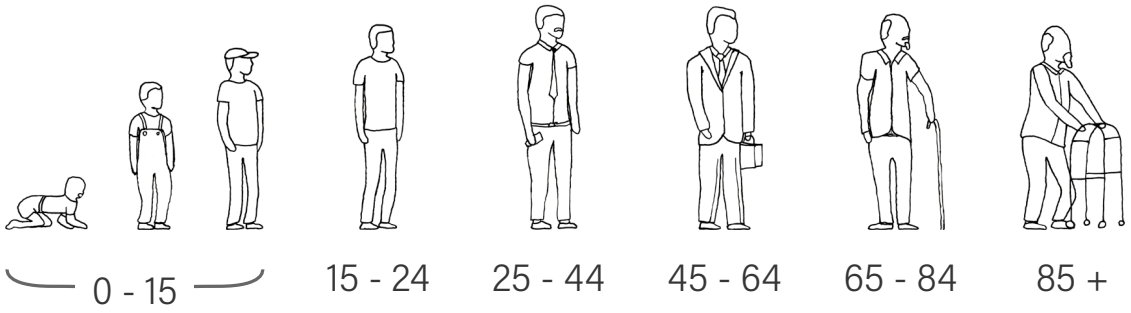
Due to the versatility in meaning provided by the term 'housing careers' this report builds from the explanation provided by Lennartz and Helbrecht in their 2018 report "The housing careers of younger adults and intergenerational support in Germany's 'society of renters'".[181] They propose that a housing career should be understood as an individual's trajectory through life as they age, and how this is tied to major life events, like the formation of family, attaining employment and vice versa. This path is framed by a person's preferences, economic capacity, and contextual conditions. Housing careers are inherent in all western urban communities. They reflect human needs over time and recognize that not everyone shares the same needs.

To accommodate a housing career, a community needs to encourage a range of housing types, at different scales and prices.

Figure 69 (pages 117-120)
Diagram describing the factors influencing a housing career. Hand drawn by author.

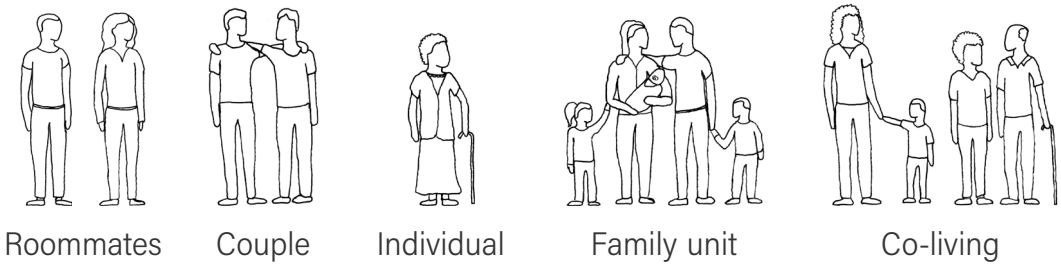
A housing career is informed by...

Age group



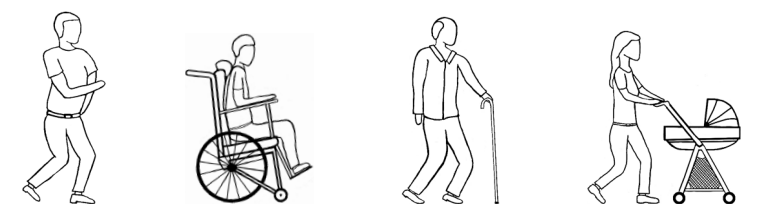
A persons age defines their core housing needs. When young, housing is typically provided by family. As a person ages, they leave home, and seek their own housing. These needs continue to change with time, even though they may remain the same for long periods. When people reach older ages their housing needs can rapidly change. Influenced by physical, mental, and social conditions as well as ones mobility and day to day ability.

Household size



A housing career is not a solo journey. People often live in a household. A household reflects the makeup and size of all occupants living in the same unit. This could be roommates, a couple, or just and individual. Over time, a person may form a family, whether it be a 'nuclear' family, or an inter-generational household shared with other family members. Some people may seek a co-housing situation, with multiple households sharing common living and outdoor spaces.

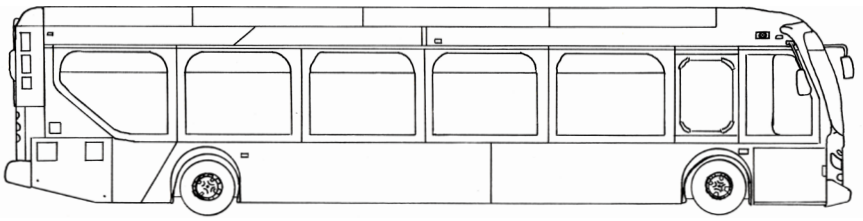
Mobility & Ability



'Walking'



Cycling



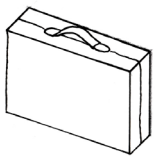
Public Transport



Driving

A households distance to and from their day to day life depends on each individuals level of mobility. Some people will choose to drive, while others may take a bus or a bike. Some will choose to "walk", if they live close enough to their day to day needs. Some people will not be able to choose how they get around, whether they cannot drive, or are not able to bike. A persons level of mobility and ability will also influence their decision to live in an urban environment or a rural area.

Proximity to...



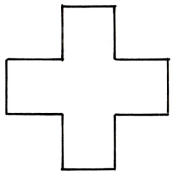
Employment



Education



Food + Amenities

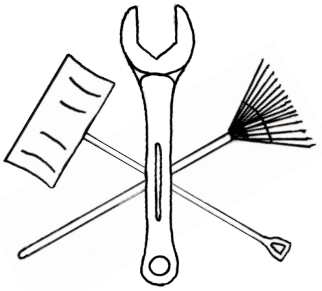


Healthcare

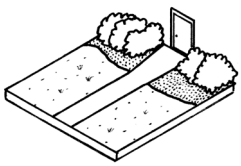
A households needs are further informed by location. Each member of a household has different daily routines, like work, school, childcare, etc. The distance to employment, education, food, amenities and healthcare inform these decisions. Some may want to live as close as possible in a busy urban environment, while others may want to live in a quite community. Some may choose a more secluded rural area, if distance is not a problem.

Maintenance level

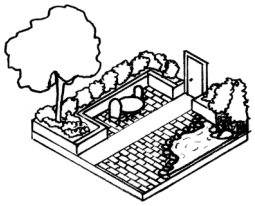
The level of maintenance informs the size of house, and outdoor space that a household will require. Some may be willing to preform maintenance regularity, while others may not want to or be physically able to.



Type and size of yard



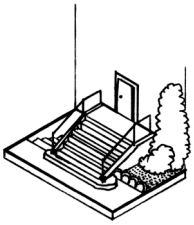
Small front yard



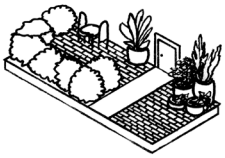
Small backyard



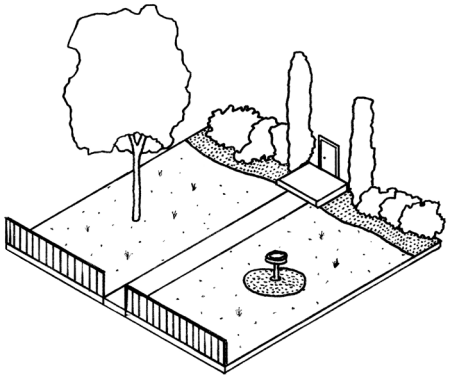
Balcony



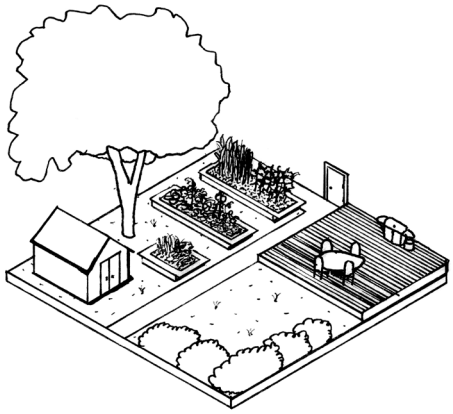
Front Stoop



Front patio



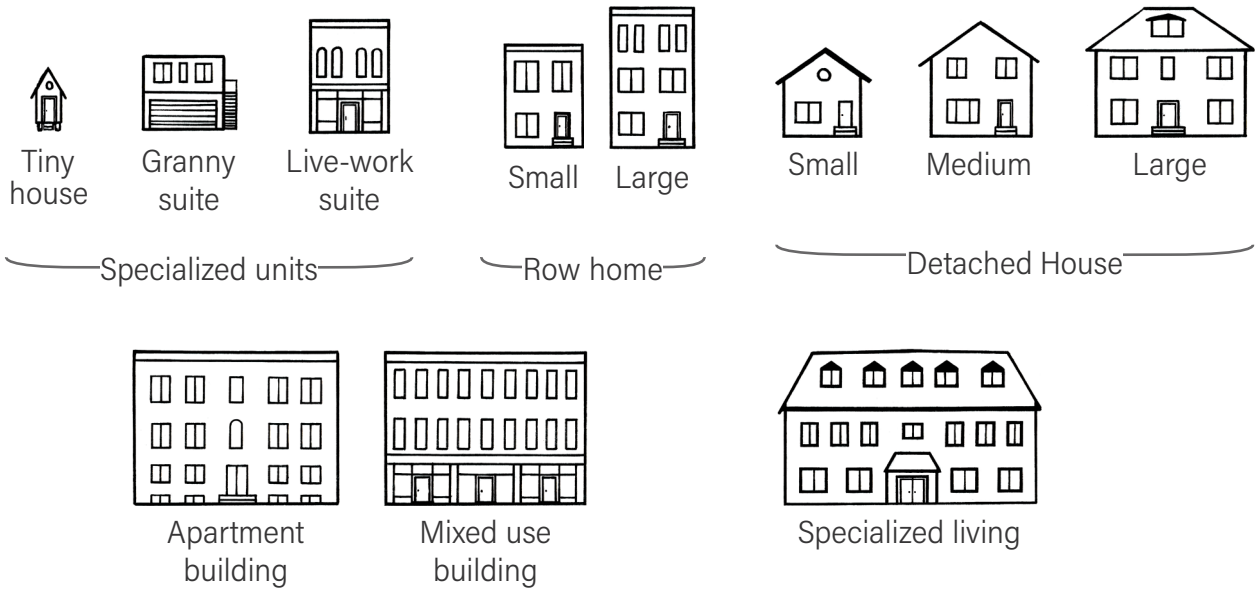
Large front yard



Large backyard

The size and form of a household, and the level of acceptable maintenance will inform the desired size of outdoor space. A family may want a large yard, while an individual may want a small space or a balcony. An older person may want room to garden, while not being able to maintain a large yard. A couple may want to be able to grow their own food. The size and maintenance level of an outdoor space is equally as important as the physical house.

Type and size of house



The final stage informing the housing needs are the size, and shape of the physical living space. All the informing factors above influence this choice. A family may want a house, while an older couple may want an apartment, or granny unit. Someone young may want to start a business and live in the same space, while someone else may want to live in an apartment above some of their daily amenities. An older person may need more specialized living space like eldercare, memory care, and retirement homes.

Conclusion

Understanding the potential housing career needs within Stonewall is essential to alleviate its demographic challenges and allow for elderly residents to age in place. Stonewall's demographic issues are deeply linked to its possibilities for housing careers of its inhabitants. The challenges are made worse by the limited diversity in existing housing types.

The housing career reflects a complex set of choices, and decisions made throughout one's life. Urban environments should strive to accommodate as many stages of this career as possible. This is reflected in a diversification of housing types, including many different sizes, forms and range of affordability. In short – provide as many housing options as possible.

Uniting the principles of housing careers with new urbanism allows for a complete community. But there is still the question of implementation, and how this incremental growth may occur in a way that maintains comfort for all residents.

Bound by Concise Comfort: The Soft City

To tie the social functions of an urban area into design, Architect and planner David Sim has proposed the 'Soft City'.[182] In his book Soft City; Building Density for Everyday Life he describes the soft city as a solution to urban development that goes beyond urban form, by designing for daily life, social interaction, and human comfort. Soft city is not a tabula rasa solution, but an incremental approach that occurs over time, and responds to the needs of an urban area. Sim explains the soft city using three main themes: Buildings, Movement, and Comfort.

Starting with the built form, he argues for developments that consider the human elements. Buildings that allow for social interaction, and spaces that allow neighbors to form relationships. As a solution, to accommodate these human elements, Sim proposes the form of the urban block. Blocks offer many benefits to urban areas. Built incrementally as modular units, each block is made up of multiple buildings, each with multiple dwellings. Taking advantage of local climatic conditions, blocks create comfortable spaces for residents indoors and outdoors. Their form allows for a shared interior courtyard with garden spaces, and shared rooftop gardens.

Movement in the soft city is equitable, and emphasizes the time spent in urban areas and how that time can be made comfortable and desirable. As a solution, Sim looks to many new urbanist principles. Soft city is human scaled, its buildings allow for a connection to the street, not only for storefronts, but also for residents above. The streets in the soft city emphasize pedestrians, while accommodating cycling, transportation and cars. The streets of soft city are accessible for people of all abilities. The lanes for automobiles are smaller to allow room for larger, continuous sidewalks. Intersections have bump-outs and larger roads have median strips to allow for shorter pedestrian crossings. Courtyards within buildings are connected to the sidewalks

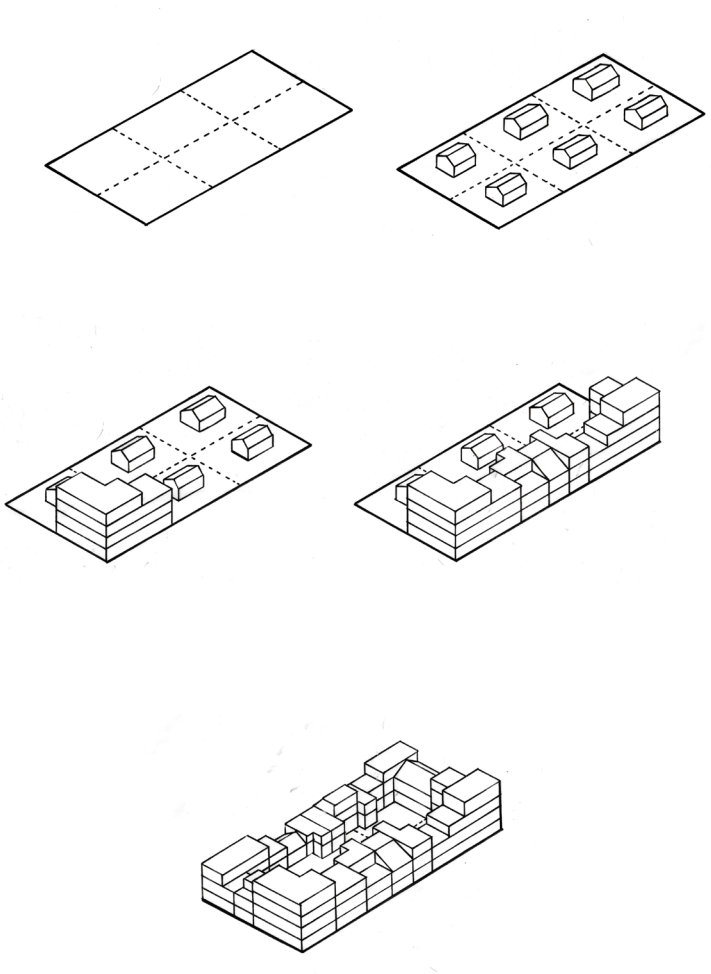


Figure 70 (above)
Urban block formation over time. Sketch by Author. Adapted from Sim's Soft City, page 19.

through passages, creating an enriched connection between public and private realms. These passages also allow for services to occur off the street, and in courtyards, these solutions all facilitate a more comfortable pedestrian experience when paired with quality buildings and street details.[183]

The soft city draws its comfort from the relationship between streets, buildings and the layering of life. The mixture of public and private space in proximity allows for more social interaction, as well as more interaction with the natural and urban environments. Outdoor spaces produced by blocks are complimented by the private outdoor spaces buildings offer. With porches, balconies, and other private outdoor spaces where possible. When paired with good light and large windows, the local climatic features can be used to the advantage of the building through passive heating and cooling. This concept of layering transcends the buildings into the streets.

The streets are planted with trees providing shade and a pleasant microclimate. Water features like fountains or splash pads allow for increased comfort on hot days. Denser buildings can retain heat longer in cold seasons, and arranging sidewalks to capture sun on winter days can increase comfort year-round. Parks, plazas and public spaces are interesting and accentuate existing ecological features, these parks extend into the region when possible. Not only do these solutions help urban areas adapt to climate change, but they also provide a stronger social connection to nature.

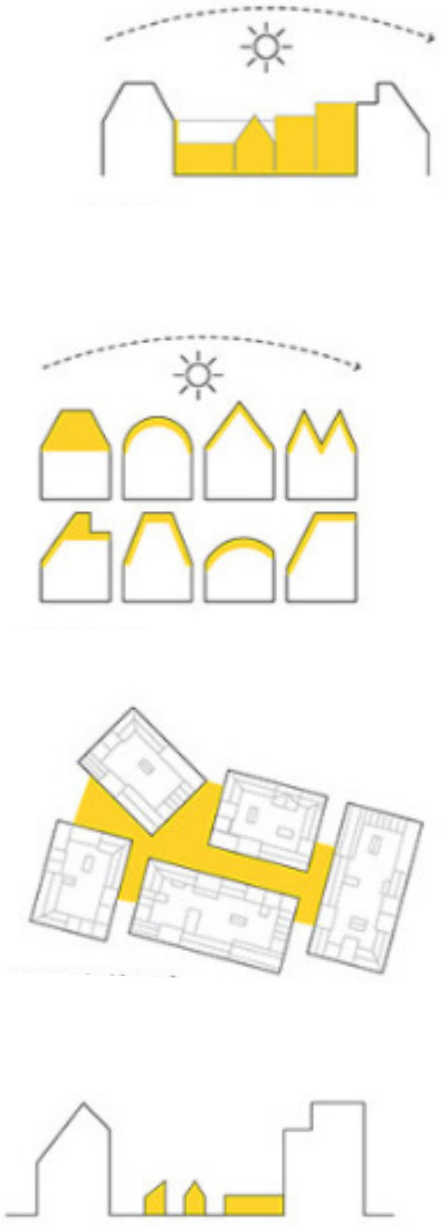


Figure 71 (above)
Diagrams showing how urban blocks interact with sunlight to create microclimates.
From Soft City: Building Density for Everyday Life, by David Sim. Copyright © 2019 Gehl Architects Finance & Administration ApS. Reproduced by permission of Island Press,Washington, D.C. Page 177.

To tie these ideas together, Sim concludes by laying out nine criteria for livable density:

1. **Diversity of built form:** Lots of different buildings
2. **Diversity of outdoor space:** Lots of different outdoor spaces, public and private and shared.
3. **Flexibility:** Buildings that allow for change in function, internal configuration and overall use.
4. **Human Scale:** Buildings and streets that create human scaled urban environments.
5. **Walkability:** the ease of getting around as a pedestrian, and as a cyclist to a lesser extent.
6. **Sense of Control and Identity:** Lots of spaces that are private, near public spaces, to enhance security and community.
7. **Pleasant Microclimate:** spaces that are designed for natural climatic comfort.
8. **Smaller carbon footprint:** Less emissions, wasteful practices, and adoption of smart building practices.
9. **Greater biodiversity:** Outdoor spaces allow for the more than human world to flourish in and around urban environments.[184]

These criteria are an assessment of livability and sustainability in a dense(r) urban area. They allow both existing and new urban areas to adapt to climate change, and demographic pressures in a way that increases human comfort and enhances the experience of everyday life. However, the criteria themselves do not speak to the temporal aspects of development, and the necessity of an incremental approach to achieve livable density.

The soft city ideals unite both theoretical and design-oriented concepts that speak to issues of everyday life and human comfort. By pairing the nine criteria for livable density with human-scale incremental growth, soft city addresses many of the demographic and climatic issues that Stonewall faces.

This temporal approach to development would allow Stonewall to grow organically, within its existing infrastructure. With a stone-by-stone approach to development, Stonewall can ensure that developments in the short term are functional, appealing and provide diversity of uses. As more development occurs, the principles of the courtyard and enclosed block start to form, unlocking new shared semiprivate social functions like gardens, playgrounds and patios.

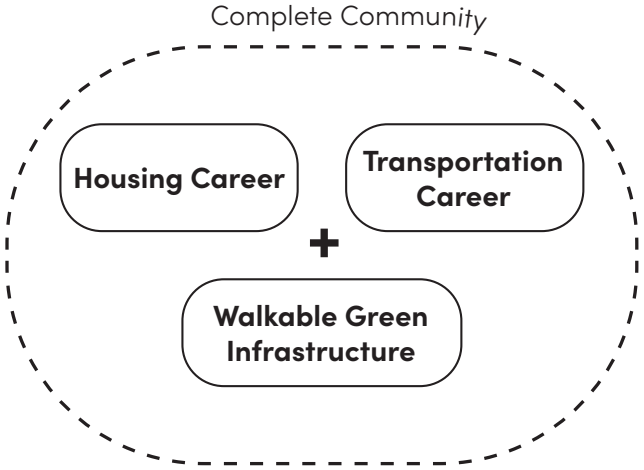
This framework allows for these developments to consider the future – and how they should be placed and designed now, so that future urban growth is efficient, attractive and comfortable. If soft city's criteria are implemented in Stonewall, not only is there a plan for long term sustained urban infill development, but also provides a practical solution to issues of housing career variety, aging in place and the effects of climate change.

Reflecting on theory: What does it mean for Stonewall

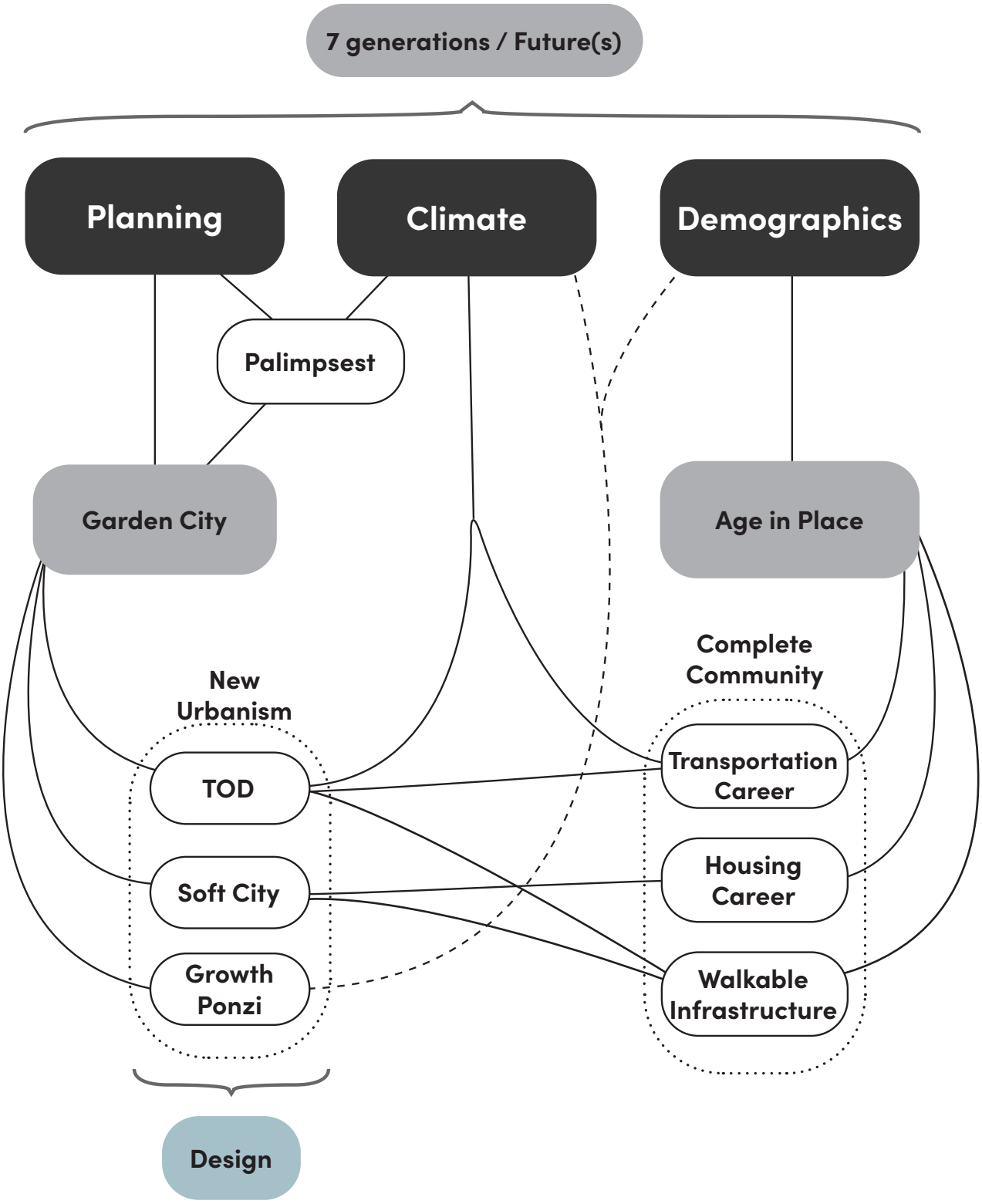
The principles and concepts laid out in this chapter are essential tools for understanding how Stonewall can plan for its shifting demographics, growing population and climate change risks. By understanding the roots of urbanism, and the many challenges it has overcome, it becomes easier to break the contemporary Growth Ponzi Scheme – which Stonewall is currently entrapped within. Through framing the towns issues around aging in place and its future prospects, the viability of the current growth regime comes into question. This strengthens the argument for incremental infill and other new urbanism modes of development. Drawing on to the CNU's scaled charter, Stonewall can densify through infill developments, enhance its active transportation infrastructure, plan for future regional transportation connections, and improve the cultural impact of its built form. This can be achieved by providing a diversity of form and function in housing options. Doing so would allow Stonewall to accommodate many potential 'housing careers'. This would alleviate many of its demographic and population issues and would allowing people to age in place. Tying these principles together is Soft City, and its emphasis on livable density and incremental urban development. The nine criteria for livable density, and the planning formation of the blocks provide a developmental guide to inform the town's incremental growth.
If Stonewall can adopt these principles, and implement them in a way that sustains community, and human comfort, it can address many of the demographic and climatic problems while creating an even more desirable urban environment. Implementing this form of growth would see Stonewall become a complete community, a place where one can live, work and find enjoyment and beauty in life.
If implemented throughout the region, Winnipeg, and surrounding communities could become a regional garden city – a place where humans are close to all their needs, and where farmlands and natural environments are cherished and rejuvenated – a shared regional vision for the future.

Figure 72 (below)
Theoretical framework for a complete community in Stonewall

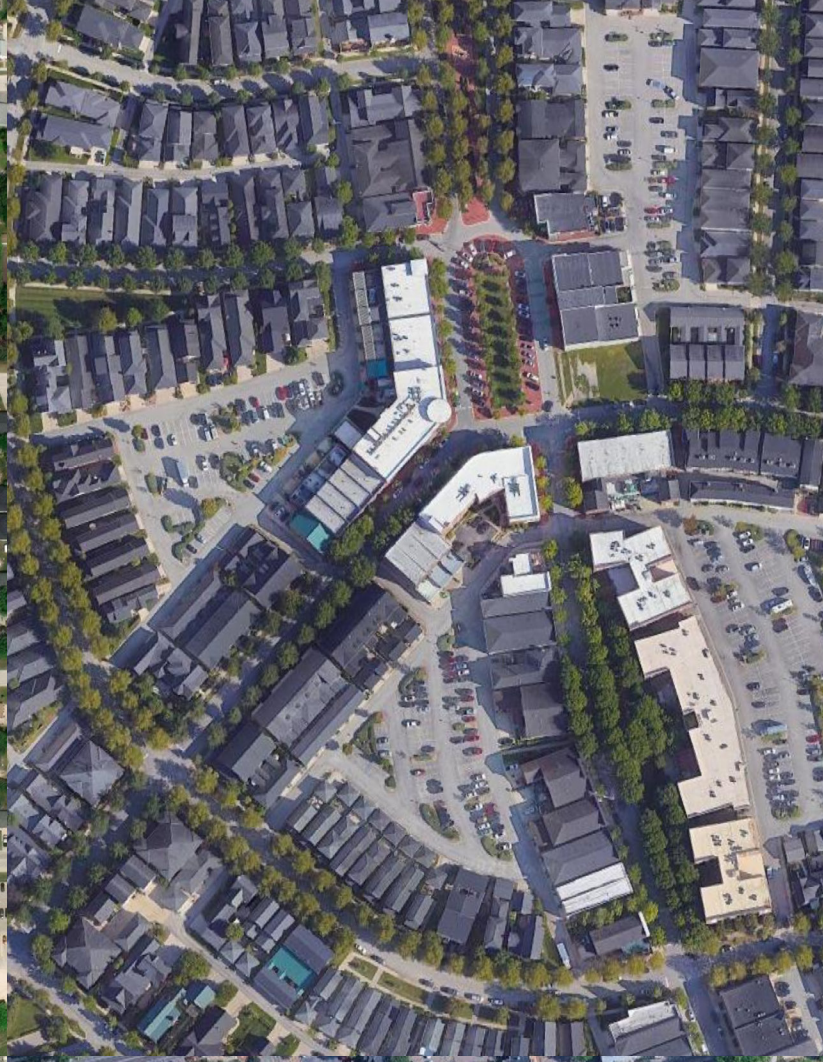
Figure 73 (left)
Map of theoretical framework.



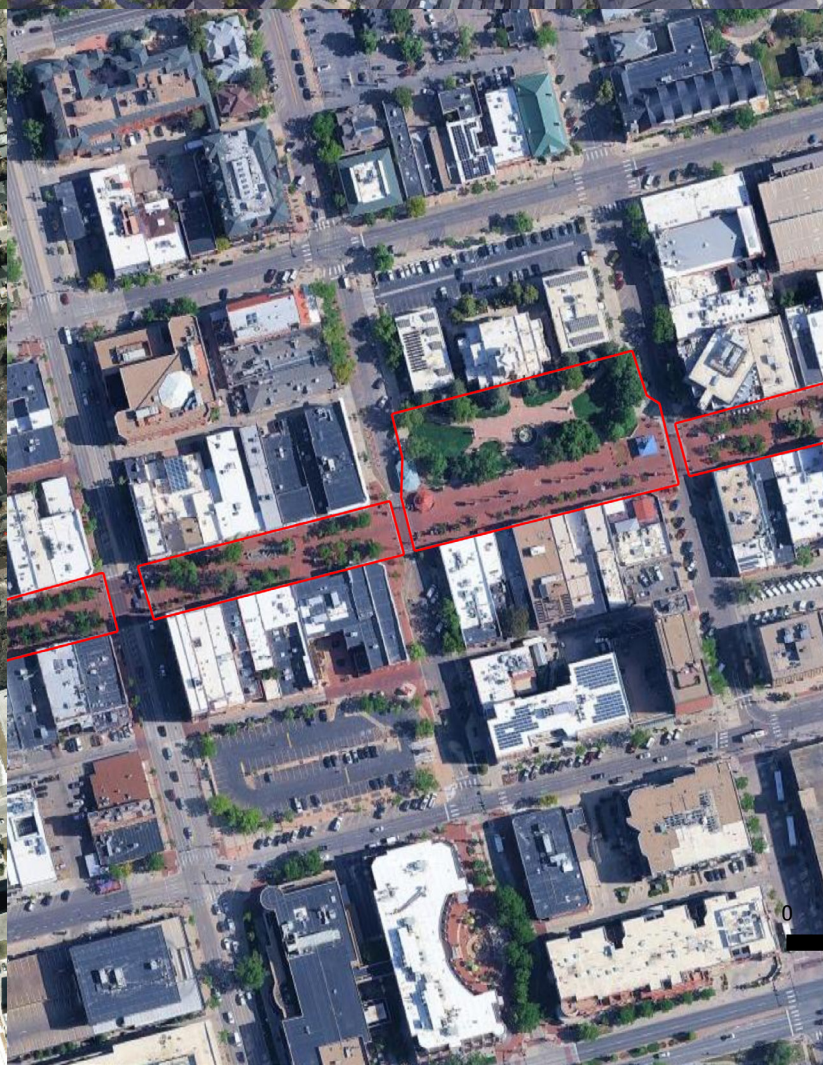
Theory Inter-relations







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PRECEDENT RESEARCH

Norton Commons, *Louisville, Kentucky*

Cabbage Town, *Toronto, Ontario*

Pearl Street Mall, *Denver, Colorado*

A note on 'Pedestrian Malls'

Map 25 - 28 (left)
Collage of satellite images showing the precedents covered here compared to Stonewall. From top left to bottom right, Stonewall, Norton Commons, Parliament Street Pearl Street Mall.
Images from Google, ESRI.

Introduction

To help understand the opportunities presented to Stonewall, a series of precedents were examined. These precedents relate back to the new urbanist principles analyzed in the previous chapter, and how they have manifested in existing communities. These precedents are all located within North America, and are located in smaller neighborhoods, or towns. Each exemplifies a different form of new urbanism in practice and an analysis provides a critique of each. The chapter concludes on the applications to Stonewall.

To help orient the differences between Stonewall and these locations, a profile on each precedent, and Stonewall have been provided. This includes information on the population, density, climate and date of founding.

Map 29 (below)
Plan view of Stonewall.

Stonewall

Location: Manitoba, Canada

Latitude: 50° N

Altitude: 237 M (ASL)

Population: 5046 (2021)

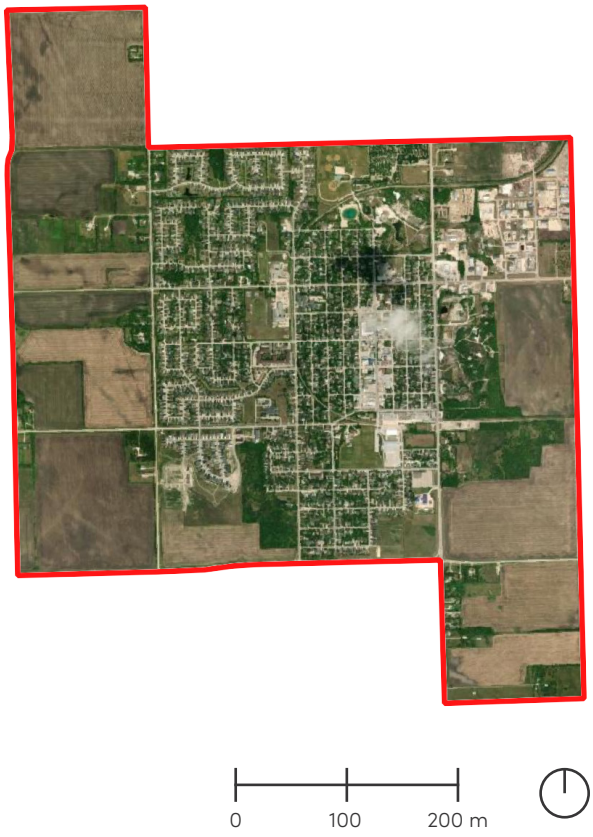
Established: 1878

Area: 942 Hectares

Dwellings: 2127

Climate: Humid Continental - Mild Summer, Wet all Year.

Dwelling per hectare: 2.12



Norton Commons

The community of Norton Commons in Louisville, Kentucky is an example of a contemporary greenfield New Urbanist suburb. The community was designed by Andres Duony of DPZ and Company. Micheal Watkins is the town architect of a New Urbanist background. The design is pedestrian-focused and centered around an urban core, taking the form of a traditional small town, mixed with European influences.[185]



Figure 74 (top right)
Photo of life on the boulevards of Norton Commons. Photo from Norton Commons. 2018.

Map 30 (bottom right)
Plan view of Norton Commons.



Location: Louisville, Kentucky, USA

Latitude: 38° N

Altitude: 177 M (ASL)

Population: 4600 (2021)

Established: 2004

Area: 247 Hectares

Dwellings: 2880

Climate: Humid Sub-tropical

People per hectare: 28 at completion

Dwelling per hectare: 12

Designer(s): Andres Duony, DPZ + Company,

Town Architect: Micheal Watkins

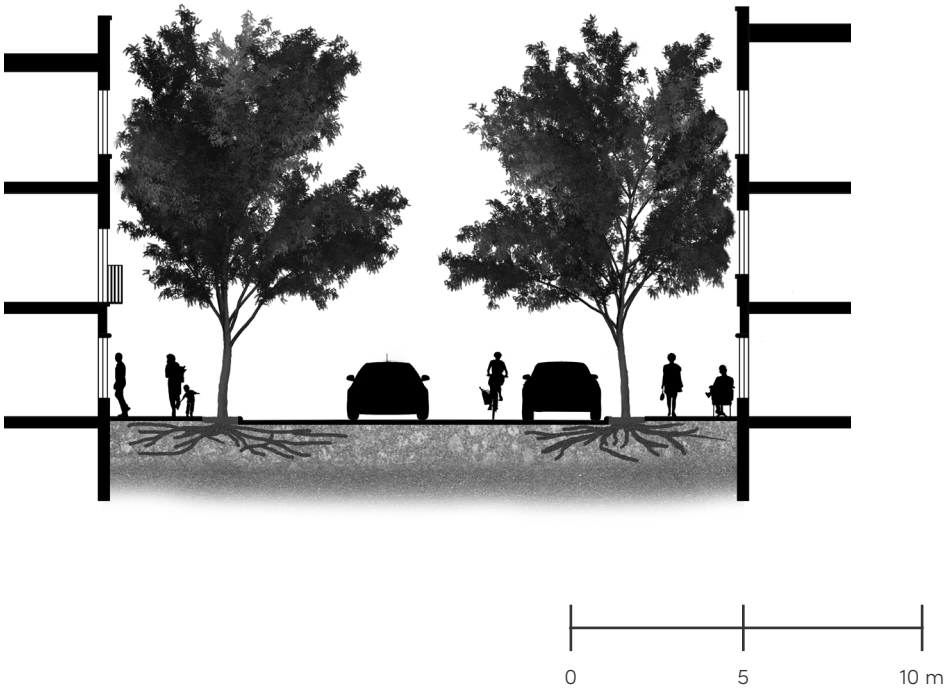


Figure 75 (above)
Section of Norton Commons Boulevard, in Norton Commons.

Conclusion

This human scaled design focus demonstrates itself in the urban fabric. The layout of the town is a warped grid, that forms into a circular patter. This grid is met with three major commercial streets that converge at a town square. The town square flows into a large central park that has regional connections. This central park also unites the southern portion of the development, phase one, to the northern portion of the development phase two. Phase two is almost complete and has a design that relates to phase one, but has a slightly different urban fabric, with its own central commercial streets.

The atmosphere created within this development is elevated by the quality of materials used, interesting buildings and facades, lush street trees, and planting areas. With many businesses along the central commercial streets, residents are able to access many day-to-day needs on foot. Access to the park and regional trail system allow for greater outdoor recreational opportunities for those living in the community. However, the function of the community is still heavily influenced by the surrounding region. Bounded by an expressway to the south, there is no public transit links within the development. This means that cars, and parking areas still heavily influence the streets and the courtyards of buildings. The lack of transportation also creates a feeling of regional isolation. Another critique of Norton Commons is though it provides many housing options, it lacks the affordability that allows for a diverse demographic makeup.



Figure 76 (top right)
Brick details in Norton Commons. 'Project--Norton Commons: IMG_9892.' Photograph by Cecilia Xi Zhang. Licensed under Creative Commons. CC BY 2.0.



Figure 77 (middle right)
Form in Norton Commons - siding. 'Project--Norton Commons: homogeneity (1).' Photograph by Cecilia Xi Zhang. Licensed under Creative Commons. CC BY 2.0.



Figure 78 (bottom right)
Form in Norton Commons bricks. 'Project--Norton Commons: homogeneity (2).' Photograph by Cecilia Xi Zhang. Licensed under Creative Commons. CC BY 2.0.

Cabbagetown Business Improvement Area

Parliament street is located in the mature community of Cabbagetown, located northeast of downtown Toronto. With its development occurring incrementally over time, it is an example of a historic community, that has evolved through infill, transit-oriented development, and local aesthetics.

Map 31 (bottom left)
Plan view of Cabbagetown BIA.

Parliament Street defines the Cabbagetown neighborhood. This street is a local commercial street that features buildings of different ages, with interesting facades. Most of these buildings have activated storefronts. Many of the buildings have offices or residential uses on their upper floors. Some mature trees dot Parliament street, creating lush areas. The street environment of the area is showcase to murals, public art, posters and signs that people are engaged with their urban

Location: Toronto, Ontario, Canada

Latitude: 43° N

Altitude: 243 M (ASL)

Population: 6300 (2023), (serves ~44,000)

Established: ~1840's

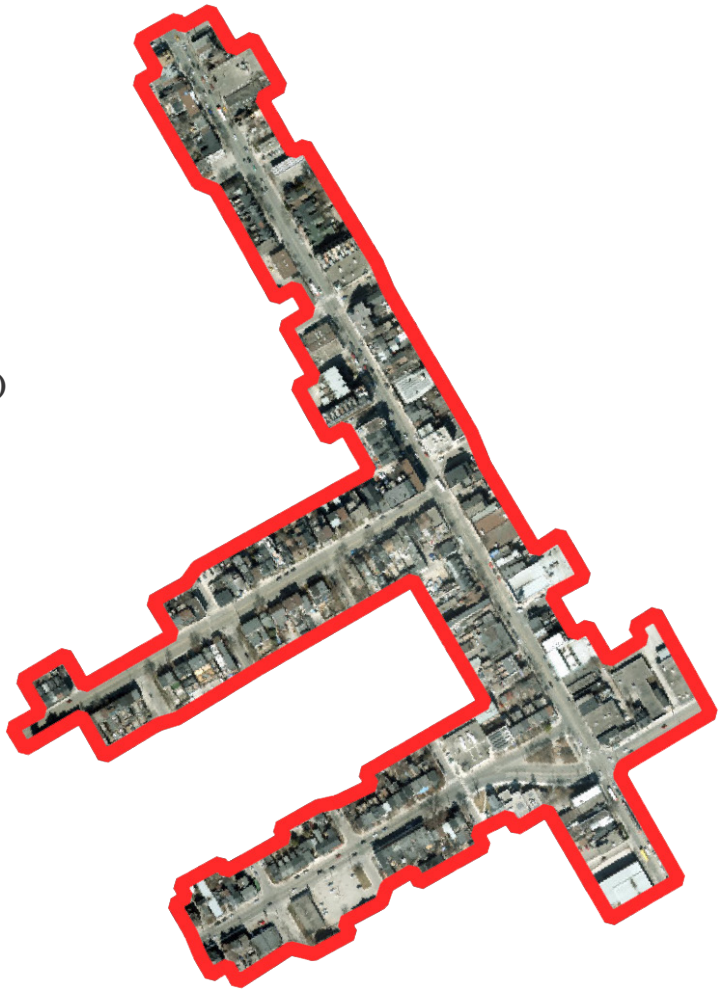
Area: 14 hectares

Buildings: 187 (Mixed use)

Climate: Humid Continental - Hot Summer, Year round Precipitation.

People per hectare: 450

Building per hectare:* 13.3



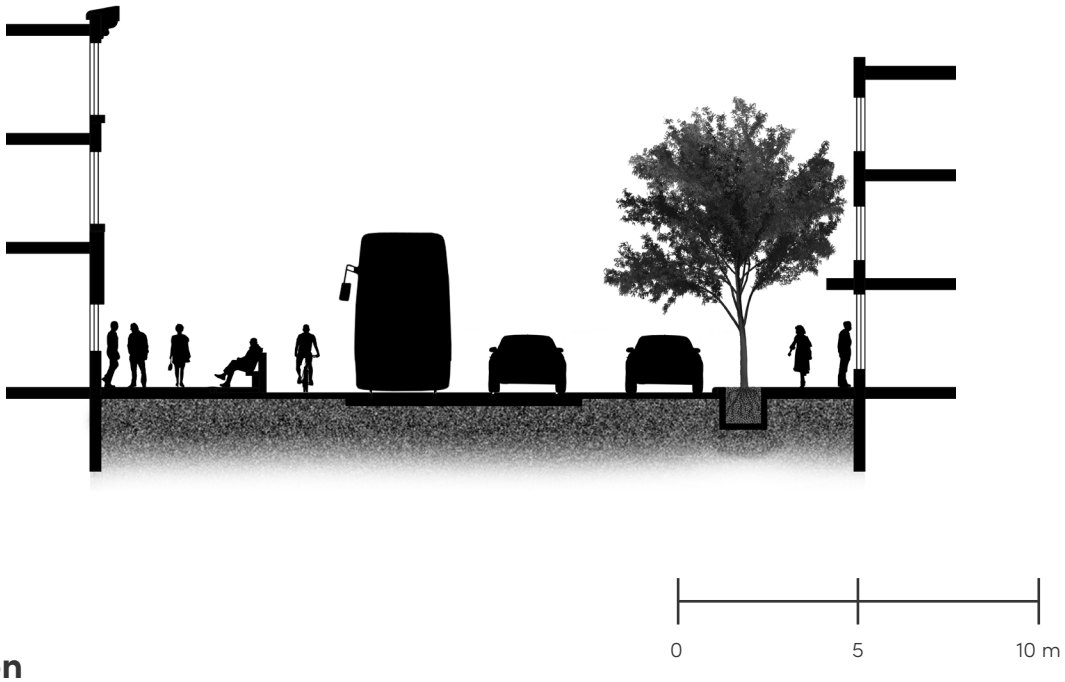
* The Dwelling count for the buildings within the Cabbage Town BIA was not available.

environment. Parliament street itself features four lanes. Two lanes for traffic, and two for street parking. Portions of Parliament Street feature a streetcar line sharing the middle two lanes. Access to other bus transportation routes is available on surrounding streets throughout the area. The avenues that flank Parliament Street fade into calm, lush residential streets, with interesting houses and gardens.

Parliament street is able to play host to a variety of businesses and activities due to the diversity of building types. These businesses include all the needs for day-today life, like grocers, pharmacies, hardware stores, furniture stores, restaurants, etc. Access to the streetcar system makes Parliament street allows for easy access to and from the neighborhood, and a place where one can get errands done on the way home. With active sidewalks and interesting buildings, the area conveys a unique atmosphere are character. Many mature trees are located on sections of parliament street, which provide comfortable dappled shade. However, Parliament street is held back by a number of features. The street has narrow sidewalks, with physical and visual clutter throughout. This includes poles for light posts, streetcar wires and traffic signs. Though successful, the storefronts and facades of many buildings are chaotic, and do not share a proportional relationship. All of these factors make accommodating pedestrian traffic at peak times challenging. This is especially true for those with mobility requirements.

Figure 79 (below)
Carlton Street at Parliament Street in Cabbagetown, Toronto. 'Cabbagetown, Toronto.' Photograph by margonaut. Licensed under Creative Commons. CC BY 2.0.





Conclusion

There are also major gaps in the street tree canopy along Parliament street, which creates the effect of green islands, detached by dustier, sunnier areas. Beside the sidewalks spaces is allocated to street parking. When paired with heavy car traffic, the space can feel dominated by cars, and car centric movement, and makes it less comfortable for pedestrians. Cabbagetown is currently creating a masterplan for the Business Improvement Zone along Parliament street. This master plan looks to make the urban realm more attractive and walkable along Parliament street.[186] The qualities examined here display the best and worst of urbanism in a mature community. Paring the historic incremental growth pattern, with an enhanced urban realm would elevate the human and social experience along Parliament Street, and within Cabbagetown as a whole.

Figure 80 (above)
Section of Parliament Street, Cabbagetown.

Figure 81 (top right)
Facades and storefronts along Parliament Street. Cabbagetown, Toronto. 'IMG_1024' Photograph by Chris Barker. Licensed under Creative Commons. CC BY 2.0.

Figure 82 (bottom right)
Quiet side streets on the peripheries of Parliament Street. Cabbagetown, Toronto. 'IMG_1024' Photograph by Jay Woodworth. Licensed under Creative Commons. CC BY 2.0.


CORNER CONVENIENCE
ATM
TENNIE'S
WHOLE FOODS
CABBAGETOWN
Parliament St
Home
hardware
Plumbing
NATURE'S BOUNTY
better off healthy
WELCOME TO
CABBAGETOWN



Pearl Street Mall

High in the foothills of Colorado is the town of Boulder. Founded as a mining town in the 19th century, it was laid out with a traditional small-town form, and a commercial main street.[187] As it grew, it attracted further investment and importance, eventually attracting a streetcar system and interurban transportation link to Denver.[188] Its main street – Pearl Street embodied a classic Main Street Architectural Tradition. As time progressed, and the modernist planning regime took hold, Pearl Street, and downtown Boulder began to experience urban decline, disinvestment, and a poor sense of place. In 1974, through the help of the firm Sasaki and Associates, among other partners, Pearl Street Mall was born.[189]



Map 32 (right)
Plan view of Pearl Street Mall

Location: Boulder, Colorado, USA

Latitude: 40° N

Altitude: 1621 M (ASL)

Population: 105,898 (2023)

Established: 1858

Area: 7000 Hectares, (downtown Boulder).

Dwellings: 146,393 (2023),(downtown Boulder).

Climate: Semi-arid - Humid-Subtropical

Dwelling per hectare: 20.9, (downtown Boulder).

Designer(s): Sasaki

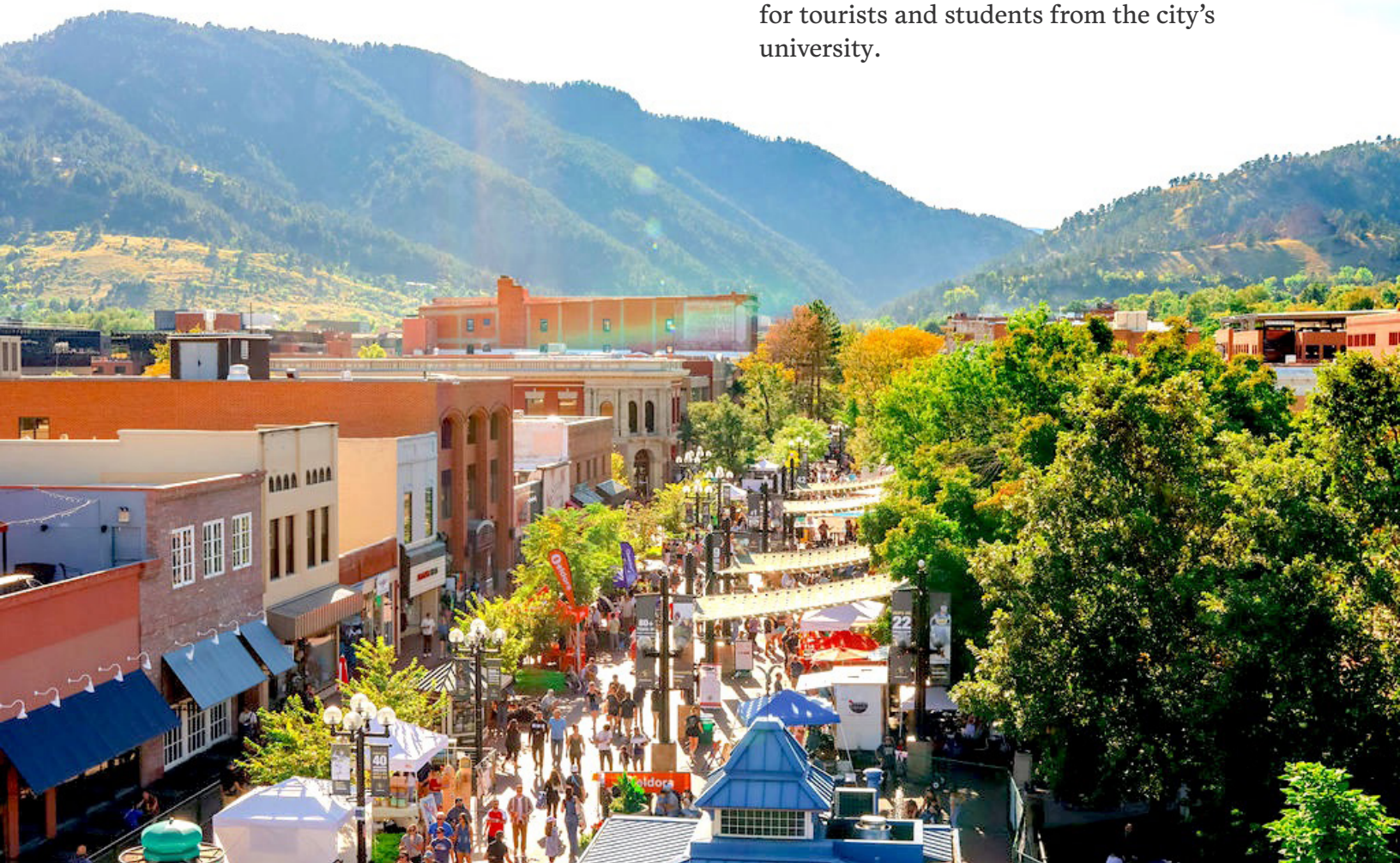
The mall consists of 4 pedestrianized blocks. These blocks act as a linear plaza lined with shops. These shops have a clean and rhythmic flow to their storefronts, and the facades of these buildings employ interesting motifs and quality materials.

The pedestrian area defined by red brick pavers. This paving distinction continues into other areas of the downtown, creating a visual cue as to where the pedestrian traffic is emphasized. Within Pearl Street, there are a variety of functions that activate the space, this includes public art, sitting areas, play areas and monuments. The mall also seamlessly interfaces into a large public square with a prominent civic building. This square is host to markets and festivals.

Figure 83 (below)
Firefly handmade festival on Pearl Street Mal, 2018. Image courtesy of Beth Pomerantz and the Firefly handmade festival.

The planting beds throughout the mall are built into the brick paving and allow for seating on their edges. Within these planters are different scales of street trees, shrubs, and seasonal flowers. The varying scale and species of street tree creates the impression of different outdoor rooms. Pearl Street serves a downtown community of just over 1000 people.[190] Though the streetcars and interurban railways are long gone, Boulder is served by a comprehensive bus system. The hub of this bus system is adjacent to Pearl Street Mall and also includes interurban bus service to Denver. The residents of downtown boulder, and the surrounding neighborhoods are able to access amenities, restaurants, bars and other shops along Pearl Street.

This creates a convenient destination for people within town. The variety and quality of public space allows people of all ages to participate in the urban environment, from children to senior citizens. The pedestrian mall is also a draw for tourists and students from the city's university.






fresh produce
patagonia

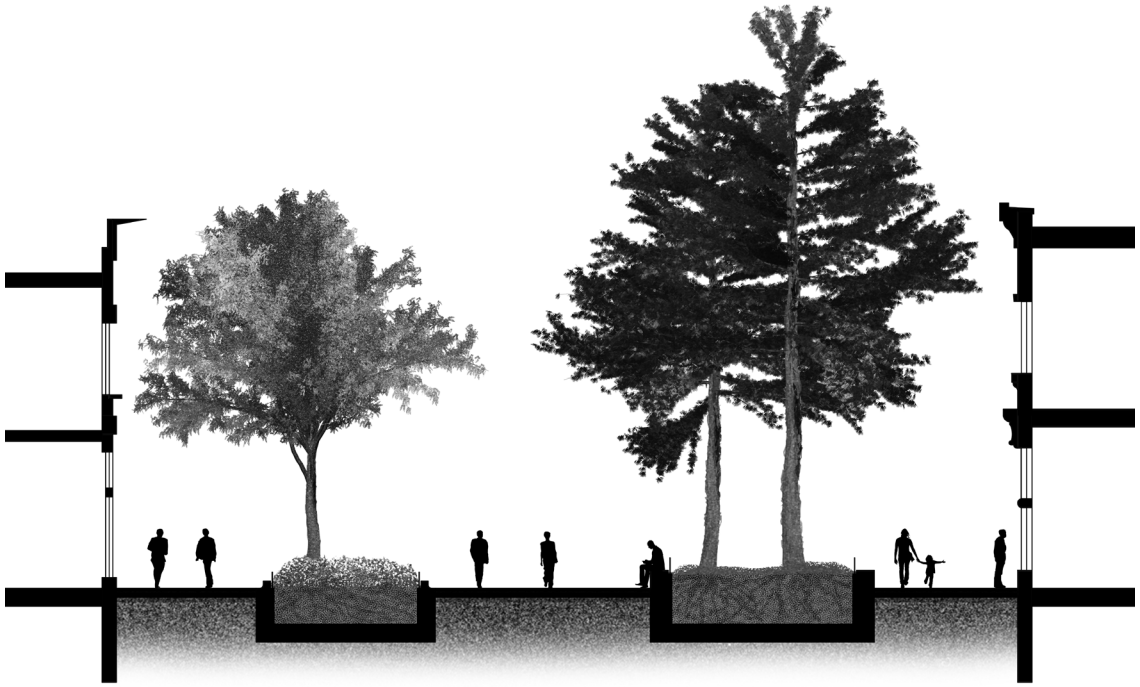




Figure 86 (above)
Section of Pearl Street Mall.

Figure 84 (top left)
Street scape of Pearl Street Mall.
'Pearl Street Mall between 15th and 14th streets' Photograph by Kai Bates. Licensed under Creative Commons. CC BY 2.0.

Figure 85 (bottom left)
Street scape of Pearl Street Mall.
'Pearl Street Mall between 13th and Broadway streets' Photograph by Kai Bates. Licensed under Creative Commons. CC BY 2.0.

Pearl Street, and Downtown Boulder as a result, also have drawbacks. The first being that Pearl Street Mall only encompasses four blocks of commercial area. This makes it feels isolated from the rest of the downtown. A lack of formal or implied entrances makes this separation more jarring. The three streets that bisect the mall disrupt the flow of pedestrians,

Conclusion

and the continuity of the space. In comparison to Pearl Street, the remainder of Downtown Boulder is extremely car centric, hosts many surface parking lots. With few residential spaces on Pearl Street itself there is less activation at later times in the day, making it feel forlorn at night. Pearl Street is a rare example of a successful pedestrian mall project, that has stood the test of time. Its careful design and planning allowed for its existing strengths to be emphasized. The well thought out spatial design creates a desirable atmosphere for both local residents and tourists. As the malls trees have grown into maturity, the full potential of the outdoor rooms has been revealed. Pearl Street has room for improvement – there is opportunity for infill, densification and the addition of more housing on and around the street. With an existing culture of walkability, change, and thoughtful planning, Downtown Boulder, and Pearl Street Mall look primed for further success.

A note on "Pedestrian Malls"

Pedestrianized streets as a concept have had many ups and downs over the last 50 years. Though based in the concept of walkability, many of these spaces have not lived up to the promise of Pearl Street Mall. A large portion of the pedestrian malls built in the 1970s and 1980s have been removed and replaced with typical car centric streets.[191]

The reasons for these failures are complex but often related to economic factors and poor design. Many downtown areas built pedestrian malls as a strategy to lure back consumers during the 1960s and 70s. At this time, suburban shopping, ample parking and big cars were all the rage. Cities hoped they could attract suburbanites back to downtowns through the creation of pedestrian spaces – an attempt to compete with shopping malls. State Street Mall in Chicago downtown is often cited as an example of a pedestrian mall that didn't live up to its promise. Opening in 1979 to great excitement, this street was transformed into a bus and pedestrian focused 'mall' lined with large planters and divided by a large bus lane. This street was decried as being barren, and dusty, with the smell of bus diesel informing the aroma. It was removed and replaced with a 4-lane street in 1996.[192]

There are many arguments as to why these malls were unsuccessful, but a main attribute to their failure is the feeling of 'emptiness' or inactivity when shops are closed. The difference being that no passive car traffic is passing through. This feeling of emptiness can be accommodated and designed for, learning from the failures of past projects.

One strategy is to provide the pedestrianized street with an active transportation spine, this encourages passive traffic on foot and bicycle. Another tactic would be to ensure that there is plenty of residential units, and dwellings above shops. This provides 'eyes on the street' and allows for a space to feel activated late into the night, this is elevated through the use of balconies and private outdoors spaces. Ample residential units also encourage the stores to stay open later – particularity restaurants and bars.



Figure 87 (left)
State Street Mall in Chicago, 1987. Image from Chicago Loop Alliance. 2023

Finally, maintenance and street cleaning can be scheduled at times when the street is especially empty, to allow eyes on the street early into the morning.
The recent COVID-19 pandemic brought renewed attention to pedestrianized spaces. As people were forced to 'social distance' they spent more time outdoors, engaging with public space, and outdoor amenities like patios and parks. As the pandemic faded, the spirit of reserving public spaces for people has remained in many places.

Pedestrian mall is a tricky term – the etymological ties to shopping malls give it baggage. This is to say it creates a reminder of the failure of shopping malls, and past pedestrian malls. This baggage is unnecessary, as shopping malls, and the concept of a pedestrian malls are themselves replications of a traditional, human scaled, walkable commercial street. Embracing the street itself, its qualities and its potential as public space is where pedestrianized places thrive. Perhaps its time to give these districts a new name.

Applications to Stonewall

Reviewing these precedents provides examples of what dense urban living can look like in a smaller community. The successful lessons from each, like the quiet urban feel, and quality design of Norton commons. The lived in, historic and art filled atmosphere of Parliament Street, and the use of main street as a focal point, in Pearl Street Mall. The main failings of each should also be considered – Norton Commons reserves too much space for car traffic, has no connections to public transport and lacks genuine affordable housing. Parliament Street is also very car dominated and has gained a dusty and gritty feel along some stretches as a result. Pearl Street Mall lacks residential capacity on the street itself, and its spatial design makes it feel isolated from the rest of the downtown.

Stonewall can take these lessons into account. Balancing the needs of pedestrian traffic and car traffic will be essential in the spatial configuration of a renewed Stonewall. Ensuring that residential units are allocated on Main street, and that affordable housing is available throughout the town. These precedents also display the relationship between public transportation infrastructure and the success of urban areas. The Winnipeg Metro Region will need to consider public transportation at the regional scale to ensure that communities like Stonewall have the tools for sustainable and equitable human centred urban growth.

Endnotes - Theory + Precedents

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KEY
GENERAL MERCHANT

PART III
Inventory and Analysis

Figure 88 (left)
Limestone fashioned side wall of 345 Main Street, featuring a ghost sign.
Personal photo. August 24, 2024.



Inventory

Introduction

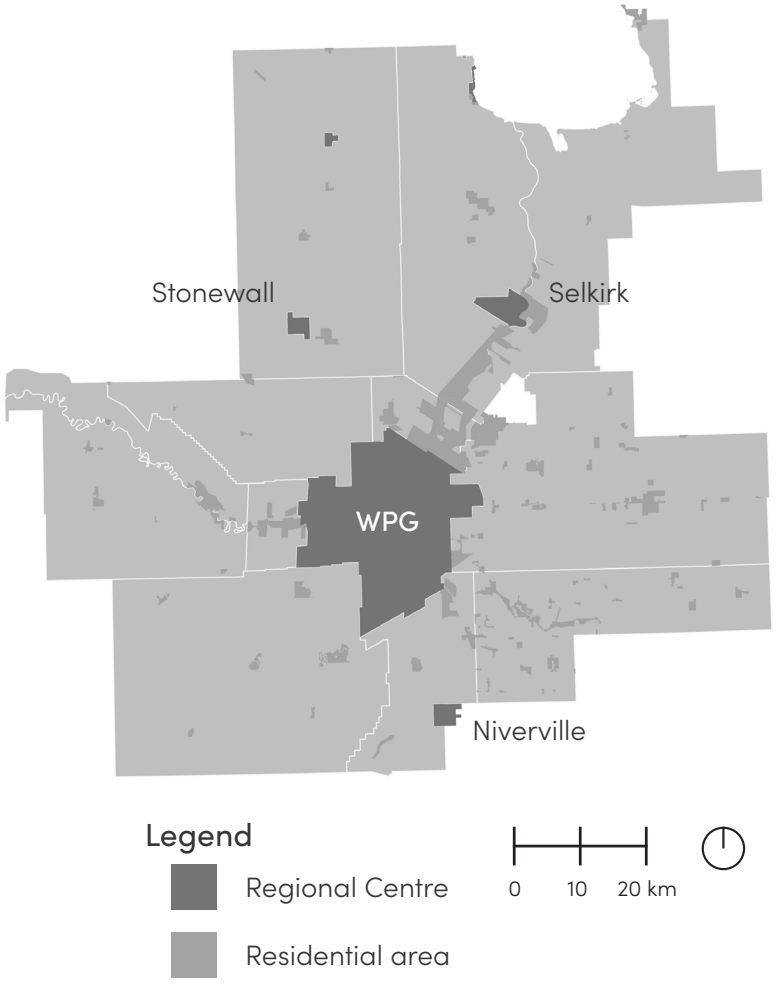
To understand the qualities of the landscape, both within the town of Stonewall, and in the broader region, a series of maps where produced. These maps allow for a scaled inventory of sites, that when taken together, create an imprint of the regional qualities. The scaled approach to the analysis pairs to the scales covered by the Charter for New Urbanism.[193] These maps start at a diagrammatic scale, covering the Winnipeg Metropolitan Region and the Northwest Winnipeg Metropolitan Region. From here the next scale captures the Town of Stonewall, and its qualities, attributes and features. Finally, the maps zoom into Main Street, and the surrounding downtown area of Stonewall.

Figure 89 (left)
View from Stonewalls active transportation pathway, looking north towards the Lions Manor 55+ living facility.
Personal photo. August 24, 2024.

Winnipeg Metro Reigon:

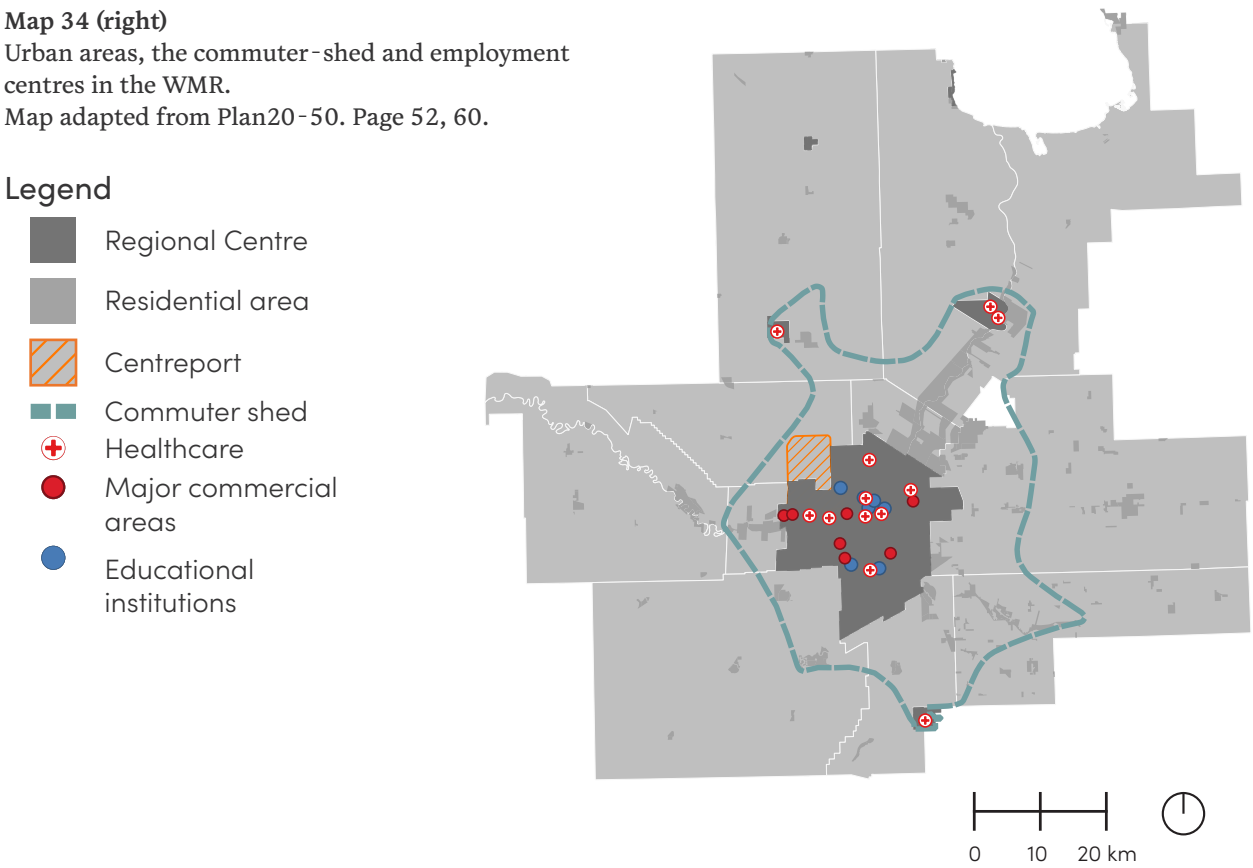
The Winnipeg Metropolitan Region (WMR) is the largest regional unit coved in this report. The WMR covers an area of 7800 Km2 surrounding Winnipeg.[194] The regional framework provides collaboration with between urban areas, municipalities and Winnipeg. Within the WMR, there are regional centres, include: Stonewall, Selkirk, Niverville, and to a lesser extent, Teulon and Dunnottar. The region is crossed by corridors of highways and railways that are flanked with developments and connect regional centres. The region is host to many natural features like marshes and forests, as well as parks and recreational opportunities. However, much of the region is currently reserved for agricultural purposes.

In 2022, there were 442,030 jobs in the WMR.[195] The main employers are the healthcare and education sectors. With major economic hubs like shopping centres, airports and railyards also playing a key role. Centreport Canada Way is an economic district focused on industry and transportation. It is currently undergoing growth and will see more jobs in coming years. The WMR has defined a 'commuter shed' that demonstrates the distance people are willing to commute for work, outside of their main urban centre.[196] These maps allow for a broad overview of the regions economic and spatial configurations. When paired with the Palimpsest research, a good impression of the landscape, and its current arrangement is achieved. The region has a layout that lends itself to further connection, of both human and natural features. There is opportunity for collaboration between urban centres, to create connections for people, transportation and ecology. But to further understand the nuances of place, it is necessary to drill into a more concentrated site.

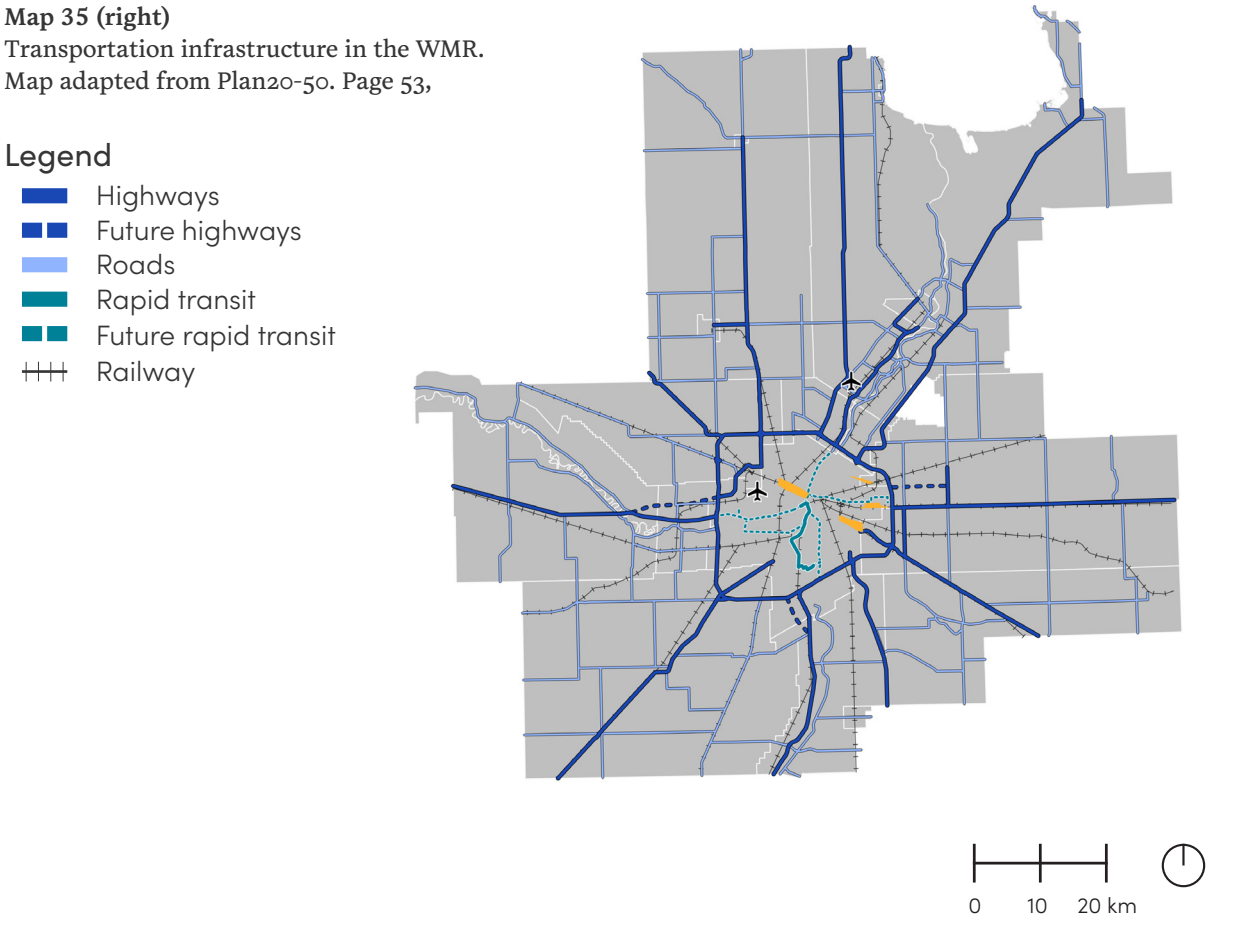


Map 33 (above)
Winnipeg, Regional Centres and other residential areas in the WMR.
Map adapted from Plan20-50.

Map 34 (right)
Urban areas, the commuter-shed and employment centres in the WMR.
Map adapted from Plan20-50. Page 52, 60.



Map 35 (right)
Transportation infrastructure in the WMR.
Map adapted from Plan20-50. Page 53,



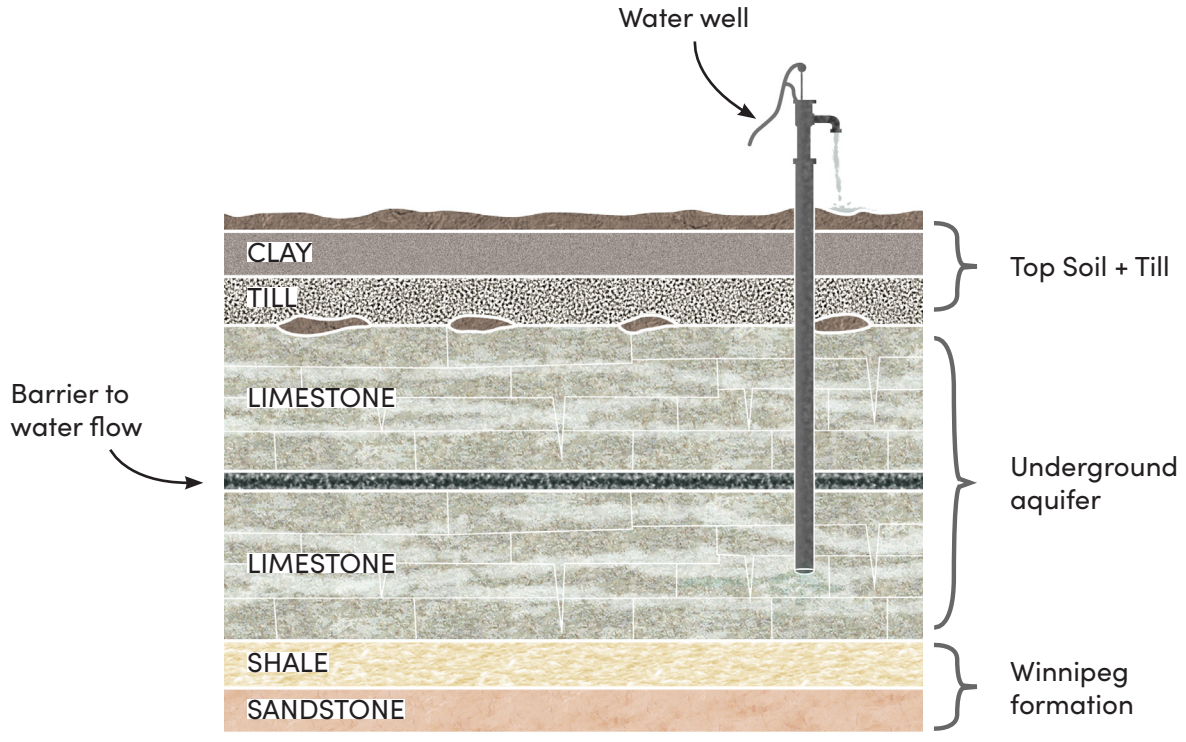
NW WMR:

The Northwest Winnipeg Metropolitan Region (NW WMR) can be defined as the area north of the Assiniboine River, and West of the Red River and Lake Winnipeg. Stonewall is at the centre of the region, but it also incorporates Selkirk, Teulon, Stony Mountain, St. Andrews and many other communities.

The region is divided by a long but subtle ridge, going north from Winnipeg, into Stonewall, Teulon and beyond. This ridge defines the upland and downstream relationship in the region. With the eastern portion of the region being wetter, and formerly home to a massive marsh. A pocket of the former marsh still exists as Oak hammock marsh, and the Netley Libau Marsh. Both of these wetlands provide recreation opportunities to the region. These natural areas are accentuated by patches of forest, and a variety of shelterbelts that frame expanses of farmland. The soils in the region are good for agriculture, but there are portions, specifically in the former marsh where the soil quality is slightly lower, and the drainage is poorer. The upland region boasts better soils and great drainage. However, drainage in the region has been altered to accommodate the mile-to-mile grid. Though larger streams are able to flow more naturally, many tributaries have been converted into agricultural drains. The disconnection of marshlands makes ecological and recreational pockets isolated.

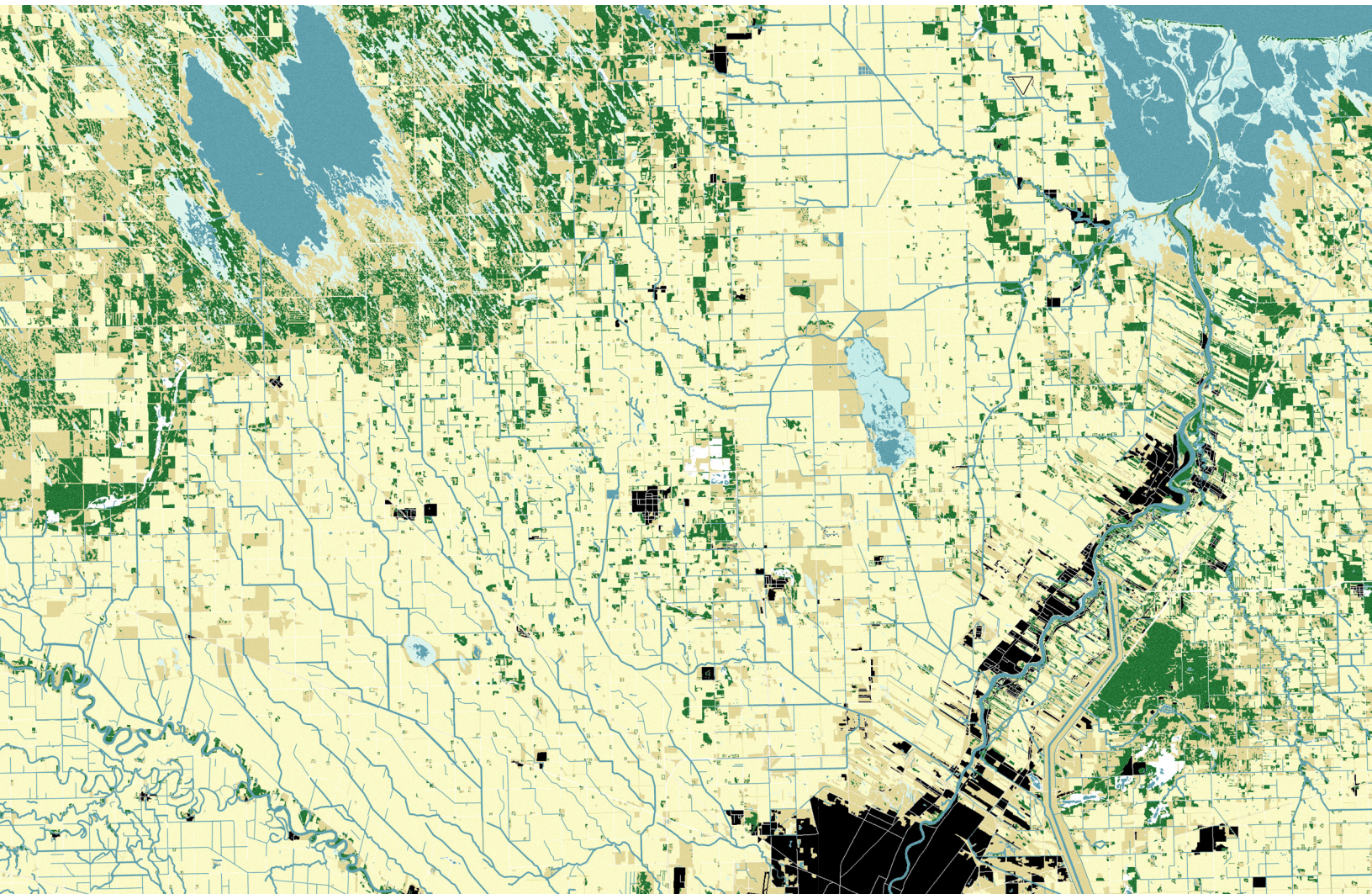
The regions historic railway network influenced urban development patterns. Though the railway network has been scaled back over time, remaining right of ways have enabled recreational pathways. Urban areas are connected through the regional road network. Provincial highways

Figure 90 (below)
Adapted diagram displaying the hydro-geology of the Netley Grassmere water shed.
Diagram adapted from Netley-Grassmere Integrated Watershed Management Plan, figure 2, page 29.



act as the top of the hierarchy. Followed by smaller paved roads, gravel roads, and a small amount of dirt roads. The highway network is efficient but relies on a divided landscape.

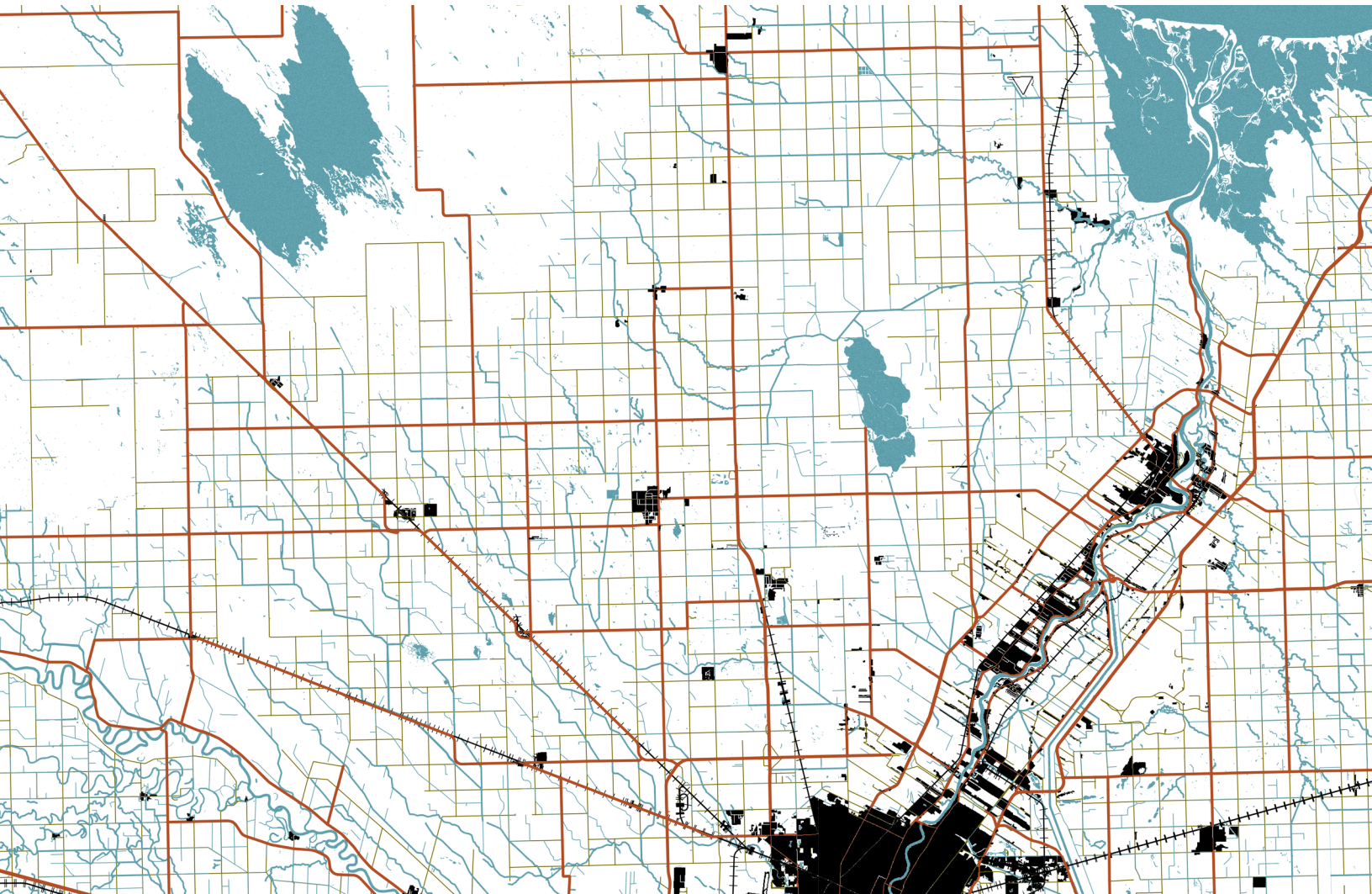
The area surrounding Stonewall is just west of the regional ridge. Being elevated, Stonewall does not have a natural body of water running through it, but Grassmere Creek defines the western edge of town. The surficial geology of Stonewall and its surroundings consists of limestone, and sedimentary deposits. There are also pockets of organic material formed by small marshes. Under the surface, the town sits on a 'bubble' in the Stonewall formation to the west, with the Stony Mountain formation to the east. The depth to bedrock in Stonewall is shallow – with it being less than 6 meters deep and exposed to the surface in some areas.



Map 36 (below)
Map of the ground cover in the NW WMR.
GIS map.

Since Stonewall is on an elevated ridge, most water drains away from town to the west, into Grassmere Creek. Portions of the town drain southeast, towards the Winnfield Marsh. The freshwater supply for the town, and rural residents in the peripheries comes from well water. Wells are driven deep into the limestone aquifer that lies deep beneath the surface. This aquifer has a flow that favours southwest to northwest flow, towards the downstream lands and Lake Winnipeg. Because of the use of wells, the quality and quantity of the aquifers are pertinent. Pollution risks exist where there is a low depth to bedrock. This is further influenced by the presence of quarries. Water for the town of Stonewall is pumped in the northwest of town. From here it is distributed through a water main network to the town's residents. The wastewater for each resident is carried to a lagoon located west of town, along Grassmere Creek. This lagoon was recently expanded and upgraded to allow for residential growth in Stonewall. The baseline capacity of the regional aquifer is very large, with untapped aquifers existing even deeper.[197]

Map 37 (below)
Map of infrastructure in the NW WMR.
GIS map.



Map 38 (below)
Overlay of soil quality, former wet prairies and ground-cover, revealing areas that are best for agriculture and areas that could be better used for other functions. GIS map.

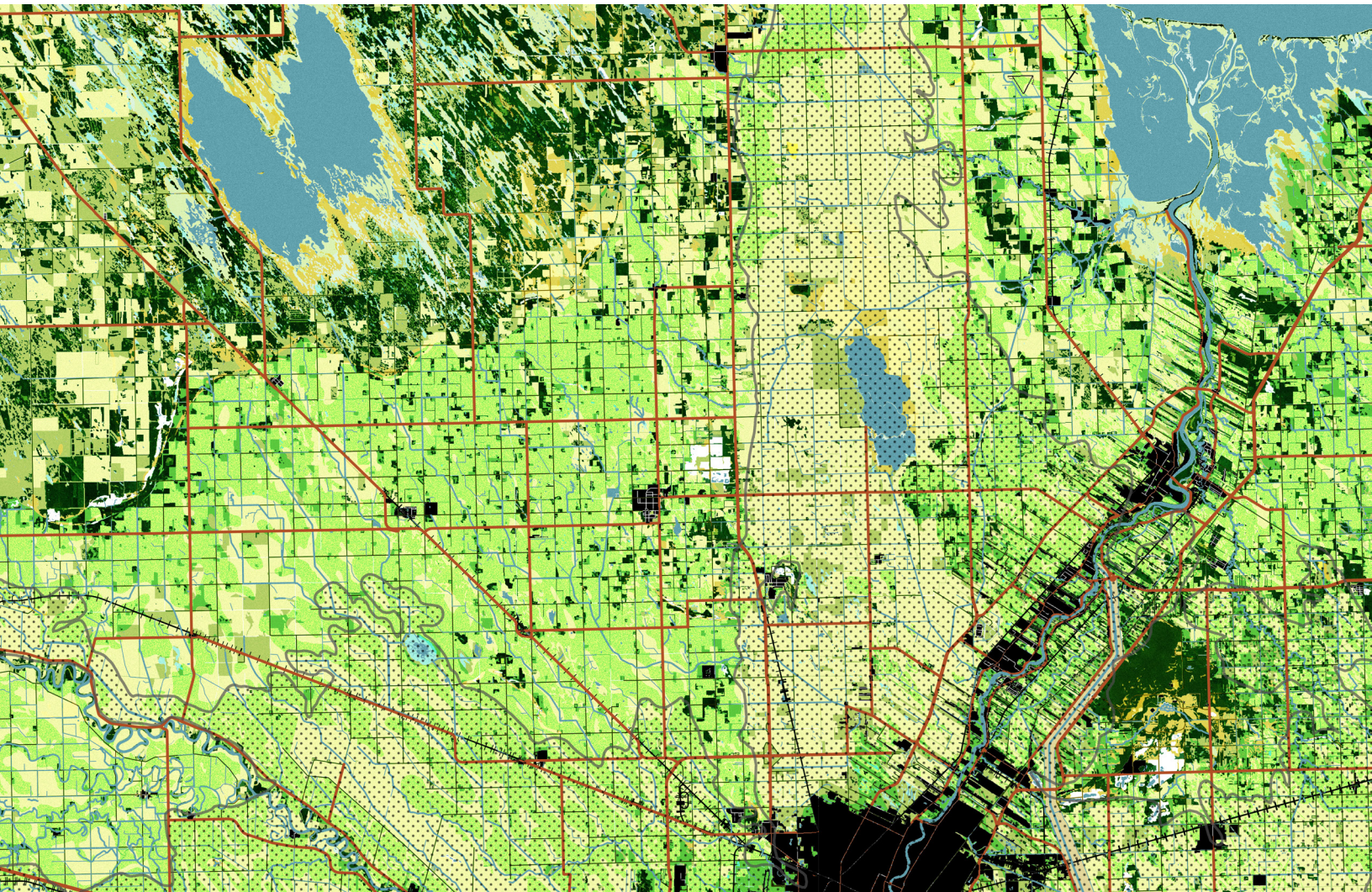
Legend

- Higher quality croplands
- Lower quality croplands
- Former wet prairies
- Pasture / grassland
- Forests
- Wetlands
- Urban areas
- Water
- Highways
- Railway

A report produced in the 1980s, stated that the groundwater resources in the region could theoretically sustain a city of 100,000 people.[198] Even with the influences of climate change, the availability of freshwater and groundwater will be supported by an aquifer that currently has ample capacity.

Provincial Highway 7 is a two-lane highway that acts as an artery for regional traffic and trade. From this highway, smaller highways stem out to connect towns like Stonewall. Local roads stem out further to connect rural properties.

0 10 20 km



The tree canopy cover of the area reflects the grid network of roads and farms. This canopy flows into Stonewall and interfaces with its rich canopy cover. The farmlands provide industry, and quality foods for local consumption and export. Regional industry also includes quarrying, with massive quarries being blasted to the northeast of town.

Stonewall has a rich connection to its surrounding region, and landscape. Being close to natural amenities like marshes and Grassmere Creek, there is plenty of opportunities for recreation. The geology of the town provides access to industry and freshwater resources, and the surrounding road network informs the layout of agricultural lands and the regional canopy cover. However, to get a more nuanced perspective of the Town of Stonewall, further analysis is required at a finer scale.

Stonewall Proper

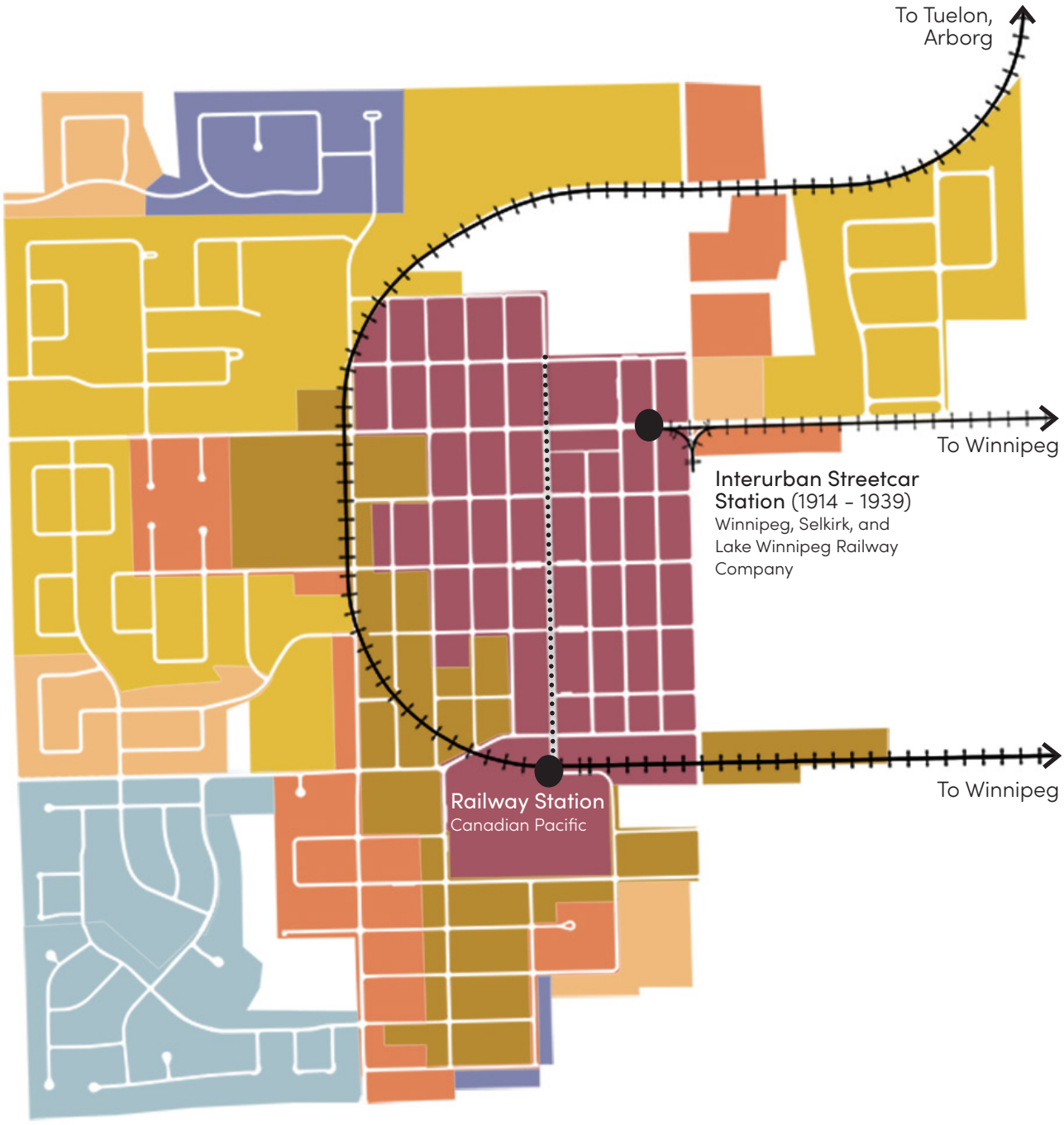
Viewing Stonewall at this scale provides a refined look at its urban context, history, and qualities. As covered in the Palimpsest chapter, Stonewall grew as a both a quarry town and a railway town. The towns historical development patterns reflect this.

The town grew from the gridded 'old town' that was laid out in its founding years. After WWII, the town began to expand west, and created a new neighborhood to the south, with these additions still keeping a grid pattern. Development in the 1970s pushed further outwards, and began to break away from the grid pattern, using cul-de-sacs and bays. Starting in the 1980s, and into the new millennium, Stonewall developed two new neighborhoods and an industrial district. These neighborhoods were planned in a car-centric manner, with winding roads, and dead ends. From the start of the 21st century until 10 years ago, growth slowed down, and the town saw infill between existing neighborhoods. Starting in 2015, the town paired with a developer to create another suburban neighborhood, this time to the southwest. As of 2025, this neighborhood is currently half built.

The towns development has been influenced by access to transportation. In the early years, the towns proximity to a wagon trail allowed for access to Winnipeg.[199] As the community grew, the railway was introduced in 1880. This allowed people and goods to easily flow into and out of town. With the addition of the interurban streetcar in 1914, main street was bookended by two public transportation options. These options allowed the town to retain a dense urban footprint for over 50 years.

However, by 1939, the streetcar was removed and replaced with a bus service. The CPR ended its passenger rail service to town in 1953, leaving only the bus service. The bus remained a reliable option for transportation into Winnipeg and other communities until the 1980s. By this time, the preferred mode of transportation had shifted to cars, and the towns rapid growth suburban growth in the proceeding periods reflect this. Stonewall does not have an internal public transportation network as the town has still retained a rather dense and walkable footprint.

Currently, there is no frequent public transportation connection to or from Stonewall. As of 2025, the only option other than driving (or cycling on a highway) is taking a night bus destined for Thompson and getting off or on in front of a building on main street.[200] This bus is scheduled at times that make it inaccessible for many travelers.



Legend

- 1919 - 1949
- 1950 - 1968
- 1906 - 1981
- 1982 - 2000
- 2001 - 2021
- 2012 - 2015
- 2020 - IP

Map 39 (above)
Stonewalls development over time. Growth and Development of Stonewall 1919-2020. Town founded 1878, Maps start at 1919. GIS Map

Stonewalls growth reflects its transportation evolution, with more suburbs being built in the post war period, accompanied by the decline of existing public transportation options. Stonewall has the potential to re-invigorate these connections through proper planning, and regional initiatives.

Road Inventory

The road network in Stonewall can be broken into three formal types: Highways, Collector Streets, and Local Streets. The towns active transportation infrastructure is limited, but within the existing network, there is three main types: Sidewalks, Recreational Trails, and 'Swalks' (Drains that are paved to double as sidewalks in dry times). Within this movement network is an outlier – Main Street. To understand the differences of each type, and why Main Street is so important, sections have been prepared that capture the scale and spatial qualities of each.

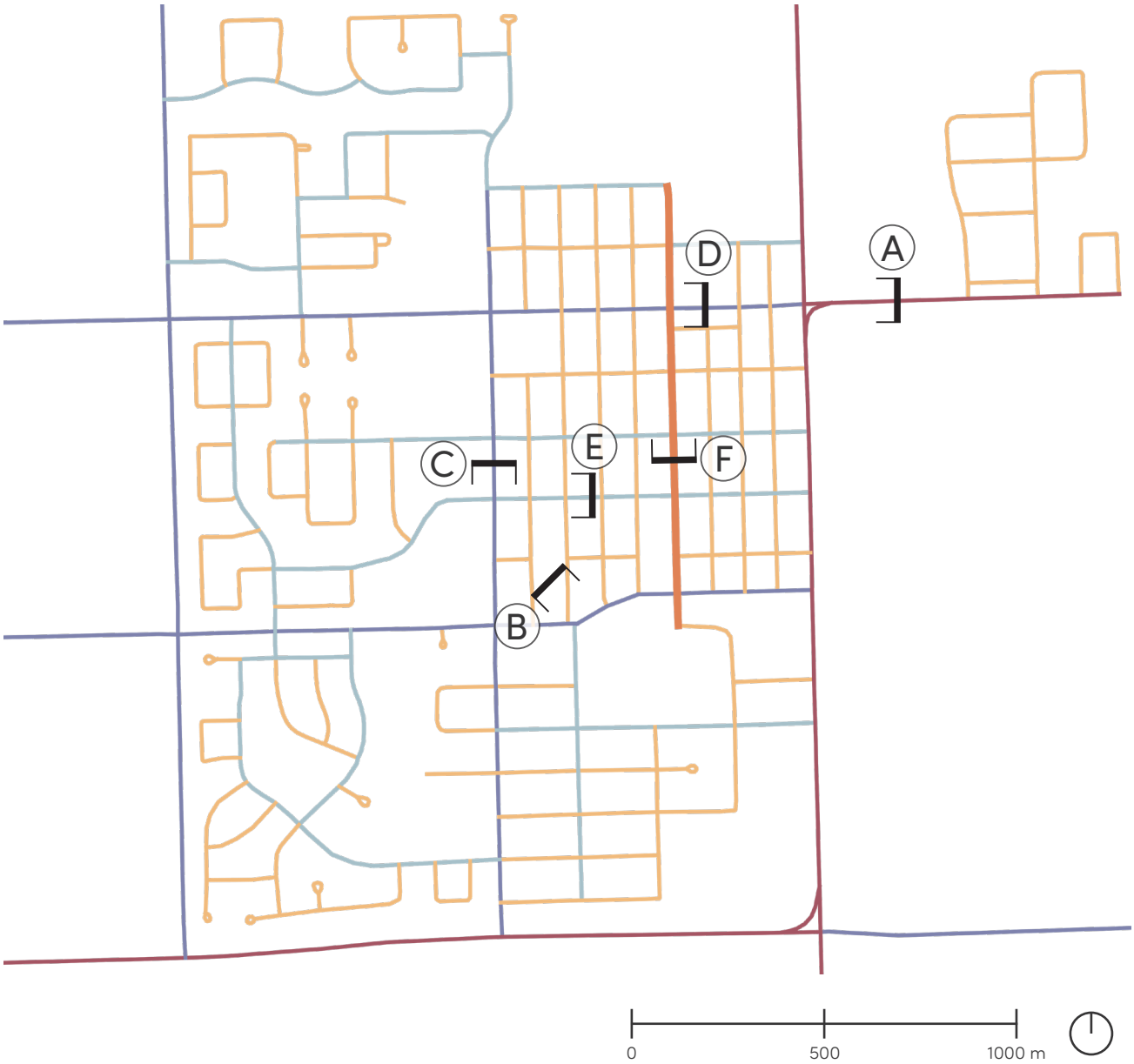
Highways flank Stonewalls eastern and southern edges and are often wide, and treeless. The highways have no active transportation infrastructure and instead offer the shoulder to pedestrians or cyclists. Drainage ditches line at least one side of the highway in most locations. The setback for the few highways commercial buildings is very far away from the road, to make room for car parking. This road type is dominated by automobiles.

Collector Streets interface with highways, to allow traffic flow into the town and get to local streets, or main street. The width of collectors are wide, with large setbacks. Similar to the highways, drainage is accommodated by a ditch on at least one side of the collector. Though some of the collector streets within Stonewall have small sidewalks, there is minimal infrastructure to accommodate cyclists. The planting on collector streets is organized in locations adjacent to parks but is otherwise influenced by vegetation on private property.

Local Streets are quiet and have a smaller right of way than collector streets. Less through traffic is experienced on local streets. No local streets have sidewalks. Their width allows for parking, and for pedestrians to walk comfortably on the road. Local streets are lined with housing, and yard spaces. The canopy of local streets is defined by private trees, often with an expansive street canopy. The drainage on local streets is pushed towards collector streets though surface drainage.

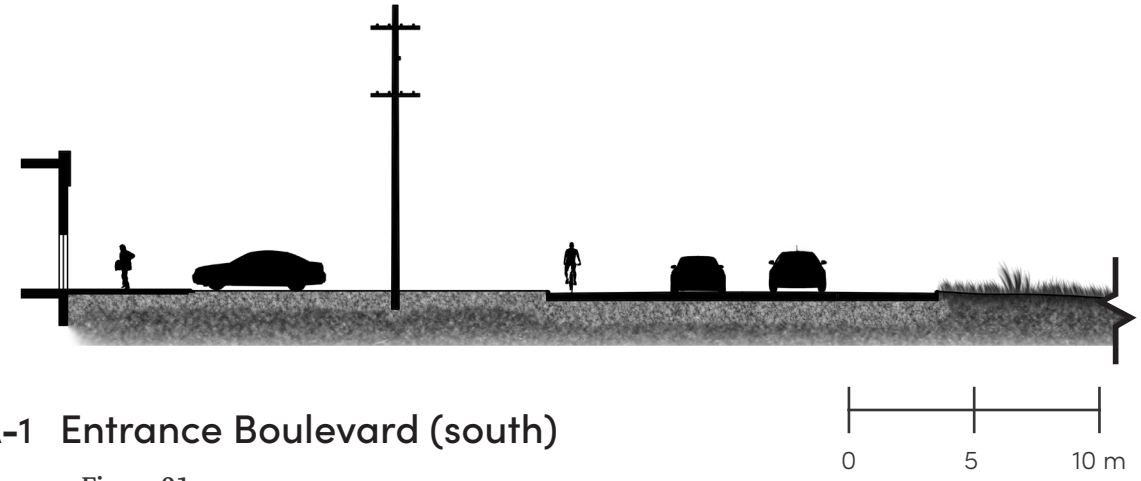
Dedicated sidewalks and pathways within town are limited, however, the former CPR railways right of way has been transformed into an active transportation pathway. This pathway swoops through town and creates a curve that connects both ends of Main Street. The pathway is 3 meters wide and elevated on the former railway bed, often featuring ditches on both sides. There are parts, where vegetation has taken over the ditches to create a mini linear forest. The pathway is fronted by residential backyards in some places, and adjacent to a collector road in others.

Main street is distinct due to its historical influence on the town, but also because it is the main commercial centre for the town. The street is flanked by small commercial buildings. Many of these buildings are built to the property lines, while others are fronted by large parking lots and setbacks. Main Street has 3-metre sidewalks throughout its length with the remainder of the streets space being allocated to car traffic and parking. Some portions of main street have street trees, creating a pleasant, and shade-filled atmosphere. The drainage on Main Street



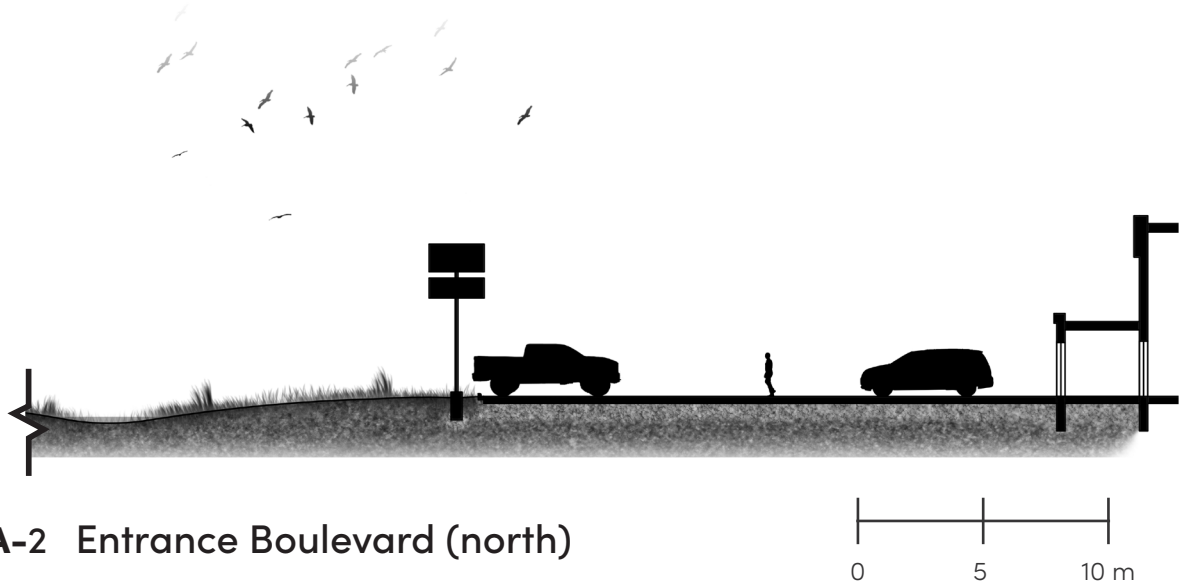
favours a southwest direction, emptying onto arterial streets, mostly towards the west and south towards Veterans Memorial Park. Observations from multiple site visits always saw people walking on main street and engaging with its businesses, showing that it is still an active and used space. Main Street's versatility exists because of its commercial buildings. To understand the relationship of Main Street's buildings to other buildings in town, it is necessary to review the towns overlaying zoning regime and the resulting form and function of its buildings.

Map 40
Road hierarchy within Stonewall. As categorized by the National Road Network database, stonewall has 4 classes of roads. Highway, Ramp, Collector and Street. This categorization is based on the qualities of the road itself from a functional perspective. GIS Map.



A-1 Entrance Boulevard (south)

Figure 91
Section of HWY 67 just before 4th Street East. four lanes, two shoulder lanes. No sidewalks. Drainage is pushed to ditches.

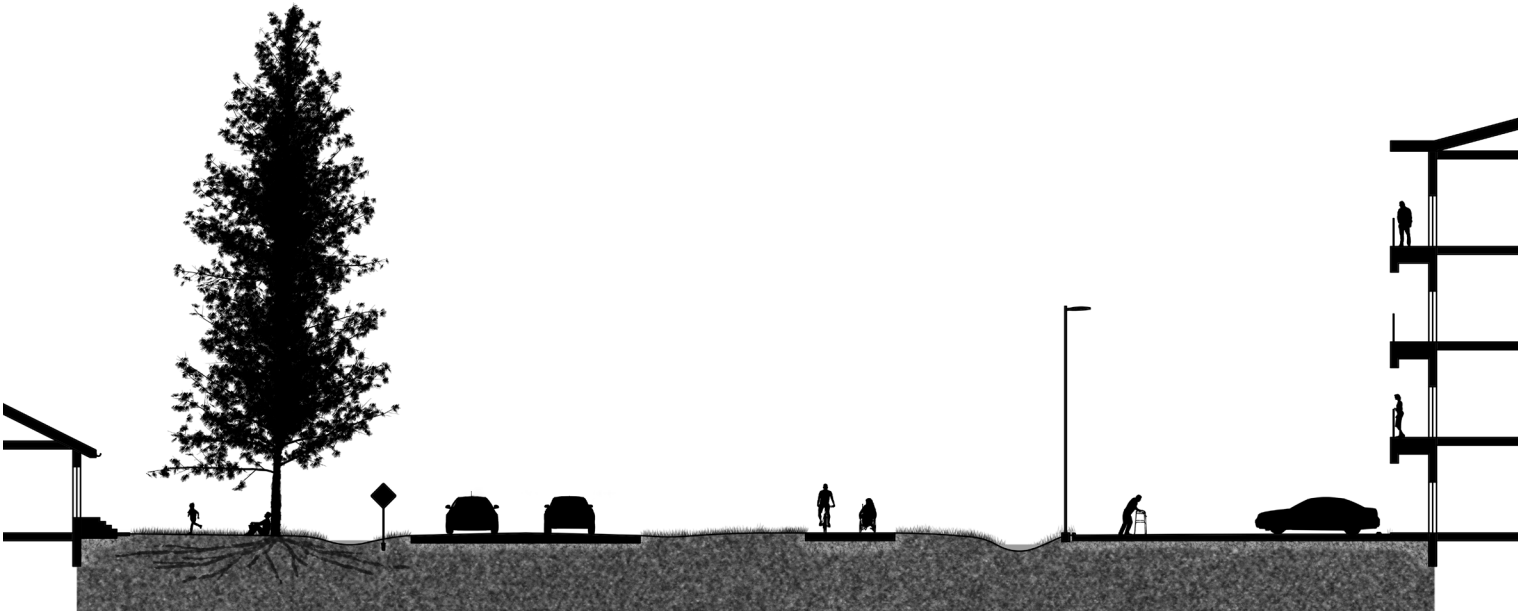


A-2 Entrance Boulevard (north)



B Active transport trail

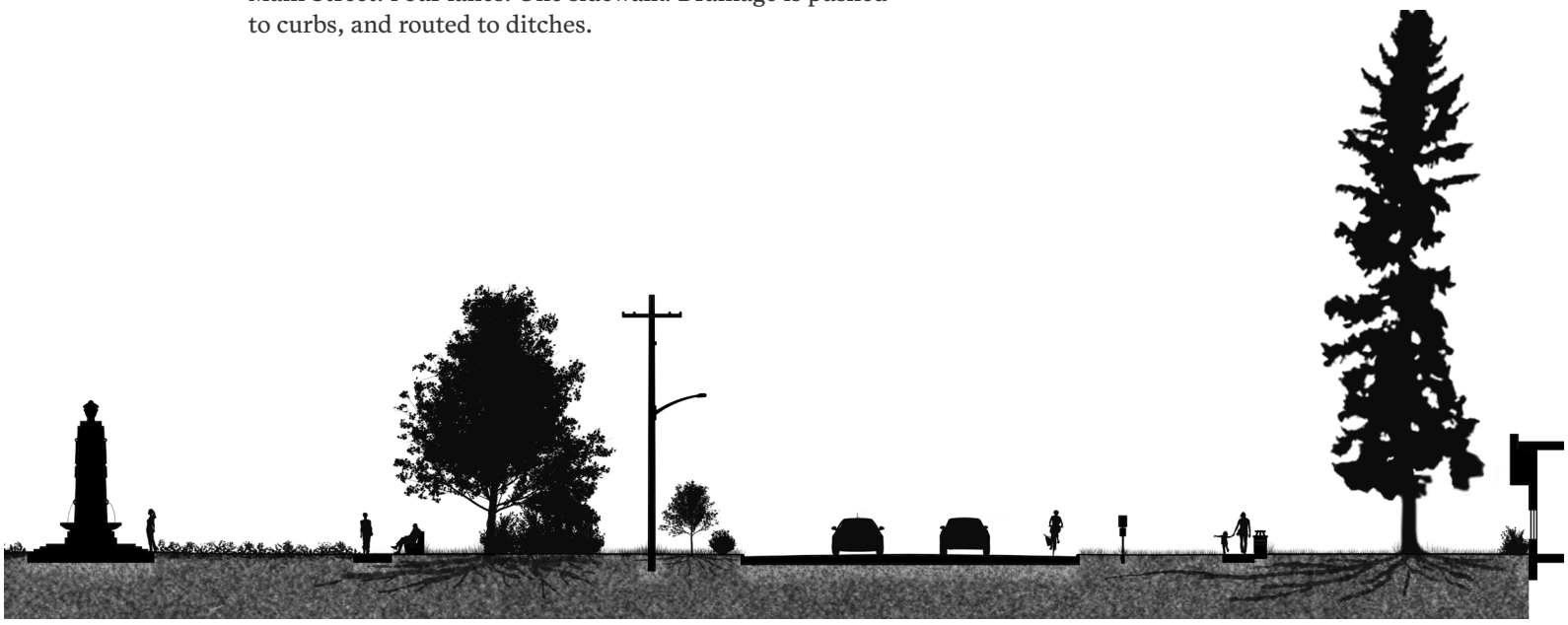
Figure 92
Section of active transportation trail between 3rd Street West and 4th street west. 3 m wide, paved path. Drainage is pushed to adjacent ditches.



C Grand Boulevard



Figure 93
Section of 2nd avenue north between 2nd street east and Main Street. Four lanes. One sidewalk. Drainage is pushed to curbs, and routed to ditches.



D High Boulevard



Figure 94
Section of 5th Street West between Centre Avenue and 1st Avenue south. One sidewalk. Drainage is pushed to ditches.

Avenues and Main Street

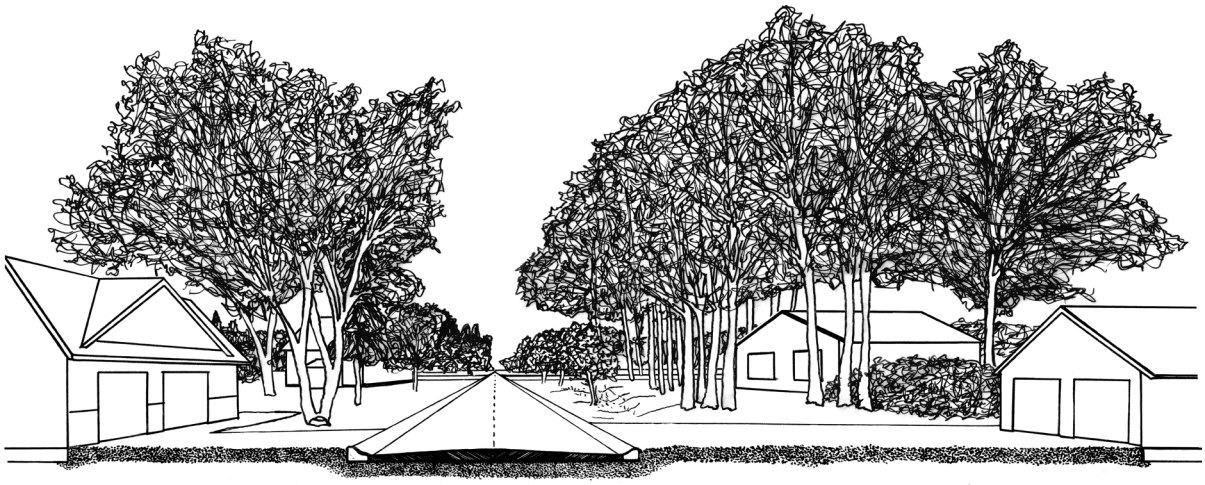
Zooming into the southern portion of Main Street and its peripheries, between Centre Avenue and 3rd Avenue South, a more refined view of the spatial configuration is available. Breaking down the space into its components allows for an isolated view of each component. This inventory breaks Main Street into two categories: hardscape and softscape. These are further divided into their defining parts. Hardscapes include the roads, the sidewalks, paved areas (parking lots, gravel lots, driveways, private pathways) and building footprints. The softscape includes all green areas captured – both public and private, as well as the canopy cover of the area. All combined, these parts create a spatial map of main street, and its interaction with the surrounding streets. To understand the on the ground conditions of main street, a SWOT analysis was undertaken. This was paired with a series of maps to provide visual cues and help determine where design moves may be needed.



Figure 95
Looking east down 1st Avenue south, towards Main Street. Personal photograph. August 24, 2024.



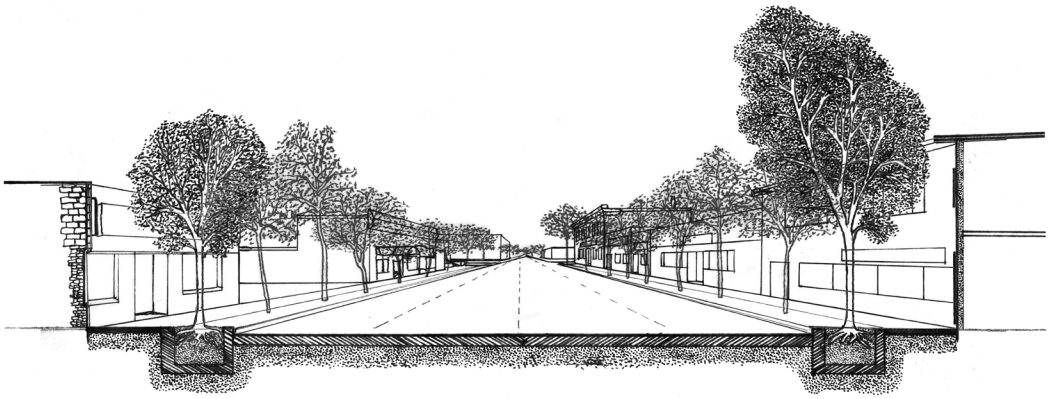
Figure 96
Looking south down Main Street, from Centre Avenue. Personal photograph. September 11, 2024.



E - Avenue

0 5 10 m

Figure 97
Section of 1st Ave South. Road width, 8 m, ROW width, 20 m. 4 lanes, two parking lanes. No sidewalks. Drainage is pushed to curbs, and routed down adjacent streets to ditches. Hand drawn ink sketch image made by author.



F - Main Street

0 5 10 m

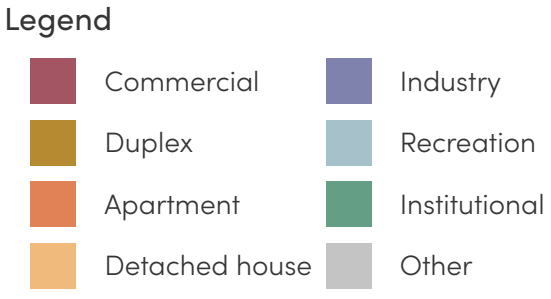
Figure 98
Section of Main Street between Centre Avenue and 1st Ave South. Road width 17 m, ROW width 23 m. 4 lanes, 2 parking lanes. 3 m sidewalks on both sides. Drainage is pushed to curbs, and routed down adjacent streets to ditches.


Density pocket
Recreation
Industrial
Density pocket
Main Street
School
HWY commercial
Schools
Eldercare
Density pocket
Density pocket
Density pocket
Eldercare
Main Street Commercial
Hospital
Main Street commercial leg
Recreation
Density pocket
0
250
500 m

Built form and Zoning

The function of buildings in Stonewall can be divided into two broad categories: Residential, and amenities (including commercial, industry / employment, recreational and institutional uses).
The residential buildings are predominantly single-family houses. A handful of duplex units and apartments have been added in recent years. These multifamily units are complimented by assisted -living facilities for older people, and two retirement communities. The location of multifamily housing has formed pockets of density throughout the town. There is very few residential units on the commercial portion of Main Street, with a handful of second floor apartments in a few buildings.
The amenities within town form two main pockets and are surrounded by institutional uses. The northeast pocket is defined by the entrance of the main highway and the commercial uses that it has attracted. This commercial zone overlaps with the towns industrial district. The other pocket is main street, and its southern leg. Main Street is defined by commercial uses, and some office uses.

Civic buildings like the town hall, and regional library are located along main street. The street also hosts many day-to-day needs like hairdressers, bakeries, specialty stores, grocery stores and more. The southern portion of main street is where the train station used to be. This space has become a strip mall, host to a big box hardware store, Grocer, and a gas station. North of Main Street is the regional elementary school, as well as quarry park, and its interpretive / event centre. Quarry park is home to sports fields, a swimming hole and a campsite. To the south of Main Street is the Veterans' Memorial park, and its arena and community centre. This park is home to soccer fields and hosts soccer tournaments. West of Main Street are the regional hospital, seniors housing, the high school and the middle school. Stonewall has a healthy stock of amenities; all located within walking distance of main street. The placement of amenities on larger plots of land allows for them to be expanded in the future as needed. The amenities and main street are connected to each other by the curved active transportation pathway, providing multiple circulation options between main street and the surround amenities.



Map 41 (top left)
Housing typologies within Stonewall.
GIS map.



ANALYSIS

2020 Stonewall Growth Report

Land-use analysis

Scenario Design

SWOT analysis

Figure 99 (left)
Moss growing on limestone in Quarry Park.
Personal photograph. September 11, 2024.

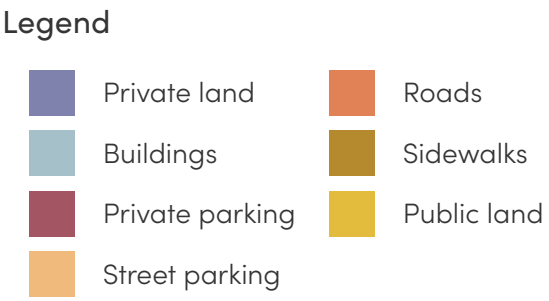
Landuse Analysis

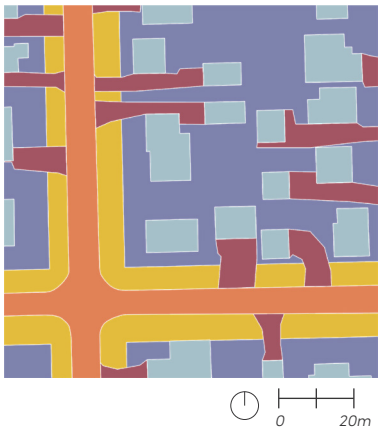
To gain an understanding of the average land use throughout town, a study was undertaken using QGIS. The analysis takes a randomized grid, that captures both residential and commercial areas. Using 15 grids, the analysis determines each grids makeup, using the categories: public land, roads, sidewalks, private parking, buildings and private land. The analysis also determines the average on-street parking available.

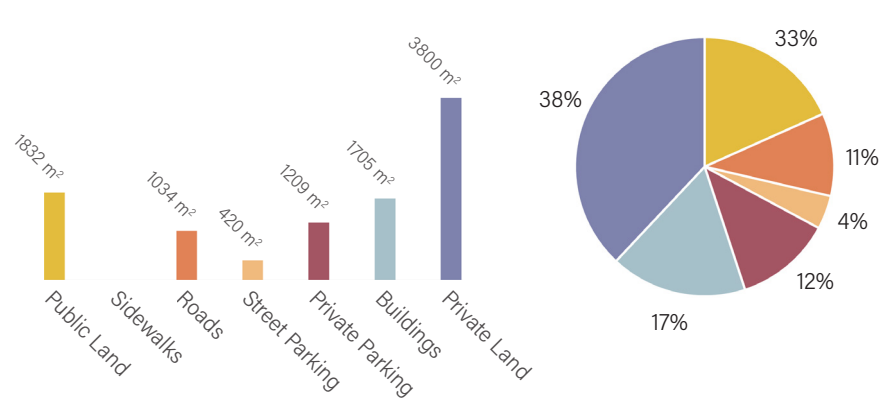
The total average landuse demonstrates that the largest portion of space is allocated to private property, in the form of yard space, and private green space. This represents 42% of the total area analyzed. 24% of the total area is allocated to cars, and parking areas. Overlapping this figure, public space represents 27% of the total area analyzed. The overlap being that 44 % of the total public space in town is allocated to cars.

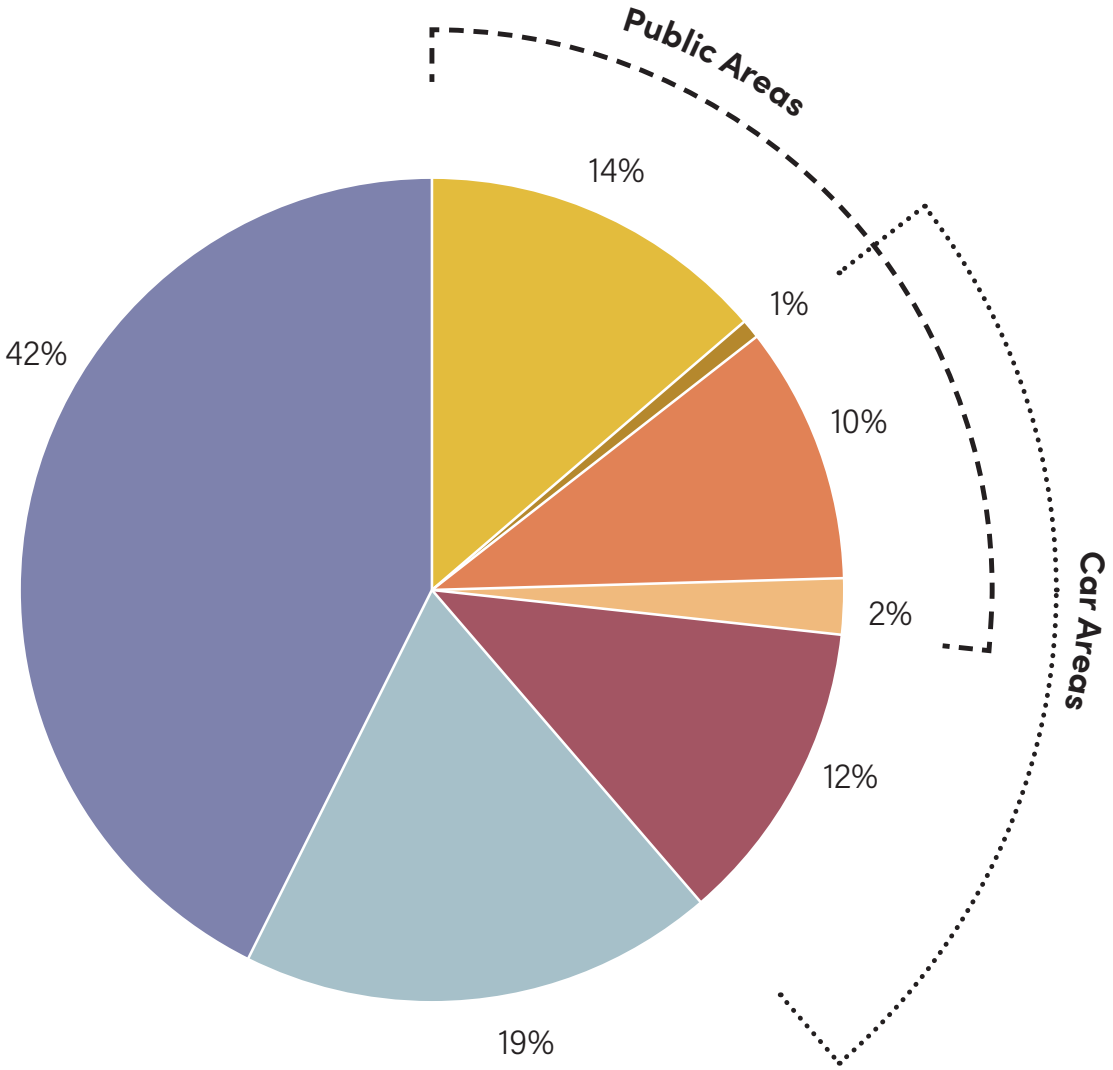
Figure 100 (below)
Sample study from the landuse analysis, depicting the makeup of Grid 10.

Figure 101
Diagram representing the total average landuse of all 15 grids.









Total Average Landuse

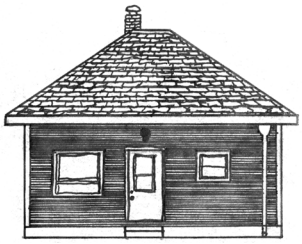
Building form and select Inventory and analysis

To strengthen this review, an inventory of selected housing and commercial buildings was undertaken. This allows for a detailed look at a variety of facades, and materials, and is paired with information on the buildings age, use, dwelling numbers, and overall density when compared to the plot of land it resides on.

The building typology demonstrates the material variety of Stonewalls buildings, and their variation in form. The houses reviewed demonstrate a local architectural language, with both fine and poor materials. Some of the houses are constructed with local stone, giving a permanent feel, while others are still grand in their use of timber. Newer houses tend to be sided with vinyl siding or stucco. The apartment building featured is made of brick siding. The commercial buildings demonstrate the use of stone within larger buildings. On Main Street, three of these stone buildings meet making a prominent corner. The remaining buildings that are not made of stone display a versatility in style, and a variety in storefront design. The building form in Stonewall is dominated by single family houses. Some outlaying pockets existing, and of these pockets, Main Street is the most important, and this is reflected in its unique form.

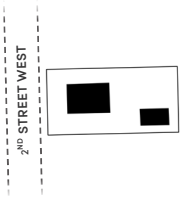
Figure 102 (pages -169-173)
A housing form study consisting of elevations, site plans and building details. Details estimated by author, ink images drawn by author.





ELEVATION

0 2 4 m



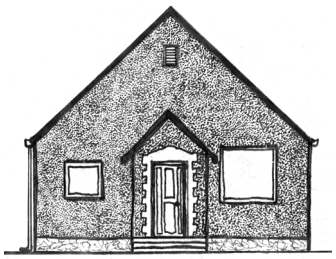
LOT PLAN

0 10 20 m

A) 284 3rd Street East

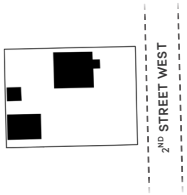
Units: *1*
Building footprint: *69.7 m²*
Estimated square footage: *139.4 m²*
Estimated parking: *4 spaces - 1 car garage*

Floors: *1 + Basement*
Lot size: *1141.1 m²*
FAR: *12%*



ELEVATION

0 2 4 m



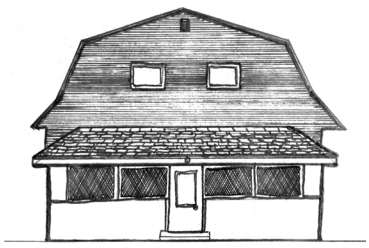
LOT PLAN

0 10 20 m

B) 337 3rd Street East

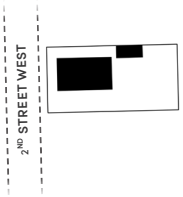
Units: *1*
Building footprint: *81.1 m²*
Estimated square footage: *162.2 m²*
Estimated parking: *5 spaces - 1 car garage*

Floors: *1 + Basement*
Lot size: *1712.0 m²*
FAR: *9%*



ELEVATION

0 2 4 m



LOT PLAN

0 10 20 m

C) 364 1st Street East

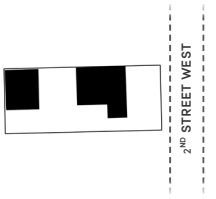
Units: *1*
Building footprint: *98.6 m²*
Estimated square footage: *295.8 m²*
Estimated parking: *6 spaces - 1 car garage*

Floors: *2 + Basement*
Lot size: *1140.3 m²*
FAR: *26%*



ELEVATION

0 2 4 m



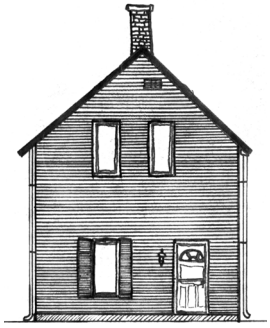
LOT PLAN

0 10 20 m

D) 441 2nd Street West

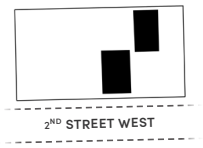
Units: *1*
Building footprint: *118.6 m²*
Estimated square footage: *237.2 m²*
Estimated parking: *5 spaces - 2 car garage*

Floors: *1 + Basement*
Lot size: *1366.7 m²*
FAR: *17%*



ELEVATION

0 2 4 m



LOT PLAN

0 10 20 m

E) 317 Centre Avenue

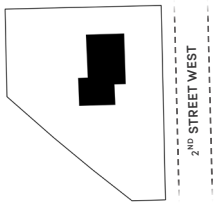
Units: *1*
Building footprint: *68.3 m²*
Estimated square footage: *204.9 m²*
Estimated parking: *5 spaces - 1 car garage*

Floors: *2 + Basement*
Lot size: *2049.7 m²*
FAR: *9%*



ELEVATION

0 2 4 m



LOT PLAN

0 10 20 m

F) 459 3rd Street West

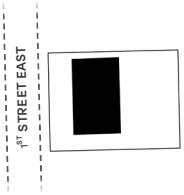
Units: *1*
Building footprint: *150.88 m²*
Estimated square footage: *301.76 m²*
Estimated parking: *3 spaces - attached 1 car garage*

Floors: *1 + basement*
Lot size: *3227.97 m²*
FAR: *9%*



ELEVATION

0 2 4 m



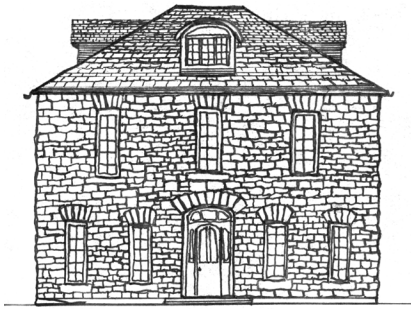
LOT PLAN

0 10 20 m

G) 467 A&B 1st Street East

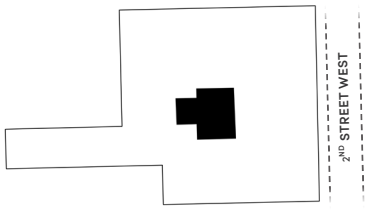
Units: *2 (duplex)*
Building footprint: *198.7 m²*
Estimated square footage: *397.4 m²*
Estimated parking: *6 spaces*

Floors: *1 + Basement*
Lot size: *1705.6 m²*
FAR: *23%*



ELEVATION

0 2 4 m



LOT PLAN

0 10 20 m

H) 263 2nd Street West

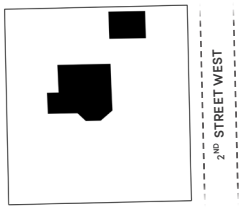
Units: *1*
Building footprint: *138.39 m²*
Estimated square footage: *500 m²*
Estimated parking: *5 spaces - no garage*

Floors: *2.5 + Basement*
Lot size: *5572.4 m²*
FAR: *9%*



ELEVATION

0 2 4 m



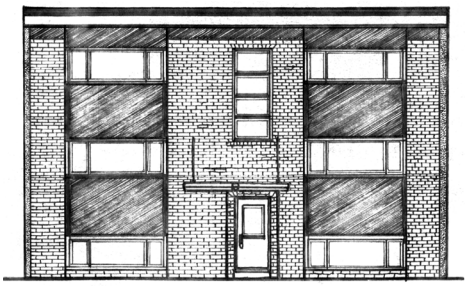
LOT PLAN

0 10 20 m

I) 289 2nd Street West

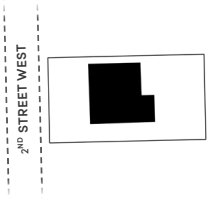
Units: *1*
Building footprint: *167.1 m²*
Estimated square footage: *668.4 m²*
Estimated parking: *6 spaces - 1 car garage*

Floors: *3 + Basement*
Lot size: *4821.6 m²*
FAR: *13%*



ELEVATION

0 2 4m



LOT PLAN

0 10 20m

J) 318 2nd Street West

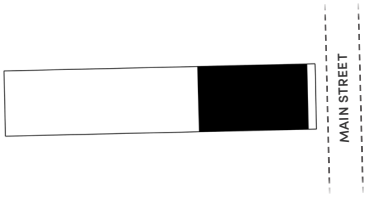
Units: *6 (apartments)*
Building footprint: *190.6 m²*
Estimated square footage: *571.8 m²*
Estimated parking: *6 spaces - no garage*

Floors: *3*
Lot size: *1768.4 m²*
FAR: *32%*



ELEVATION

0 2 4m



LOT PLAN

0 10 20m

K) 345 Main Street

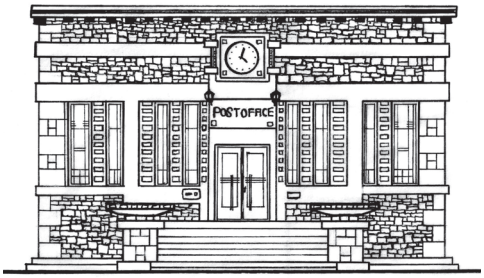
Quarry Stonewall Dental Centre, Chad Sheppard Accountant

Commercial unit on first floor, office or above.

Built: 1904

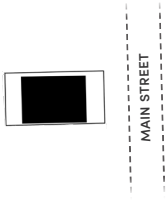
Commercial Units: *2*
Building footprint: 394.5 m²
Estimated square footage: *1,183.5*

Floors: *2 + Basement*
Lot size: 2720.4 m²
FAR: *43%*



ELEVATION

0 2 4m



LOT PLAN

0 10 20m

L) 357 Main Street

Event Centre.

Former post office, Library.

Built: 1914-1915
Architect: *Francis Conroy Sullivan*

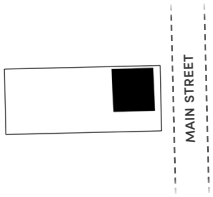
Commercial Units: *1*
Building footprint: 165.2 m²
Estimated square footage: *330.4*

Floors: *1 + Basement*
Lot size: *686.7 m²*
FAR: *48%*



ELEVATION

0 2 4m



LOT PLAN

0 10 20m

M) 407 Main Street

Florist / Thrift store.

Built: Unknown

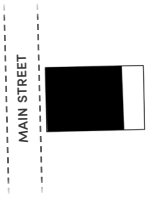
Commercial Units: *1*
Building footprint: 98.7 m²
Estimated square footage: *197.4*

Floors: *1 + Basement*
Lot size: *1362.8 m²*
FAR: *14%*



ELEVATION

0 2 4m



LOT PLAN

0 10 20m

N) 332 Main Street

Sig's Grill / Coffee Shop

Built: *Unknown*

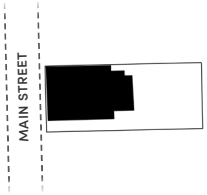
Commercial Units: *1 + office or residence above*
Building footprint: 268.6 m²
Estimated square footage: *805.8*

Floors: *2 + Basement*
Lot size: *840.6 m²*
FAR: *95%*



ELEVATION

0 2 4m



LOT PLAN

0 10 20m

O) 356 Main Street

CIBC Bank

Built: *1912*

Commercial Units: *1 + offices above.*
Building footprint: 239.7 m²
Estimated square footage: *719.1*

Floors: *2 + Basement*
Lot size: *1380.4 m²*
FAR: *52%*

Density Analysis

To get an estimate of the residential density within Stonewall, an analysis of was undertaken in QGIS. The analysis uses the unit of a block to gain an understanding of density, and the existing makeup of residential blocks. The analysis breaks the block into four key parts: buildings, private paved areas, private green areas, and public green areas. Seven blocks were modeled and analyzed. Using the total average floor space of each dwelling, in relation to the total area of the block, an average density of each block was estimated. Using averages from census data, each block is able to be given an estimated population. This population can help predict the estimated demand of parking for each household in the block. Including garage spaces, the estimate also provides the total parking capacity of each block.

The analysis confirms that the predominant residential building form within Stonewall is single family housing. These dwellings almost all have attached parking, and/or driveway parking. On average, each dwelling is about one floor, with a basement. When taken together, the analysis shows that on average, each block has a density of 12 dwellings per hectare. This is accompanied by a total average floor area ration of 42% among the blocks examined. The average number of people per block is 33 people. The total average residential parking demand per block is 27 cars, while each block is built to accommodate 76 parking spaces.

This inventory confirms that the allocation of space within town is heavily influenced by automobiles. This is reflected in the residential density. This analysis calls into question the current allocation of space to cars, and the existing built form.

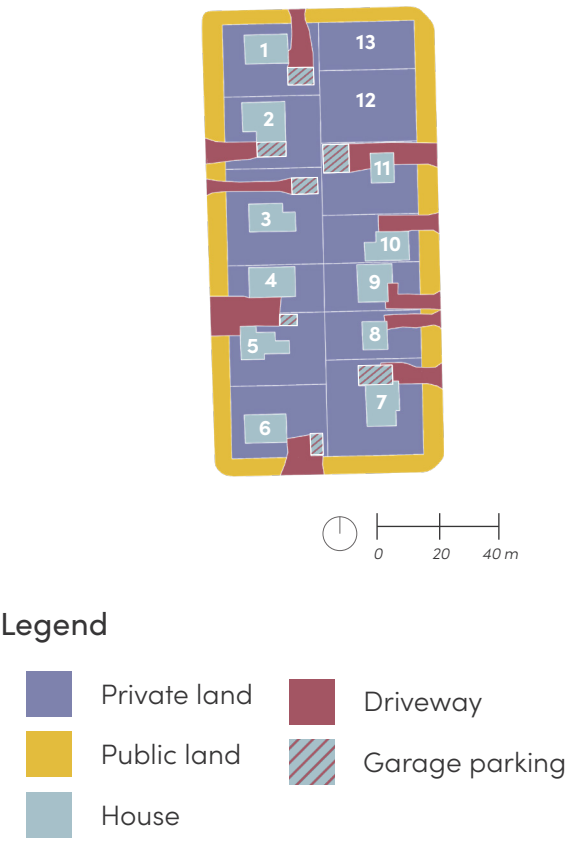


Figure 103 (above)
Sample block from the density analysis, depicting the use of space and the allocation of parking.

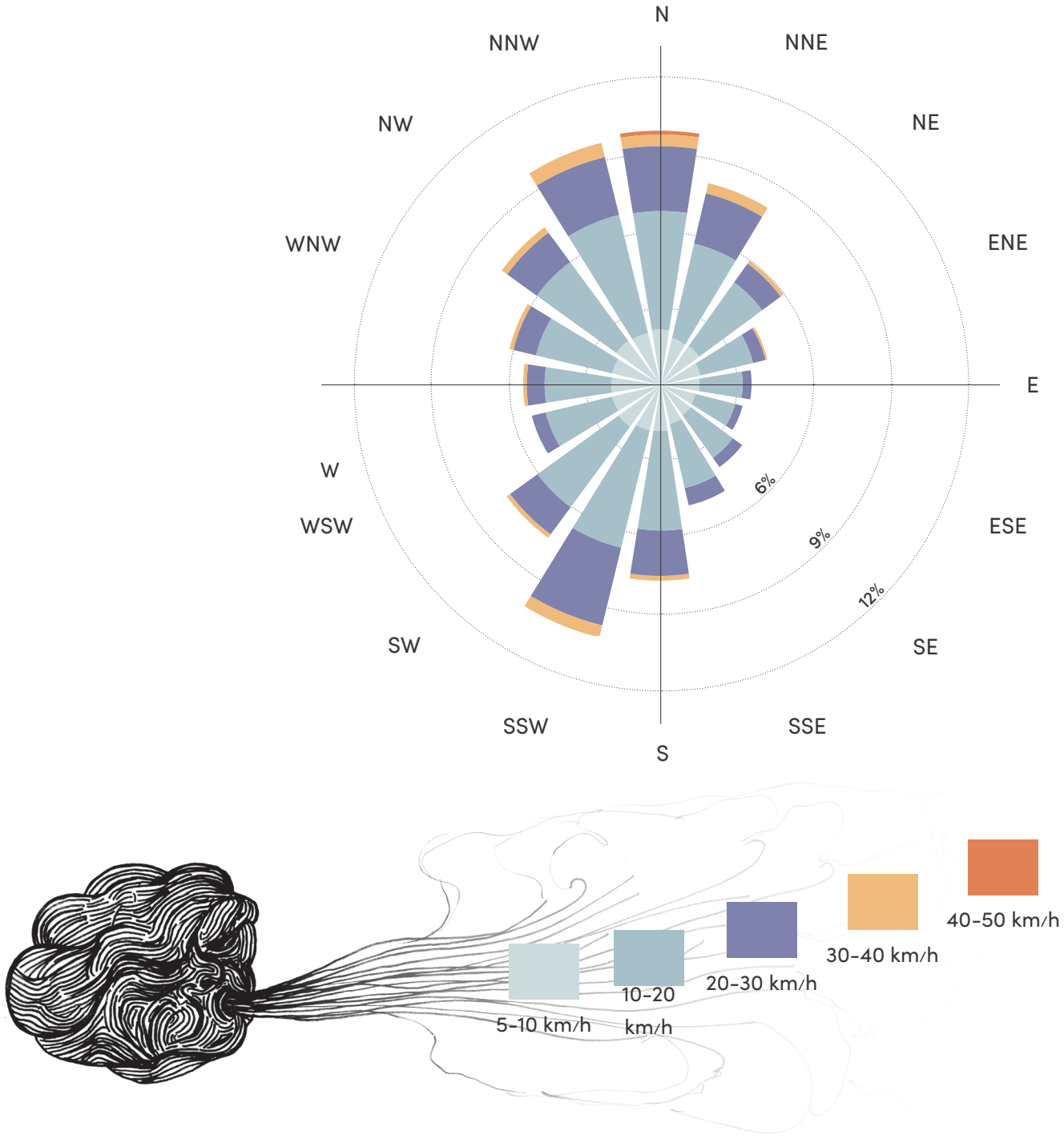
Climate over time

To further ascertain the spatial conditions of Stonewall, a review of the sun wind and climate is needed. Analysis of the seasonal sun paths allows for an understanding of where shadows or excess sunlight will be cast. In Stonewall, the sun is cast from the south, with a lower angle in the wintertime. This allows for Main Street to experience ample sunlight during daytime hours, while providing more shade to east-west avenues.[201]

The wind direction within Stonewall averages from the north / north-northwest and the south-southeast. The wind speeds are highest from the northernly winds.[202]

Stonewalls experiences a seasonal climate cycle, with a definable Winter, Spring, Summer and Fall season. In winters the average low temperature is around -20 degrees. In the summer, the average high is about 25 degrees.[203] The town experiences more precipitation in the summer season, particularly from May until October. In winter, the landscape is defined by snow. The average climate patterns tie the everyday climatic experience in Stonewall back to the regional climatic patterns discussed in the palimpsest.

Figure 104 (below)
Wind rose for Stonewall Manitoba. Diagram adapted from Simulated historical climate & weather data for Stonewall, Meteoblue.com. accessed June 25, 2025.
CC BY-NC
Cloud drawn by author.



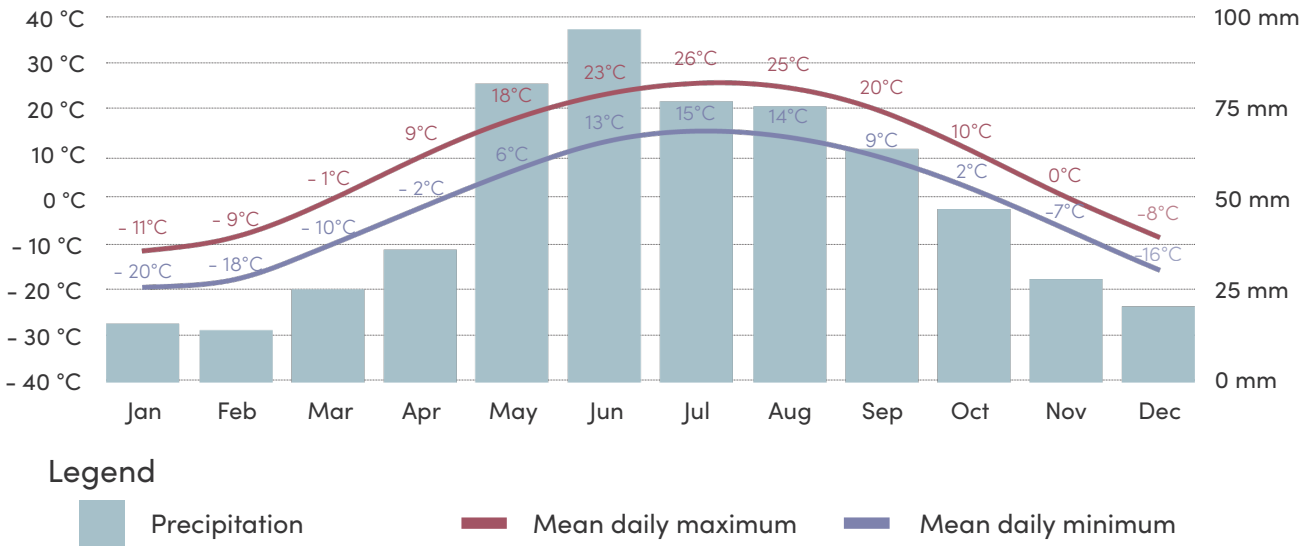
Conclusion - Built Form Analysis

Stonewall's development over time was influenced by transportation patterns, going from a dense transit served community, to a sprawling car served town with suburban fringes. This suburban growth continues to this day. The roads in Stonewall are reflective of both automobile traffic and the drainage regime within town. The roads often have a poor interaction with their surroundings and are accompanied by few active transportation options. The former path of the CPR has created a substantial and beautiful active transportation link throughout the town, and Main street stands out as a significant street with a diversity of interaction to its surroundings.

The functional typology of the towns buildings reveals the influence of Main Street, and the predominance of single-family houses. Pockets of residential density exist, but not on Main Street. The towns most prominent form of building is detached housing and garages. This is followed by large and small detached commercial buildings, mostly on Main Street. The building inventory provided a glimpse of the materials and forms in use and highlighted a number of historic buildings on Main Street. Due to the diversity of form, and its perennial quality within the town, its is necessary to include the nuanced spatial conditions of Main Street in any plan for Stonewall's future growth.

Figure 105 (below)
Simulated historical climate & weather data for Stonewall, Meteoblue.com. Accessed June,2025. CC BY-NC

Figure 106 (bottom right)
Chart demonstrating the historical population growth of Stonewall, alongside the trajectory of potential growth, as laid out in the growth report. Adapted from Town of Stonewall, "Supply & Demand Study – Residential Lands



2020 Supply and Demand Study

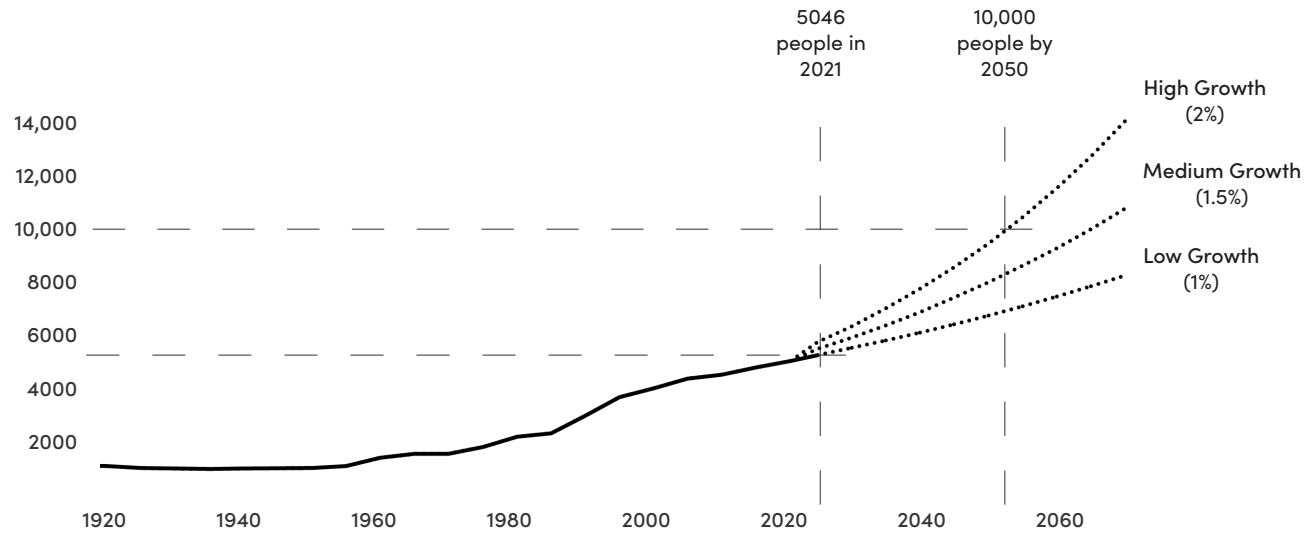
In 2020, the Town of Stonewall commissioned a growth report. The purpose of this report was to explore how Stonewall could grow over the next 50 years.[204] By laying out three potential population scenarios the report was able to determine the potential future housing needs of Stonewall. Based on these potential timelines, the report lays out how much housing will be needed in 10-year intervals, for each scenario.

The report assumes that infill within Stonewall would occur on 217 identified vacant lots within the towns limits. In addition to these lots, the report also identified 836 potential units on greenfield sites. The report includes a marginal number of multifamily units within their assumptions, at 230 units. All together, they identified 1283 potential units within the town.[205]

Using this count of potential units, they predicted when the available housing stock within Stonewall will be depleted. The report's findings show that under a high growth scenario, Stonewall will have a deficit of 427 units by 2050, increasing to a deficit of 2124 units by 2070.[206] To accommodate this growth, the report finishes by recommending that Stonewall increase its town boundaries. Specifically, by acquiring additional land on the town's peripheries to alleviate the predicted future housing deficit. The report states that:

> *"At an average yield of four lots per gross acre of land [10 units a hectare], the approximately 531 additional acres [215 hectares] would be required to accommodate a projected need for 2,124 dwelling units"*[207]
>
> — Town of Stonewall Supply and Demand Study

Stonewall took the advice of the report, and legally expanded its boundaries in 2024, annexing 314 hectares of land to expand the town through residential and commercial growth.



Issues with the report's recommendations

The population numbers from the report are not solid, and there is no consideration of population wildcards, such as increased migration in the region. The report also makes little mention of alleviating the demographic issues, other than acknowledging they exist.
The report assumes that development will occur at a very low density of 10 units per hectare. This density is lower than the existing average yield of 12 dwellings per hectare that was found in the block analysis covered previously in this document. The Stonewall report also assumes that green fields and vacant lots will be filled with single-family dwellings, with little consideration for denser developments, or other housing alternatives.

By advocating for further sprawl, the report's recommendations would push development away from Main Street by creating new commercial centres on the edges of town. This would encourage less walkable, more car centric neighborhoods, further away from the heart of town. Expanding the footprint of the town in this inefficient manner also greatly increases the maintenance and budgetary burden for Stonewall.
The resulting recommendations, if undertaken, would sprawl out Stonewall's infrastructure and amenities to the edges of town. This would create a costly maintenance deficit and decrease the towns walkability. This form of growth would impede Stonewall's ability to adapt to aging populations, limit the diversity of new housing, and mitigate the impacts of climate change.

This density assumption skews the report and makes the required dwelling number

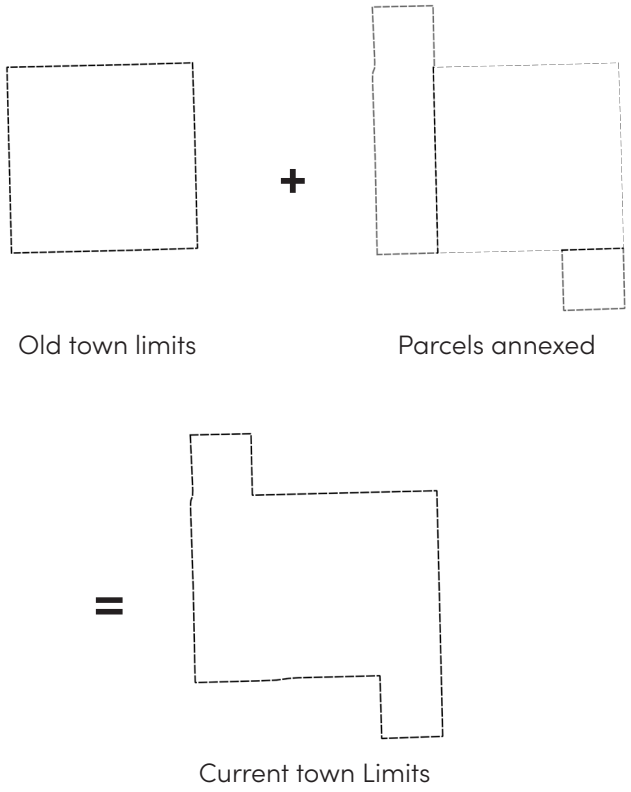
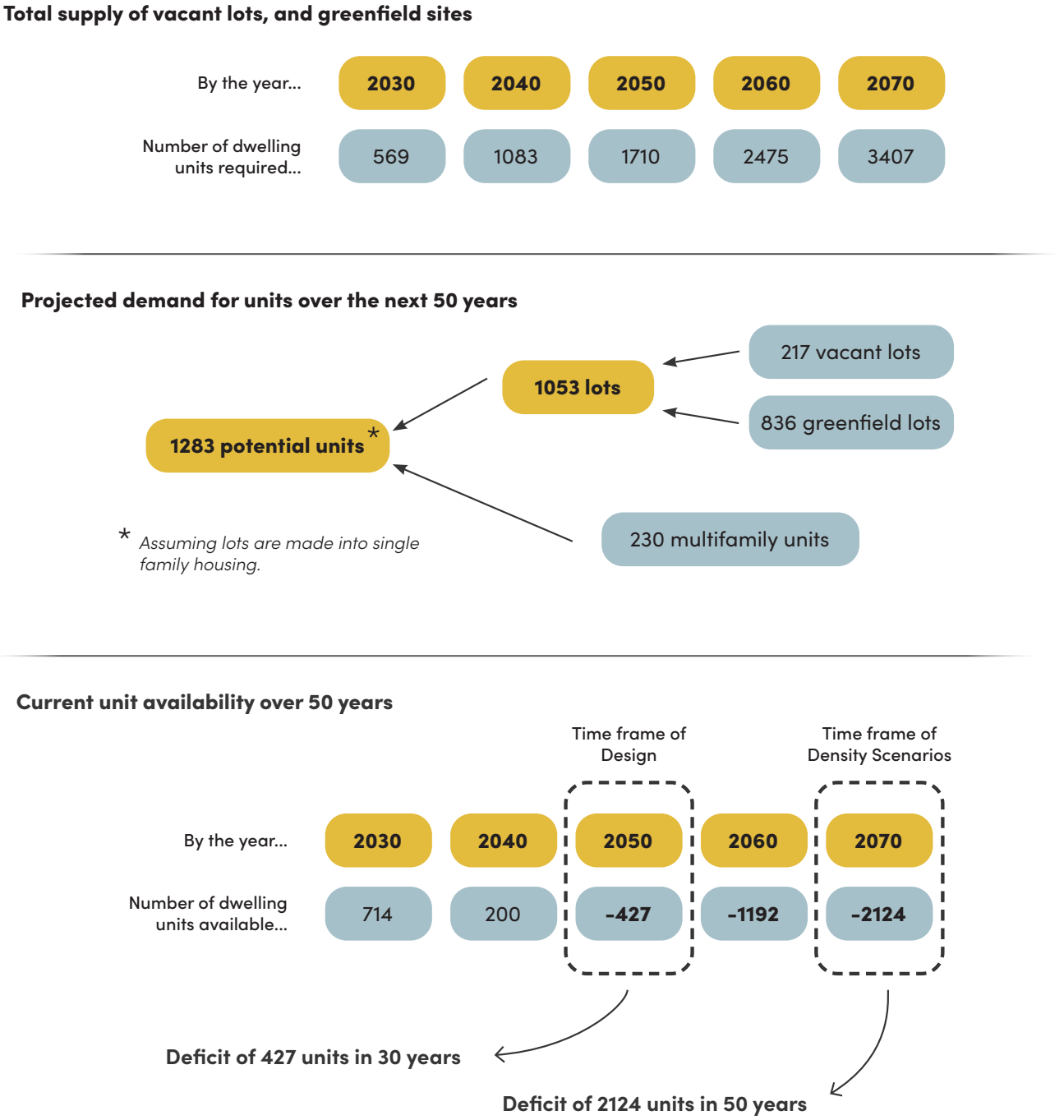


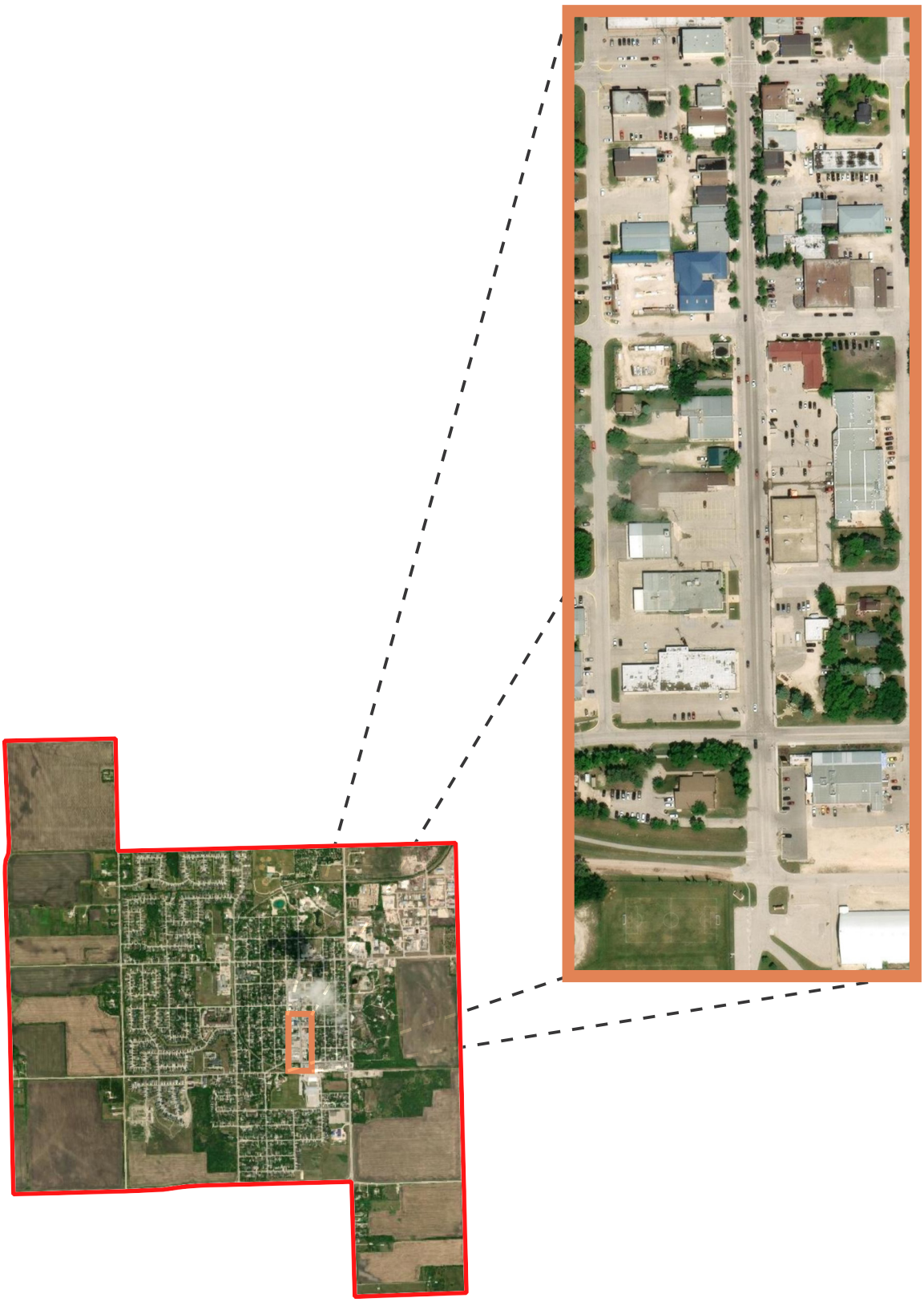
Figure 107 (above)
Diagram of Stonewalls urban footprint expansion.

of 2124 more daunting than it is. The report could have provided a different approach, looking at different forms of density within the traditional town boundaries, and providing insight into how infill could be undertaken to achieve the 2124 unit deficit, while avoiding suburban development.
However, the town has a major strength in its footprint, where most residents are 15 minutes away from Main Street. This is bolstered by the centralization of most amenities on or adjacent to Main Street. By focusing design on Main Street, there will be impacts and benefits not only for the town, but the whole adjacent region as well. Main street provides an excellent frame for future



growth within Stonewall. A larger vision is needed to understand the potential for redevelopment within Stonewall. With Main Street as an existing focal point, there is potential that it could accommodate these growth goals, while also achieving solutions to demographic, and climatic issues. To understand the existing conditions on main street, a closer analysis is required.

Figure 108 (right)
Diagram adapted from the Stonewall Growth Report, demonstrating the project deficit of units over the next 50 years. Adapted from Town of Stonewall, "Supply & Demand Study – Residential Lands



Main Street SWOT Analysis - Introduction

This analysis focuses on the strengths, weaknesses, opportunities, and threats that are faced by selection of Stonewall's Main Street blocks. Each area of analysis focuses on five categories: Services / Amenities / Employment, Urban Form, Housing / Density, Green / Natural Space, and Social Function / Character. Each of these categories are rooted back to the town's key problems of demographics, population, and climate change. The end of each area of analysis has a summary reflecting the findings.

Map 42 (left)
Map showing the site of the Main Street SWOT analysis. GIS map.

STRENGTHS

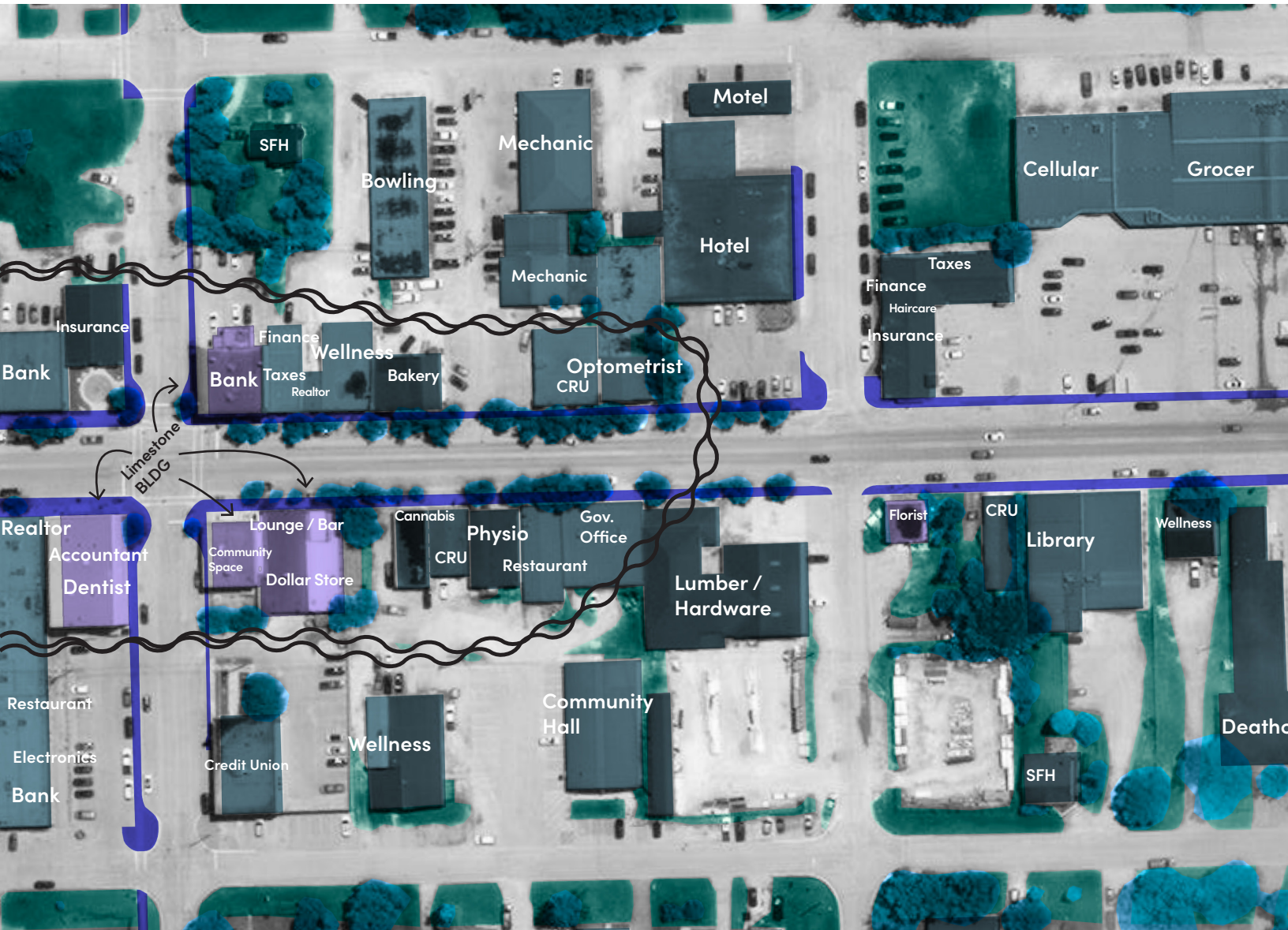
Services / amenities / employment:
Main street is home to many businesses, amenities and services. This includes restaurants, hair care, dental care facilities, legal offices, lounges/bars, a florist, grocers, a department store and many others. These services are located within a close distance of many residents and to each other. This allows for local employment, and local shopping. Many amenities and services are within walking distance of Main Street as well.

Urban form:
Many of the stores and buildings on main street are close together and have the classic tight-knit main street form. Some of these buildings reflect a high material quality, and elevated architectural design. At the intersection of Main Street and Centre Avenue, there are 4 heritage buildings, made of limestone beside each other, forming a sort of character zone. The wide footprint of Main Street allows room for festivals, markets and events.

Housing / Density:
The blocks surrounding the main street are full of single-family houses on large lots. The density on Main Street itself is higher in comparison, especially in the northern portion of the site. The buildings on Main Street are made of 1-2 story buildings.

Green / Natural Spaces:
The area surrounding Main Street is imbued with an expansive network of tree canopies. On Main Street there are a number of trees that frame local businesses on the northern section of the site. At the end of Main Street is a pocket park. There is also a connection to the active transportation trail, and Veterans Memorial Park at the south end of Main Street.

Function / Character:
There are a lot of businesses, many of them small and local, that provide a sense of identity and local culture to the town. These small businesses outnumber big box stores and strip malls. The sidewalks of Main Street already serve as a meeting place for the community, and a local hub for residents. At the end of Main Street,



a monument to Stonewall's 100th birthday sits in the pocket park. Main Street and the town are pleasant places to walk and enjoy nature. Being in a rural location, country life is close, with visible stars at night.

Reflection:
Main street embodies the classic form of a north American small town main street. It has portions of historic development that have been highlighted, that adds to the character of the town and makes for a charming urban fabric. This is added too by the diverse tree canopy surrounding it, and access to parking space at both ends of the street. With many events and festivals held on the street, there is a strong social function. Main street is well positioned to service many of the residents within town, with many existing amenities, like schools, sports facilities, and healthcare facilities within a stone's throw of the commercial strip. The character, and social function of Main Street align well with the WHO age in place criteria – specifically when it comes to outdoor space and civic engagement.

Map 43 (below)
Strengths, Main Street Scale. GIS map



WEAKNESSES

Services / amenities / employment:
Main street currently has several vacant store fronts, these create gaps in the activation of the street. The lumber yards at the corner of Main and 1st Avenue South take up prime real estate on the street and adjacent avenues. Many stores do not have perpendicular signs for pedestrians. The Royal Canadian Mounted Police station at the southwest end of Main Street inefficiently takes up a large plot in a prominent location, taking away from the classic main street feeling, and connection to Veterans Memorial Park.

Urban form:
The sidewalks on Main Street are small, averaging about 3 meters. When compared to the 4-lane footprint of the street, it makes the sidewalk experience feel isolated. This is made worse through inconsistent paving design and quality on the sidewalks. There are a handful of big box stores and strip malls on and around Main Street, these are fronted with parking lots. Empty lots on and around Main Street are also often used for both formal and informal parking. This is made more intense by many car-centric buildings, like mechanics, a gas station and a motel. Empty lots that are not used for parking are unprogrammed and desolate.

Housing / Density:
There are very few residential uses that share the same blocks as Main Street. With 6 single family dwellings and no apartments or other units / dwelling types available. This creates a housing vacuum on Main Street. The density of the buildings on and around main street is low at about 1-2 stories at most. The organization of lots around the southern portion of Main Street is poor, with areas that are overly sparse and desolate.

Green / Natural Spaces:
There is a large gap in street trees and public tree canopy, with only a handful of public trees on main street. Besides these trees, there are few private trees on Main Street. There are also very few public, private and semi-private green spaces along Main Street. The

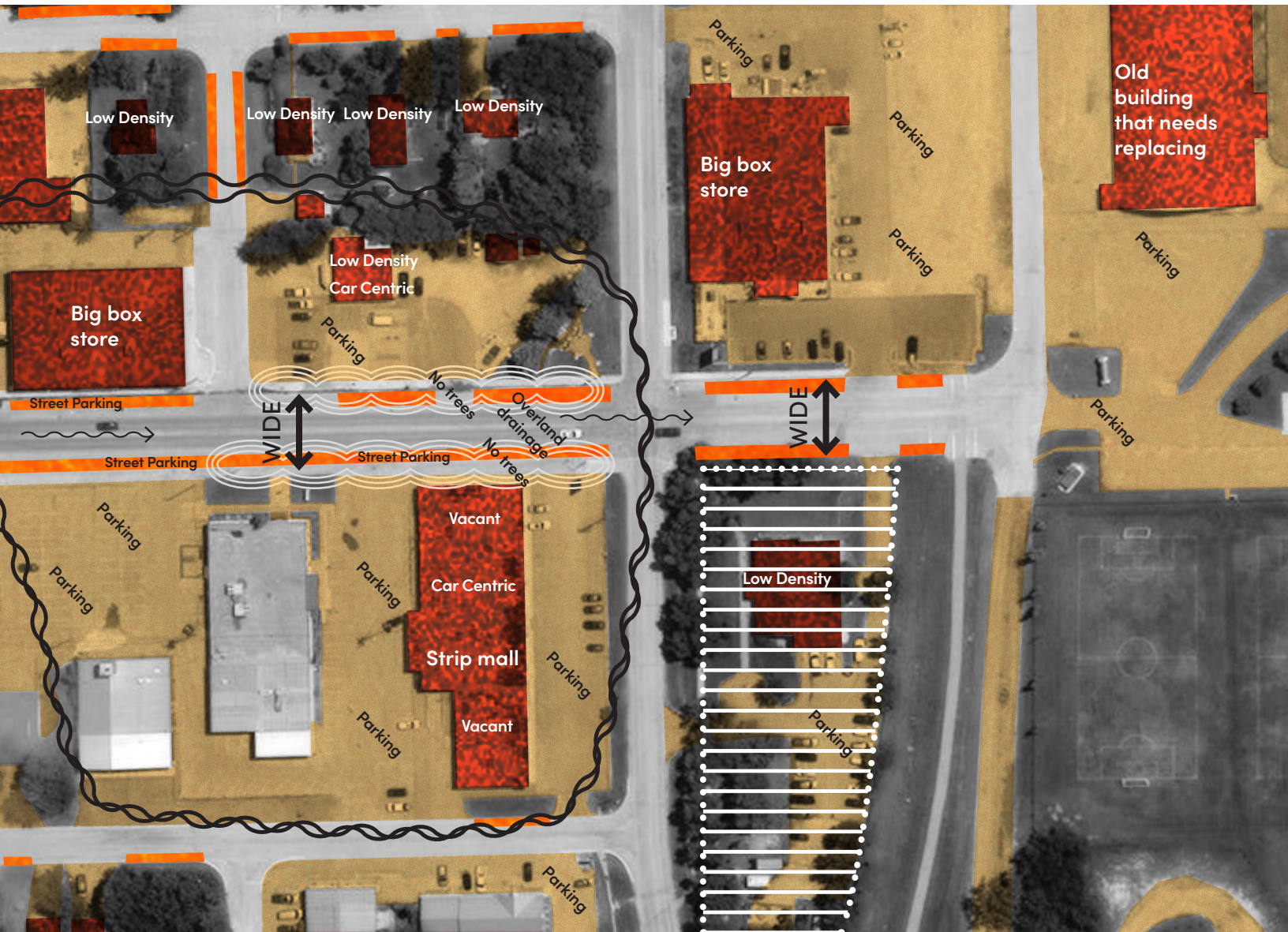


drainage network in town is on the surface, meaning that higher rain causes higher surface flows. On hot days, the expansive parking lots create extra heat and add to the town's urban heat island.

Function / Character:
The 4 lanes of car traffic make it harder to cross Main Street. There are no crosswalks or traffic signals or stop signs. This is even harder for senior citizens, children, or those with disabilities. The character of Main Street is car-centric at the south end of the site. This is where the largest gaps in building form and canopy cover occurs. This empty, vacant and underused portion of Main Street represents a loss of potential tax revenue. In this portion of the site, large parking lots and strip malls encourage people to drive from place to place and not walk between stores. This creates less room for spontaneity in everyday life and threatens the function and importance of Main Street.

Reflection:
Main Street has many weaknesses when it comes to the allocation of urban space. Much of the street is reserved for cars and car parking. This is made worse by expansive parking lots and car centric uses like strip malls. These uses exacerbate the urban heat island effect and reduce climacteric comfort. During heat events, the excess heat could be challenging and dangerous to senior citizens. With few street trees or vegetated spaces, the spaces along Main Street are warm and dusty. Paired with a low density, and no housing on Main Street, there is a large loss of functional potential, and city income. The size of the sidewalks, as well as the lack of formal pedestrian crossings, take away from the potential social functions and hold back some residents from enjoying the benefits of main street. Main Street is not that enjoyable to walk on.

Map 44 (below)
Weaknesses, Main Street Scale. GIS map



OPPORTUNITIES

Services / amenities / employment:
Main street could be enhanced through the addition of new amenities in vacant storefronts, or in new buildings, with street-oriented units. There is also the potential to integrate kiosks and booths. Redevelopment of the Rockwood Hotel could allow for increased tourism and expanded amenities for the town, like a shared aquatic's facility. Existing civic uses like the library, legion, and community halls could be redeveloped to accommodate residential units above their existing use.

Urban form:
To create a succinct, connected and identifiable public space, Main Street could be closed off to cars and vehicular traffic, with the focus of making it a public space. This could extend from the historic / character section and create a connection to Veterans memorial park. The roads adjacent to main street can undergo road diets to return more space to people, trees and ecology. Parking could be accommodated in a reasonable manner, organizing parking to succinct areas. The built form of Main Street has the potential to be redeveloped in a manner that could allow the formation of soft city inspired blocks. These blocks could create courtyards and community spaces behind buildings on Main Street. These spaces could allow for shared gardens, patios, playgrounds and other semiprivate spaces. The south end of Main Street could be made monumental, with a plaza that relates to future transportation infrastructure, and a new Town Hall. This space could connect south to Veterans Memorial Park, and into an expanded arena and indoor community and recreational centre.

Housing / Density:
The densification of Main Street could be achieved through the addition of units above stores on main street, and units above strip malls and big box stores. Additional units could replace underutilized/vacant buildings through new mixed-use buildings. More housing types could be added to alleviate demographic pressures and accommodate the needs local housing careers.



Green / Natural Spaces:
Main street could be planted with additional tree species, and an overall denser urban tree canopy. An extended tree canopy ensures that Main Street is well endowed with trees and extensively connected with the rest of the town's canopy. The shade provided by the trees allows for a pleasant micro-climate on hot days. The interior spaces of blocks on main street could become gardens for food, flowers and leisure. Rooftop gardens could also provide additional shared garden spaces and cooling effects. Water and runoff could be used to create water features, or rain gardens in car free areas, and storage of water.

Function / Character:
Main Street could become a car-free space that encourages community, commerce, and civic pride. This could create more potential for the tourism industry in town, with Main Street as a focus. There is also potential to use the redevelopment of Main Street to provide services for eldercare. The redevelopment of Main Street could employ local materials, specifically local limestone, for details, planters, and building facades.

Reflection:
Main Street has many opportunities for growth and intensification. With additional housing and community spaces, the social functions of Main Street can be enhanced. This means that there could be more opportunities for events, stores, services and communication on Main Street. The creation of housing on Main Street could provide a very walkable and accessible housing option. With a mixture of good space, good tree canopies and engaging details, Main Street could become a jewel for not only the town's residents, but the region, and beyond.

Map 45 (below)
Opportunities, Main Street Scale. GIS map.



THREATS

Services / amenities / employment:
There are many aging buildings that need replacement. If services and amenities in these buildings are expanded or replaced through strip malls and big box developments, it could make the existing commercial areas on Main Street less desirable. The addition of storage and industrial lots further threatens the commercial zone. This is further worsened by the threat of amenities moving to periphery locations in town due to parking demands, and a lack of employees or business with an aging town. If amenities leave Main Street, it could see it's a drain in its commercial capacity.

Urban form:
Main street has a wide footprint. This large footprint is also echoed in the avenues that intersect with it. These large roads encourage people to drive at higher speeds, which is not only loud, but dangerous. With a lack of pedestrian crossings, there is an elevated danger to pedestrians, and a worsened walking experience. The streets have a lot of room reserved for parking, which hurts the character and sense of purpose for the street. This also disrupts site lines across the street and to storefronts. The addition of further parking could make areas feel like afterthoughts for people. There is also a risk that the heritage and character buildings in town are lost due to negligence.

Housing / Density:
The single-family houses on the edges of Main Street's blocks could become very desirable as the town grows and make the area more exclusive, and less affordable. Conversely, these houses could degrade over time and become a burden for the area. There is also a risk that existing housing is converted into car centric services, or low-density developments like strip malls. This could worsen the existing housing career issues. The largest risk would be for the town to create a new suburban development outside of the traditional town boundaries. This would take commercial activity away from Main Street and push new residents further away from Stonewalls core.



Green / Natural Spaces:
There are many large, paved areas that worsen the urban heat island effect. The lack of street and shade trees in these areas and throughout other streets adjacent to Main Street also worsens this heat. The existing street trees are a mono-culture of Green Ash trees. This increases the risk for tree disease, especially with the introduction of the Emerald Ash Borer to the region. The lack of storm water retention means that droughts could be even worse for the trees, plants and green spaces in town. With north to south winds being the strongest and most predominant, there is a risk for higher winds on Main Street, as well as snow buildup in the winter.

Function / Character:
Main Street could lose businesses, and buildings, if services and amenities decide to build on the outskirts of town. If Main Street sees little investment, it could become another suburban like destination, with strip malls and even more car parking – like the suburban 'power centres' of Winnipeg. This could be made worse if new developments clash with existing forms and materials.

Reflection:
The threats facing Main Street are expansive. A major risk being the loss of commercial activity, and employment, and an increase in parking infrastructure. The large streets allow for faster traffic, and an increase in traffic could be dangerous to pedestrians. Sparse paved areas near Main Street, like parking lots, make the area hotter, less accessible and less desirable. Empty lots and low-density buildings also worsen the housing career prospects in town when they replace existing housing. Existing street trees are at risk of mass die-offs . The disruption from future transportation infrastructure could divide the towns' urban fabric into two. Finally, there is the risk of losing the town's character and identity if Main Street fails.

Map 46 (below)
Threats, Main Street Scale. GIS map

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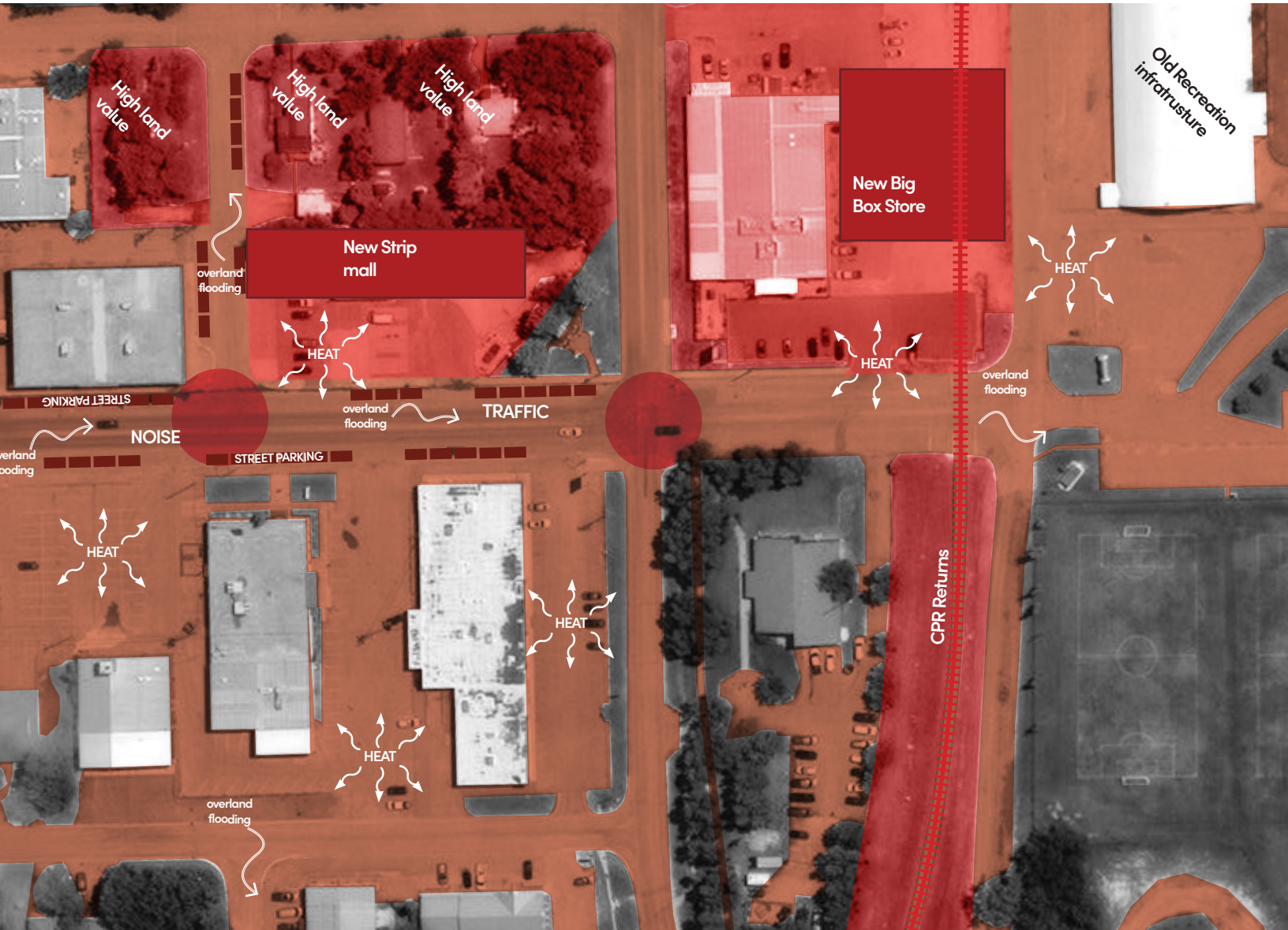

SWOT Analysis Conclusions

Stonewalls Main Street is influential to not only the urban fabric of Stonewall, but also its residents. With a classic main street feel, plenty of community events and a central location, the street is primed to accommodate further development. The schools and other amenities that surround main street allow it to be a complete community. However, there is room for improvement on Main Street.

A lot of main street is reserved parking, and other auto oriented uses. The excess paved area worsens the urban heat island effect and amplifies the summer heat. With only a handful of street trees, there is not much shade on the street. Small sidewalks and a wide street also take away from the pedestrian experience and make the space feel expansive and empty in areas.

However, there are many opportunities for improvement on Main Street. Empty parking lots could be developed with mixed use infill to allow for more housing and amenities. More street trees and shade could help make the street climatically comfortable. The existing density, and proximity to amenities means that main street is primed for densification and further expansion. This is heightened by the location of the former railway station, a site that is perfect for a future regional transportation link.

Main street still faces future threats, however. If suburban development occurs on the outskirts of town, Main Street could lose commercial activity to suburban developments. This would take traffic and people away from Main Street and could spur commercial vacancies on main street. The few existing street trees are at risk of disease, which could decrease the comfort and character of Main Street. These factors could degrade the character and function of main street.

This SWOT analysis provides a starting point for reimagining Main Street, and the rest of Stonewall. This analysis re-affirms the importance of Main Street within Stonewall, and its contribution to the social fabric of the town. Showing that Main street is well positioned to take on further growth and development. Without this growth, there is a chance that Main Street would see urban decline, and a poorer pedestrian experience. If this was to occur it could be a lot harder for stonewall to retain an aging population and mitigate the worst effects of climate change.

Conclusion: Inventory + Analysis

This inventory, and its resulting analysis provides an insight into the current conditions of the Northwest Winnipeg Metropolitan Region, Stonewall, and Stonewall's Main Street. The scaled approach to the analysis pairs to the scales covered by the Charter of the New Urbanism.[208] This allows for the design to take a similar scaled approach. A SWOT analysis of Main Street revealed existing successes on main street, and areas for future improvements.

The regional inventory affirms the importance of the WMR, and its connections between Winnipeg and regional centres like Stonewall. This inventory reviews the commuter shed, and underscores the importance of regional connections, and inter urban area connections.

The scale of Stonewall reveals a town with growing pains. Pressure is pushing development outwards, and the form of development is low density. With a diverse main street that is primed for potential, understanding its potential and limitations is necessary. The inventory revealed the geology and aquifer capacity were covered along with their potential limitations. A review of Stonewall's growth patterns revealed a relationship between the automobiles of transportation and the physical form of development that followed. The town's road hierarchy provides further information on the form, makeup, and functional flow of people and traffic. A review of the buildings in towns revealed their functional and formal typologies. This allowed for a review of the towns existing housing stock, and revealed the town has a high number of single-family dwellings. When paired with the land use analysis, the results show that the town has overbuilt parking demand for a relatively low-density urban area. The outcomes from the analysis strengthen the argument for altering the towns spatial regime.

A SWOT analysis of Main Street revealed existing successes on main street, and areas for future improvements. This analysis showed that main street has potential to take on more housing and provide even more social functions. Another key outcome was the need to create a comfortable environment on Main Street. Allowing commercial activity to move away from main street and towards the edges of town will not only hurt the economy of Main street but also make it harder for people to walk to and from daily needs – degrading Stonewalls existing complete community.

The solutions to shifting demographics, fluctuating population, and climate change can be demonstrated through the incremental development of Stonewall's Main Street, and its surroundings. By locating development on Main Street, the town can intensify its walkability and strengthen the local services and amenities. Being central within the town, residents could easily walk to and from main street for daily needs, and recreation. Placing housing on Main street would open up a new form of housing and lifestyle choice within town. This would allow for a more nuanced demographic mixture of residents, especially along main street. Creating a diversity in housing unit types could create new opportunities for residents to age in place. Improving Main street itself would provide opportunities for comfort, recreation and social services. This could also increase the tourism within Stonewall and on Main street. However, this solution cannot happen in a vacuum and needs to be tied to a larger framework and vision for the region.

Endnotes - Inventory + analysis

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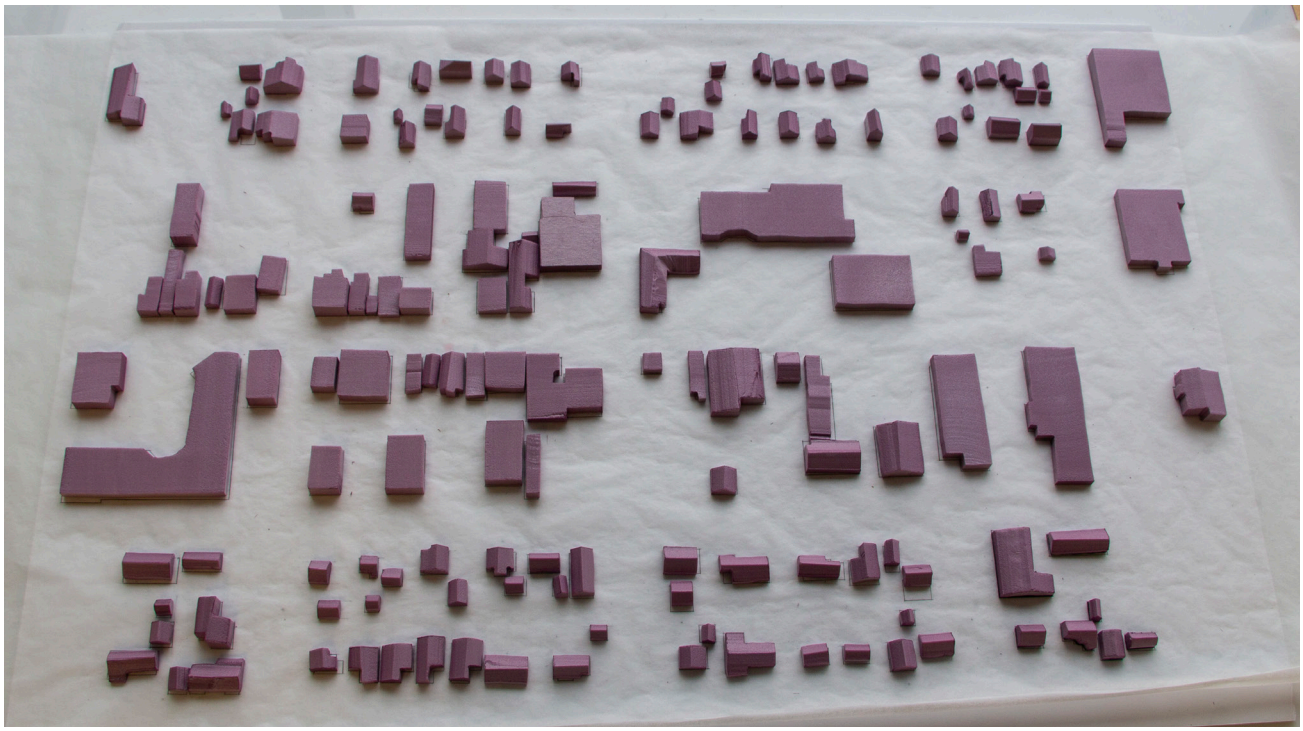
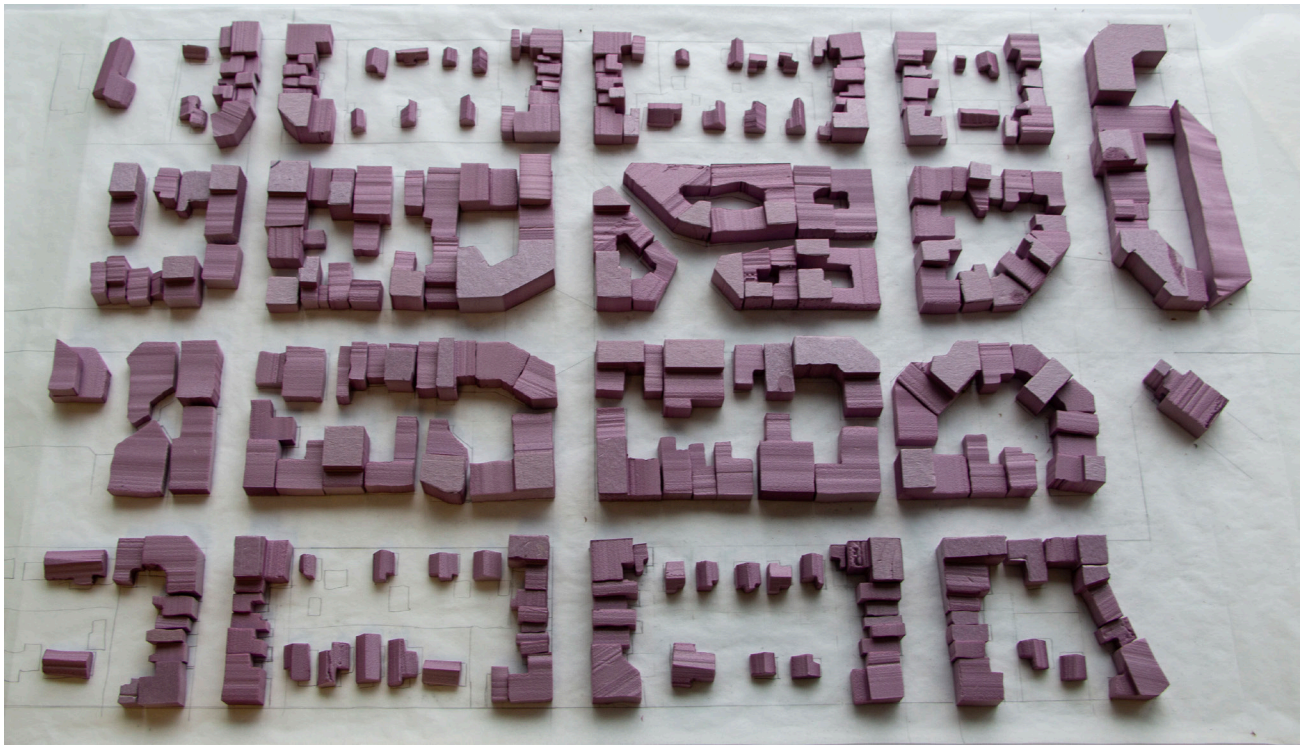


2025



2055

PART IV
Design Proposal

Figure 109 (left)
Foam Process models, depicting the current conditions in 2025, and a potential future condition in 2055. Hand made models by author.

Introduction

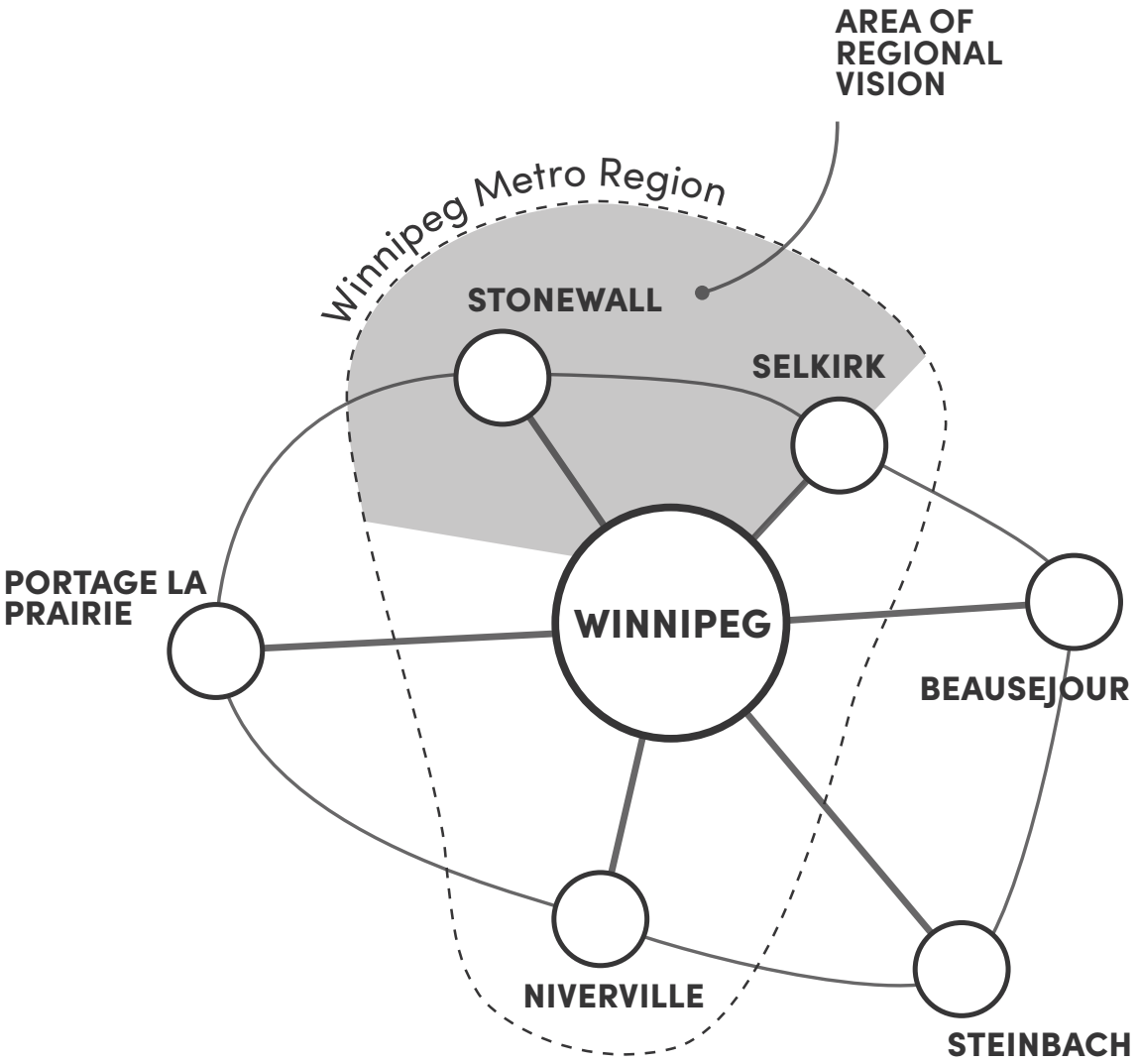
The region faces critical issues, with shifting/fluctuating demographics, and the increasing effects of climate change. The choices made by Stonewall, and the greater region today will have impacts on its future success tomorrow. These choices could either worsen the existing issues, or they could be used to build a solution.
This proposal addresses the emerging issues and incorporates the theoretical approach and analysis of this work; it is necessary to break this proposal into scales, starting with an overarching regional framework.

To unite the regional goals of preparing the landscape for climate change, and connecting people with public transportation, the Winnipeg Metropolitan Region will be transformed into the Winnipeg Regional Social City.

At this scale, Winnipeg Metropolitan Social City, its Garden City satellite communities and their connecting corridors, are in focus. The Winnipeg Social City is directly linked to the regional centres of Selkirk, Niverville and Stonewall. This Social city also includes the existing regional centres of Steinbach and Portage la Prairie, which currently fall outside of the WMR. These five regional centres will become 'Garden Cities', linked to each other and Winnipeg through public transportation corridors and highways. These corridors will also allow for a variety of movement options like cycling and walking, as well as winter mobility like skiing, snowmobiles and snowshoeing. Public transportation corridors will also include railway right-of-ways, to allow for future system expansion, and intensification. The system will start as a highway bus service. Over time, this service will be moved to a dedicated right of way, fashioned from a former railway bed. As time goes on and demand increases further, this line will be further upgraded to eventually service inter-urban rail. As demand increases, these corridors will also act as a spillover zones for new development, and create new communities along an existing transportation corridor.

This vision connects Regional Centres to Winnipeg by providing alternatives to driving. The addition of public transportation in a predictable manner allows planners, towns and municipalities to designate areas for development adjacent to future transportation stops. By doing this, the region is able to lower its dependency on travel by automobile, and in turn, its environmental footprint. This supports a more equitable transportation network, that allows people of all abilities and ages to get around the region independently.

This framework is strongly rooted in Ebenezer Howard's Garden Cities scheme. Using satellite centres and existing corridors, the region inhabits both the connectivity and utility of a 'Garden City'. The scheme also relates to the regional principles in the Charter for New Urbanism, specifically the concepts of connecting urban areas with public transportation and alternatives to the car.[209] This allows existing urban areas to plan growth around transportation infrastructure, which is a key aspect of New Urbanism and transit-oriented development.
This framework only captures the diagrammatic aspects of the plan. To understand how this garden city manifests on a regional landscape, the design focuses further on the Northwest Winnipeg Metropolitan Region.



Winnipeg Social City

Figure 110 (above)
A diagram of the Winnipeg Metropolitan Social City, with Regional centres as satellite cities.

Regional Vision

As the scale tightens, a slice of the Winnipeg Social City is revealed in greater detail. This view covers the existing Northwest Winnipeg Metropolitan Region. Stonewall, and other urban areas. At this scale, information on the form and flow of the landscape becomes available.

The transportation corridors are made clear, and with these a series of potential development zones are highlighted. These zones allow for transportation planning to occur while reserving land for future development needs.

Landmark features like restored marshes, and a new quarry provincial park are connected through a system of riparian corridors. These features and corridors are surrounded by agricultural pockets. Wetland areas are informed by topography, soils and the location of drained wetlands. These lands are low in elevation, and naturally collect water. Instead of continuing to drain them for agricultural uses, they should be restored as wetlands. This allows the region to retain water more reliably for times of drought and creates large portions of habitat for wildlife that also support increased recreational opportunities.

The quarries northeast of Stonewall are transformed at the end of their lifecycle and become an expansive provincial park with recreation amenities like camping, resorts, and swimming options. This new park allows for restoration of Stonewall's native alvar landscapes and would create a diverse habitat for regional flora and fauna.

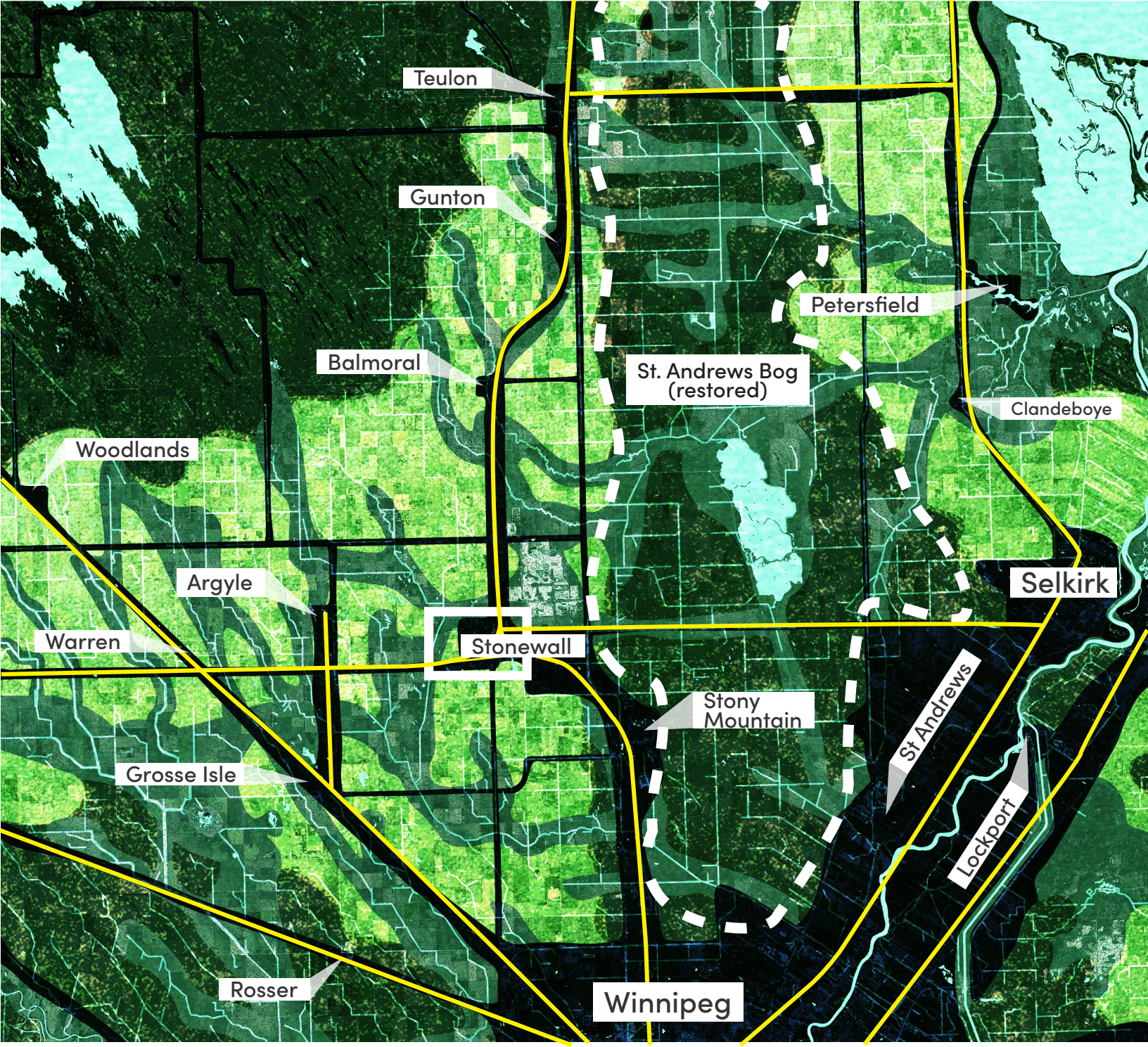
The proposed locations of riparian corridors are informed by the former and existing drainage regime. Existing drains and former streams and tributaries are restored and given room to meander and flow naturally. This allows them to facilitate habitats for beavers, which help enrich local ecological conditions and retain water on the landscape. The riparian corridors create pathways for plants and animals to migrate throughout the region, connecting the marshes, the new provincial park, and Lake Winnipeg with the surrounding farmlands and urban areas.

This enhanced ecological network naturally extends into the greenspace and canopies of the human world. This link allows for a variety of recreational pathways to branch off into the region, ranging from paved paths to dirt trails, allowing parks to flow from urban to rural areas. Riparian corridors interact with the road network and break up the rigid mile to mile grid down into more reasonable parts, based on drainage patterns and not abstract survey tools.

Locations with high-quality soil and good drainage are retained and strengthened as agricultural areas. Farms are subdivided into smaller holdings. Doing this combats the negative effects of farm consolidation and factory farming. This will create a greater variety of crops species, and will allow for a diverse farming practices.

The network of roads, and trail access from the riparian networks will allow for enhanced movement options for humans and nature to and from rural areas. Together these pieces work to create a regional mosaic that enables use at all scales, by all beings.

Map 47 (right)
A slice of the Winnipeg Social City, showing the matrix of transportation and ecology in Northwest metro region in 2055.



Northwest Winnipeg Social City

0 5 10 km

Legend

- Marsh / wetland
- Riparian areas + regional paths
- Open water
- Agricultural land
- Urban areas
- Public transportation corridors

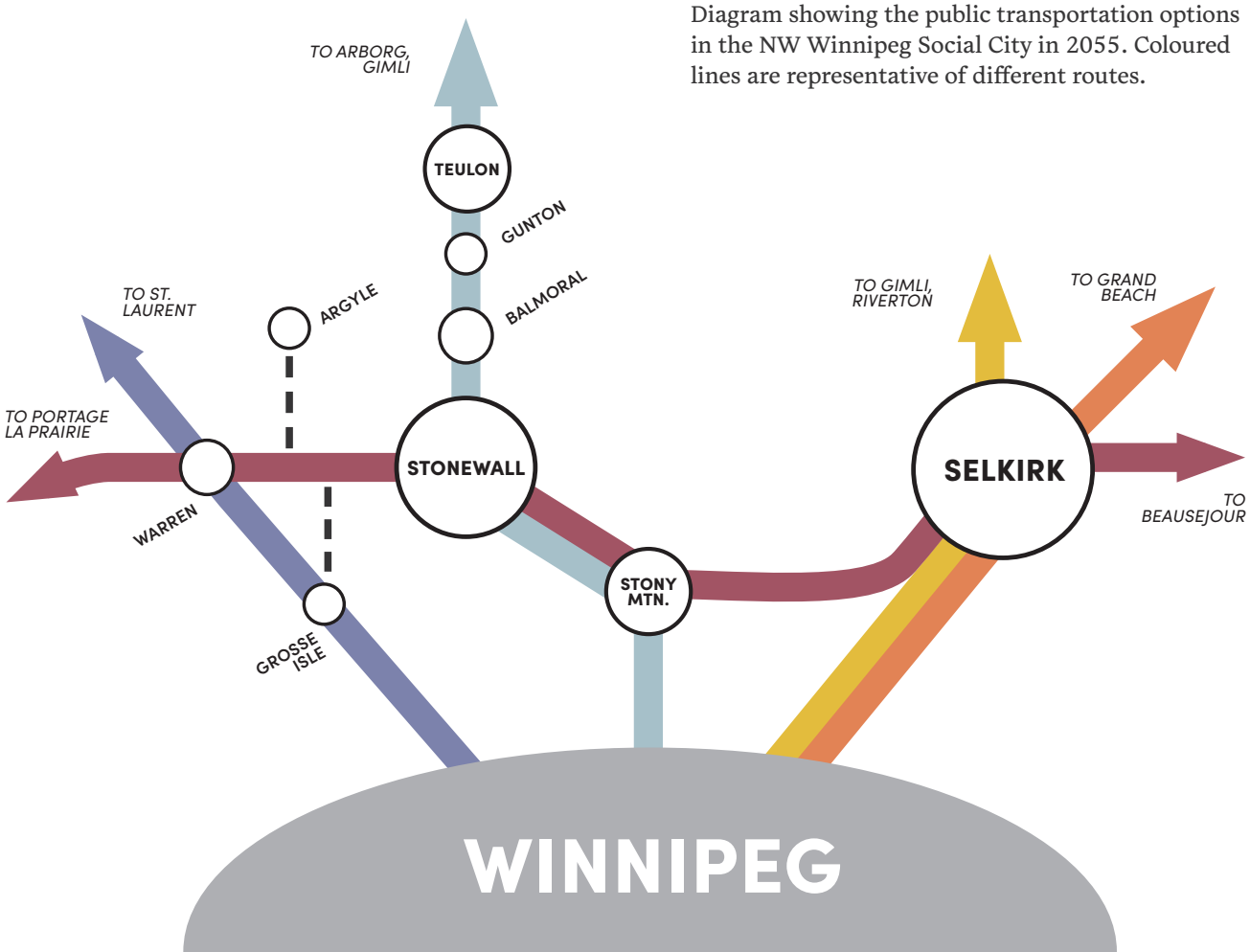
This vision's relationship to garden cities is strengthened at this scale of viewing. This is clear in the order of regional organization and the proximity of all residents to nature and agricultural landscapes. This scale also highlights the links with transit-oriented development, by reserving areas for future development along transportation corridors that already connect to existing urban areas and amenities.

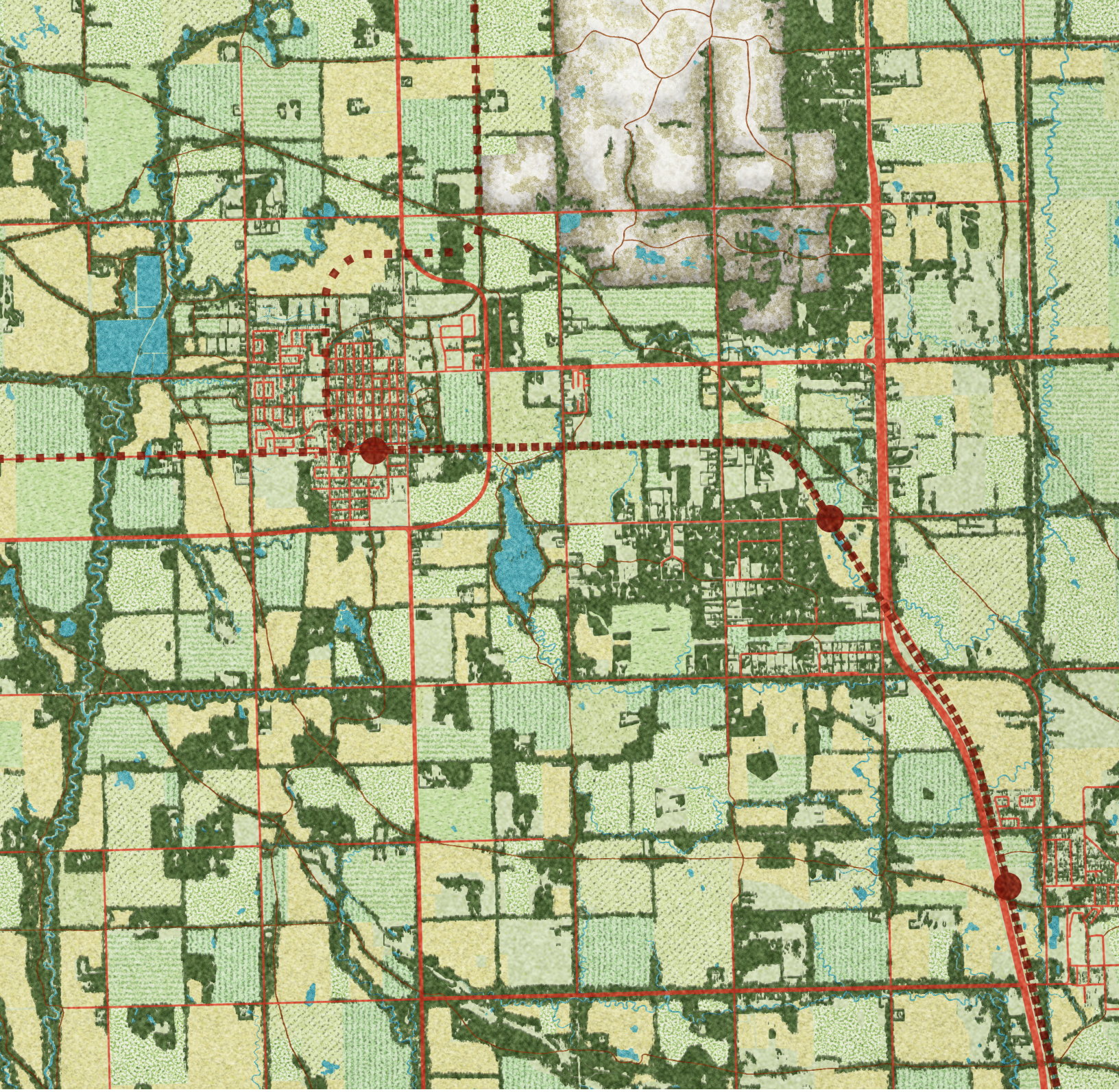
The allocation of space for ecology allows for the return of natural ecosystems and their services. In the time of climate change, this is of elevated importance to help alleviate challenges with water retention. Tying this into the Charter for New Urbanism, this embodies the spirit of 3rd tenet, where they state: "Farmland and nature are as important to the metropolis as the garden is to the house."[210] This also related to the spirit of municipal boundaries, and having hard limits for urban expansion. This return of space to nature also connects to the 7th generation principle and the idea of preserving our natural environment now, for future generations.

This regional framework would facilitate both natural and human functions. The riparian corridors connect key points in the landscape and help retain water and enhance ecosystem services. New urban developments will be restricted to zones adjacent to public transportation corridors. Existing urban areas and regional centres will be enhanced through public transportation connections, to allow for increased urban infill development. To understand the role of urban areas in this scheme, a view of Stonewall exemplifies this vision on a finer scale.

Map 48 (right)
Closer view of Stonewall, and its surroundings in 2055.

Figure 111 (below)
Diagram showing the public transportation options in the NW Winnipeg Social City in 2055. Coloured lines are representative of different routes.





Stonewalls regional plan

0 500 1000 m

Legend

- Forested areas
- Water
- Agricultural land
- Highways
- Roads
- Trails
- Quarries
- Transitway
- Transitway future expansion
- TOD location

Stonewall's Town Plan

Stonewall is a pearl in the Winnipeg Social City, serving its local population, and regional neighbors.

The town is be hugged by a necklace of parks that connects the town with the regional network of paths, creeks, and forested areas. The wastewater lagoon to the west of town is re-imagined, forming an engineered marsh to facilitate natural waste management. This marsh would be adjacent, but not connected to Grassmere Creek, now re-naturalized and meandering.

To the southeast of town, the medium-sized wetland near Winnifield Road is restored, and made into natural area, and regional parkette. This space, as well as select locations on Grassmere Creek allows for enriched ecological functions and act as a habitat for many creatures.

In this vision, Stonewall embodies the human scale and the needs of its residents above the needs of cars. To accomplish this, three design strategies are applied: densify the existing urban footprint; diversity the housing, amenity and movement options; and equalize the share of public space to reflect these changes.

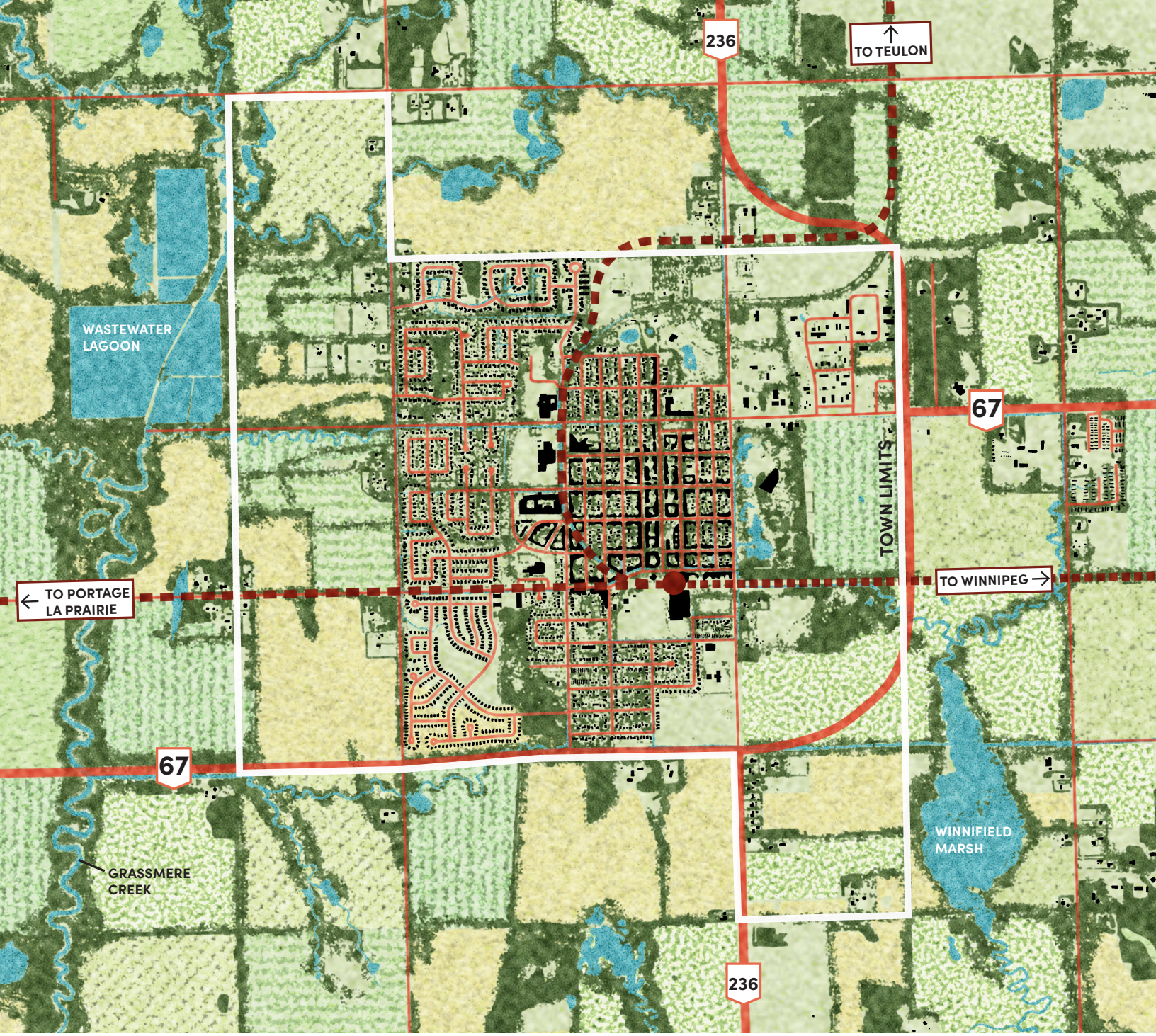
Densify
Growth in the town is limited to existing infrastructure, and new suburban developments is banned. Growth will take the form of infill development on existing plots within town. Infill development is first incentivised to occur along and near Main Street, and its intersecting Avenues. Infill developments are used to frame park spaces. Existing amenities, like hospitals, schools and recreation infrastructure are expanded and enhanced to support the growing population.

Diversify
Infill developments are be mixed-use and comprise of a variety of housing types. New developments on Main Street include publicly accessible uses on the ground floor. This enriches the commercial character of the street. The upper floors accommodate a range of different residential unit types, at different sizes and prices.

Infill on the Avenues allows for additional housing types, like row homes. Intersections of Avenues are framed with apartment blocks. These blocks have ground floor uses that range from corner stores to community drop-in centres. Existing greenspaces and parks are enhanced to allow for a connected park network throughout the town, and to facilitate more green infrastructure into the town's urban fabric. This has the added benefit of expanding the town's active transportation links, and its connections to the region.

Equalize
With a dense and diverse urban environment, the urban fabric and public space responds accordingly. Highways are altered so that they no longer bisect the eastern edge of town. This creates a highway bi-pass and allows for slowed traffic within the urban areas. Boulevards facilitate the connection between regional car traffic and the rest of the urban area, while accommodating other forms of movement.

Map 49 (right)
Map of Stonewall and its immediate surroundings in 2055.



Town Plan

0 500 1000 m

Legend

- Forested areas
- Water
- Agricultural land
- Quarries
- Highways
- Roads
- Trails
- Transitway
- Transitway future expansion
- TOD location

A regional public transportation connection bisects the town at the south end of Main Street. The roads within town are transformed to reflect this new hierarchy of movement. Avenues are transformed with expanded sidewalks, cycling infrastructure, and additional public trees. Street traffic is slowed, and parking limited to one side of the street.

Traffic on local streets is shared, and vehicles move slowly. This is reflected in removal of space for cars, both in lanes of traffic, and parking spaces. Street parking is limited to allow for more pedestrian space. This additional space hosts drainage infrastructure integrated with public street tree planting. Main street sees the largest transformation, with the removal of car traffic from five blocks of the street, this creates a human scaled public space, and regional destination.

This plan expands the housing career options local residents'. This accommodates many of the demographic challenges in Stonewall and alleviates the pressures of an aging population.

The use of infill development to achieve additional growth enriches the walkability and social functions of the community. This follows the Charter for New Urbanism's principles of the neighborhood and allows for urban areas to predictably evolve and fluctuate with population and demographic demands.[211]

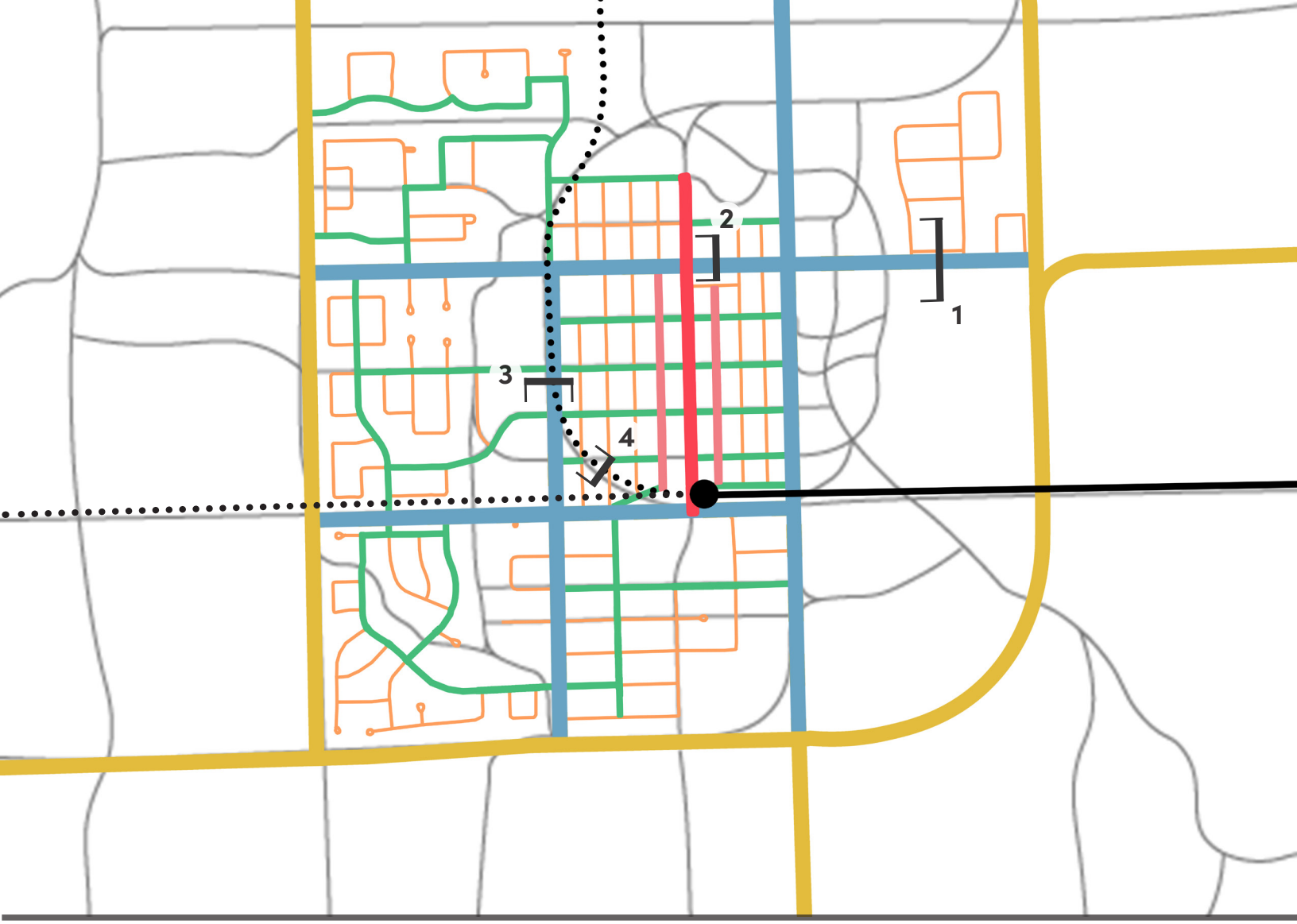
The addition of quality, walkable public spaces creates equitable connections throughout the town and into the region. This reduces the communities reliance on automobiles. This network of movement supports a diverse demographic pool and draws on the principles of TOD, and the CNU's principles of the corridor.[212, 213]

The expansion of greenspace and urban canopy cover mitigates increased climatic challenges, like the urban heat island effect. These greenspaces have the added benefit of creating climatic comfort within town and connecting people to nature.

Relating back to Soft City, and the criteria for livable density, the active transportation infrastructure and expansion of greenspace lower the carbon footprint, create micro-climates, facilitate walkable human scaled environments and increase the biodiversity in urban areas.[214]

This scale of the plan provides a broad view of the town's future. A closer look at Main Street, and its surroundings help understand how these principles relate spatially and temporally to Stonewalls streets, atmosphere and character.

Map 50 (right)
Proposed movement network for the town of Stonewall in 2055. This network includes options for movement by walking, biking, driving, or public transportation. This network is further explained though section in the next spread.

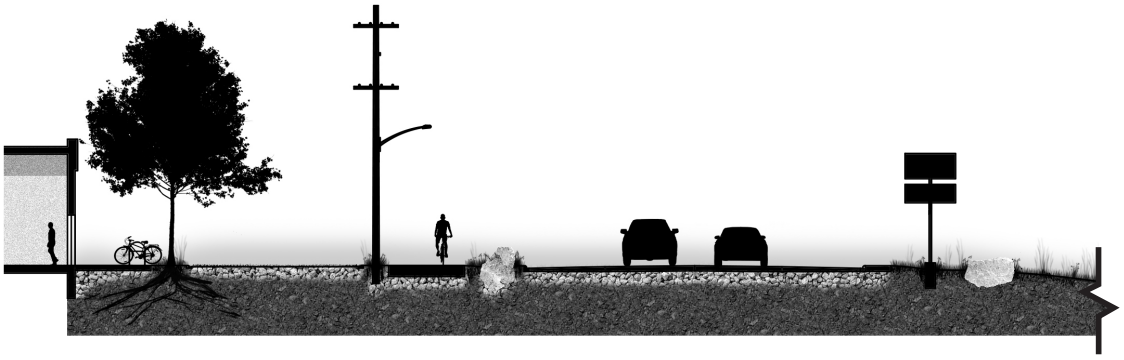


Proposed Movement Network

0 500 1000 m

Legend

- Highways
- Boulevards
- Avenues
- Streets
- 1st streets
- Main street
- Active transportation trails
- Regional transit stop
- Transitway
- Future transitway extension



1a Entrance Boulevard (south)

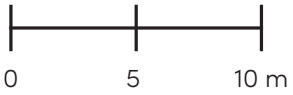
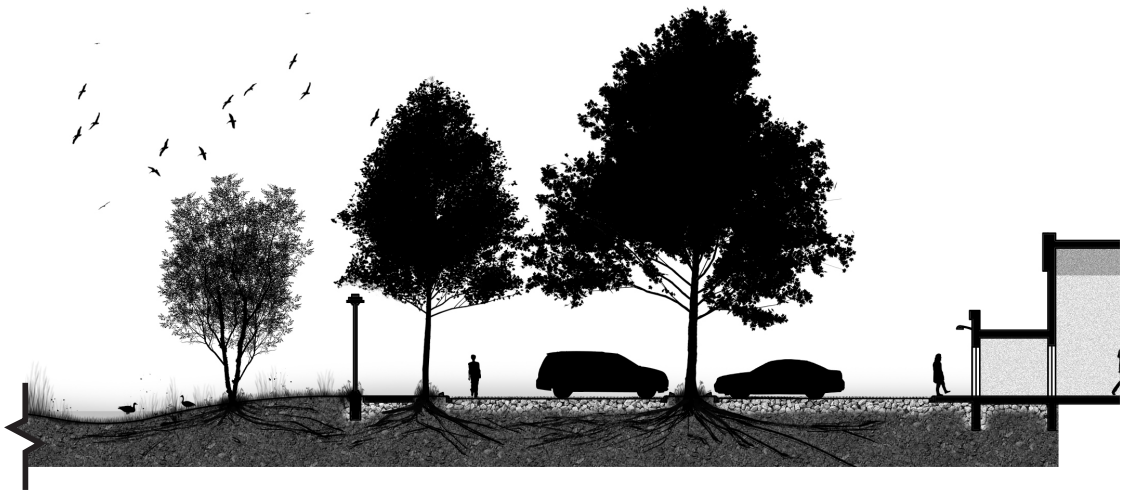


Figure 112
Re-imagined section of HWY 67 just before 4th Street East in 2055. (Split into two parts).



1b Entrance Boulevard (north)





2 Active transport trail

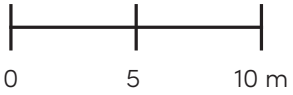


Figure 113
Re-imagined section of active transportation trail between 3rd Street West and 4th Street West in 2055.



3 Grand Boulevard



Figure 114
Re-imagined section of 5th Street West between Centre Avenue and 1st Avenue in 2055.



4 High Boulevard



Figure 115
Re-imagined section of 2nd Avenue North between 2nd Street East and Main Street in 2055.


1
2
3
4
2
16
17
15
14
B
5
13
11
A
C
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6

Main Street Design

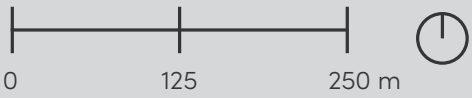
To embody overarching regional plan, Stonewall's growth is framed by three criteria: enhanced walkability and regional connectivity, a diversity of infill densities, and a strategic placement of infill within a network of public spaces and places for residents and visitors.

Stonewall can only achieve this growth if it carefully positions and grows its amenities alongside its housing options. This includes expanding healthcare and eldercare for an aging population. Expanding schools and recreation facilities. Creating new outdoor and cultural spaces, and leaving areas available for institutional uses like university campuses.

Map 51 (left)
Densification plan and map of Stonewall's amenities in 2055. Many of these locations are expanded upon existing amenities. This set of services allows for a healthy demographic mixture. Further details to the expansion of housing and public space is provided later.

To understand how Stonewall will evolve under these criteria, Main Street is chosen as a site a detailed design and growth analysis. This site includes three blocks of Main Street, from the intersection of Centre Avenue and Main Street to south to Veterans Memorial Park. This site represents the intersection of the historical centre of town, with the new transit hub. The end goal for Main Street is a dense, walkable, car-free public space. This space incorporates a diverse tree canopy, areas for social functions, and limestone details, like benches, planters and paving. Room is provided for active transportation infrastructure and emergency service access. This gives space back to people, and deepens the formation of social functions, community, and place. Where the Avenues intersect Main Street, the car-free zone continues to the edge of the block. This makes logical entrances to Main Street and pick up and drop off areas. Parking is accommodated on the 1st Streets flanking Main Street. Once the Avenues have passed the 1st Streets, they will become shared Avenues, with large sidewalks, ample trees, and a mixture of housing options.

Densification plan



Key

1 - Swimming Hole
2 - Restored Kilns
3 - Quarry Park Centre
4 - Expanded industry area
5 - Future institutional use
6 - Community Centre
7 - Recreation / aquatics centre
8 - Transit Hub
9 - New Signature Civic Building
10 - Regional Library
11 - Hotel and pool
12 - Regional Hospital
13 - Retirement home
14 - High School
15 - Specialized eldercare
16 - Middle School
17 - Elementary School

This space of Main Street is framed by two to four story buildings that integrate storefronts. These buildings have interesting details and facades, and the storefronts have a repeating logic, that create a visually appealing and navigable urban space. To accommodate additional functionality each site development is designed to address the principles of Soft City. This creates urban blocks over time. As blocks form, courtyard spaces within them are developed. These spaces accommodate private, shared, and public spaces, while also providing space for garbage collection and other urban functions. Blocks create comfortable spaces for residents, and provide them with a variety of housing options, and greenspaces within proximity to each other.

Main Street becomes an activated and beautiful public space. At Centre Avenue and Main Street, where the intersection is flanked by historic buildings, the space reflects the history of town, and provides a 'Guidestone' that indicates North, South, East, and West. This monument provides an easier understanding of the towns numbered street system. Going south, with a slight decent, the street is planted with rows of trees, recalling the historical planting scheme of Main Street. This space is primed for outdoor dining, festivals and street fairs. The tree planting provides a clear sight line south, downhill, to the intersection of Main Street and 1st Avenue South.

This intersection is redeveloped into a place fronting a new iteration of the Rockwood Hotel. The focal point of this space is a large specimen tree, with limestone seating and planters. Going south from the intersection narrows before opening into a large market grove. This space is fronted by an upgraded regional library and features scheduled local market days. The tree planting in this plaza creates is executed in a grid pattern creating a shaded area. A portion of this space is dedicated to a splash-pad and play area in front of the regional library. South from here, the tree planting tightens and a large public art piece draw attention.

At the intersection of 2nd Avenue South and Main Street, the street opens into a medium sized plaza featuring a large sculpture, and specimen tree. This space is fronted by a new Legion Hall, that features a legion bar, and housing for senior citizens. In front of the building there will be a large patio for drinking, dining and outdoor games. Flowing into the street movable and fixed seating allow for the outdoor patio to be used as needed.

Figure 116 (below)
Elevation sketch A. depicting the western face of 1st Street West, between 1st Street South and 2nd Street South. The houses sit comfortably between two mixed used buildings at each end of the block. Hand drawn sketch by author.



A.

Separating this patio in the centre of the space is a large planter with dense trees, and a sculpture incorporating the military vehicle currently on display by the legion. Looking south from here, the space once again narrows before dramatically opening up into a large plaza with a water feature in view.
At the south end of Main Street, where it meets 3rd Avenue South, a town square is created. This space fronts the regional transportation centre, and a new town hall. In the centre of the town square is a water fountain made of limestone. This fountain integrates the existing Stonewall Carin Memorial into a new civic fountain. The sides of the square fade into perpendicular and linear plantings of trees, which lead into park space surrounding town hall. This park will integrate public lawns and a retention pond for the water drained south off Main Street. Further south of this park, a new shared avenue will provide a link for people and cars; it follows the path of the transitway. Beyond this new avenue, an upgraded and rejuvenated Veterans Memorial Park, and recreation centre await.

The dense tree canopy along Main Street creates a comfortable climate for people. The planting scheme is varied to create seasonal interest, and enhance ecosystem services. Notable buildings act as landmarks for navigation. This includes historic structures, like the limestone buildings at Centre Avenue and Main Street, as well as new structures like the Rockwood Hotel, regional library, legion centre, town hall and transit-hub.
Public spaces like the new civic square and market square enhance municipal pride and foster natural interactions with neighbors. With areas for outdoor dining, local markets, playgrounds, splash-pads, water features, and public art, people are able to regularly enjoy and engage with Main Street space and each other.
To understand how Main Street could achieve this end goal, thought must be given to the temporal aspects of this scheme. Each step of the way needs to improve the conditions in Stonewall and build towards a concise end goal.

Figure 117 (below)
Elevation sketch B. depicting the western portion of Main Street, between 1st Street South and 2nd Street South. This drawing shows the rhythm and character of Main Street's mixed use buildings.
Hand drawn sketch by author.

Figure 118 (bottom)
Elevation sketch C. depicting of the northern portion of Centre Avenue, between 1st Street West and 2nd Street West. This slice of street is made of row-homes that are bookended by mixed use apartment buildings.
Hand drawn sketch by author.

B.



C.



2025

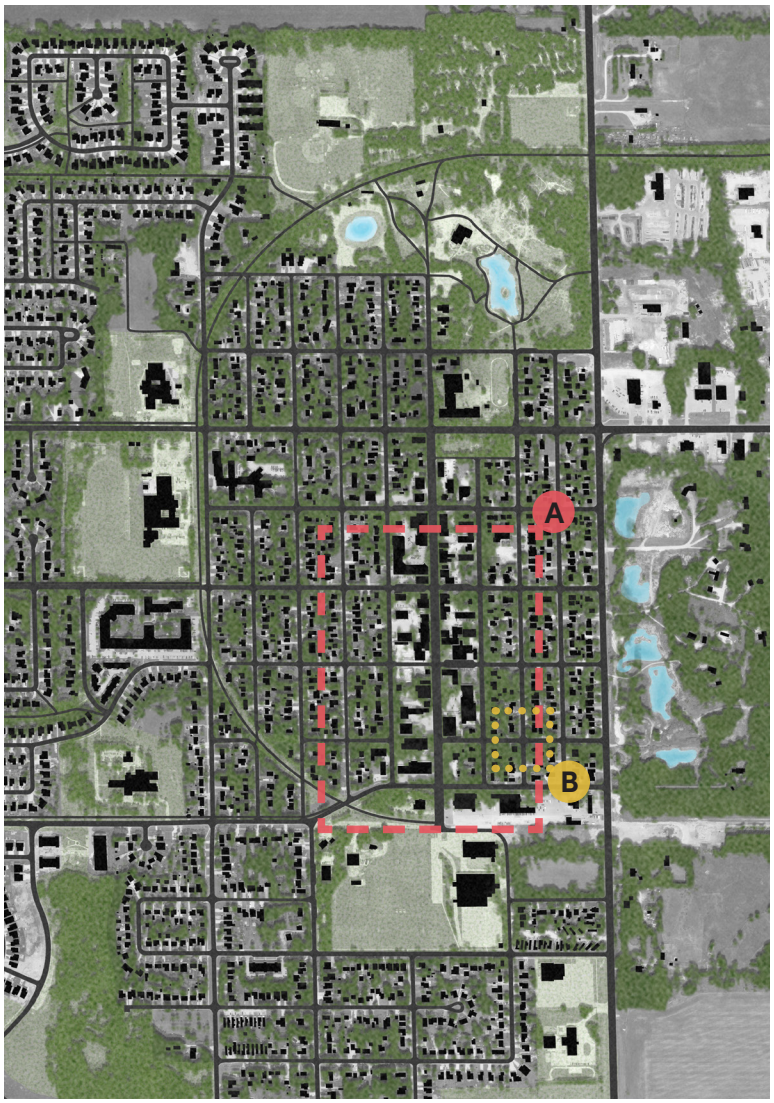
Execution Incrementalism and potential Growth

The Main Street design has been broken into 5-year implementation intervals between 2025 and 2055. These intervals suggest how infill growth would occur, and how public space and infrastructure may respond. Starting 5 years from the present, the first increment is until 2030.

This spread should be used as both a representation of Stonewalls existing conditions as well as a guide to the 30 year growth scheme. Each spread starts with a Plan overview of the growth. Showing Main Street and the surrounding mature areas of Stonewall.

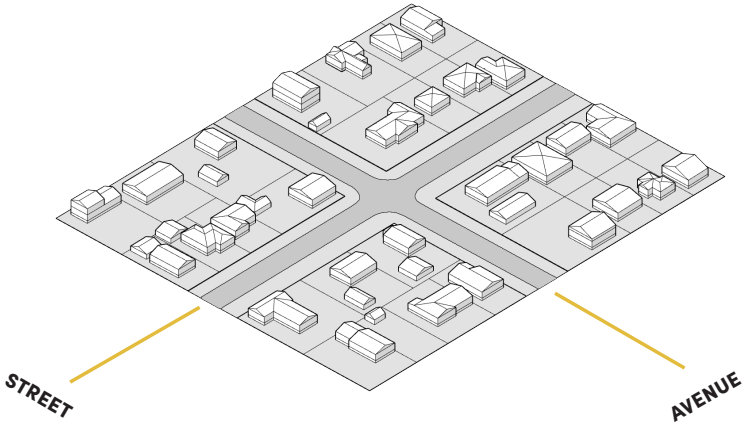
The estimations of growth figures are made from the 3D Main Street Growth Model, shown in isometric on the far right. This model also includes approximations of the tree canopy evolution over the same period.

Finally, each spread provides a Intersection Growth Detail, showing how Main Streets surrounding Avenues will develop through infill buildings.

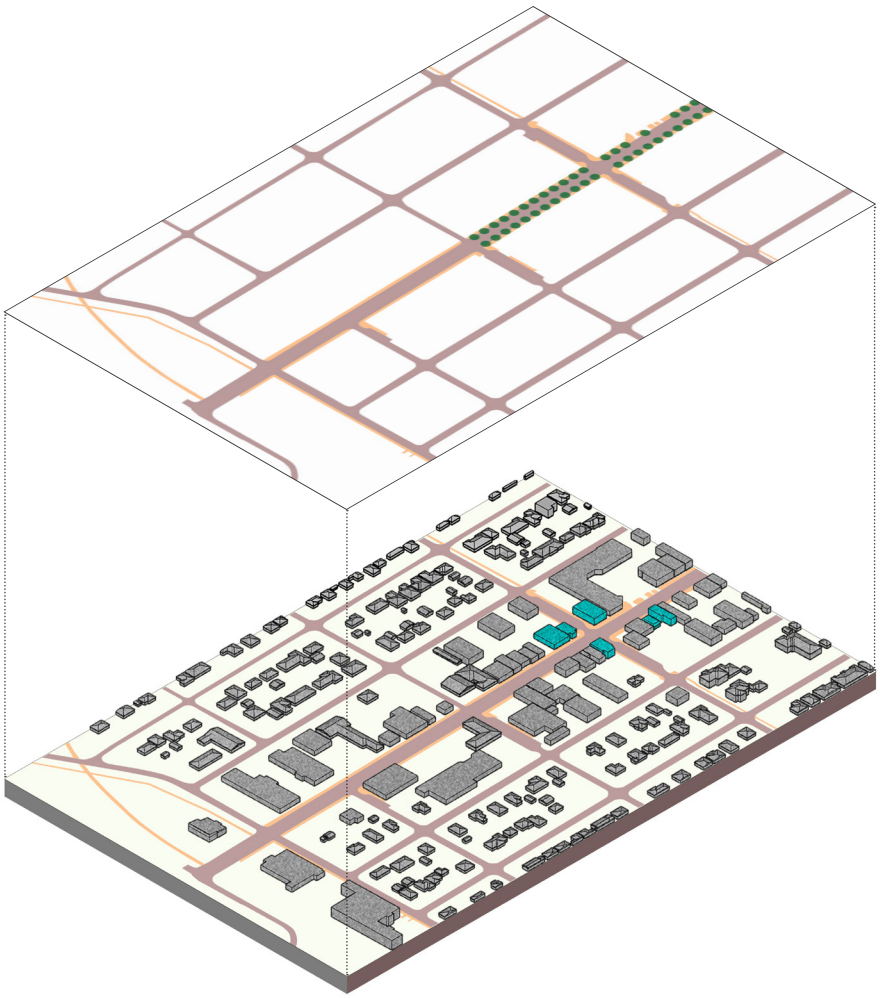


Plan Overview





B. Intersection Growth Detail



A. Main Street Growth Model

Legend

- Historic buildings
- Existing buildings
- Pedestrian area
- Roads
- Juvenile tree

Units in 2025

Detached units:	**113**
Duplex units:	**28**
Row-homes:	**0**
2 Bed Apts:	**0**
1 Bed Apts:	**6**
3 Bed Apts:	**0**
Studio Apts:	**0**
Total units:	**147**

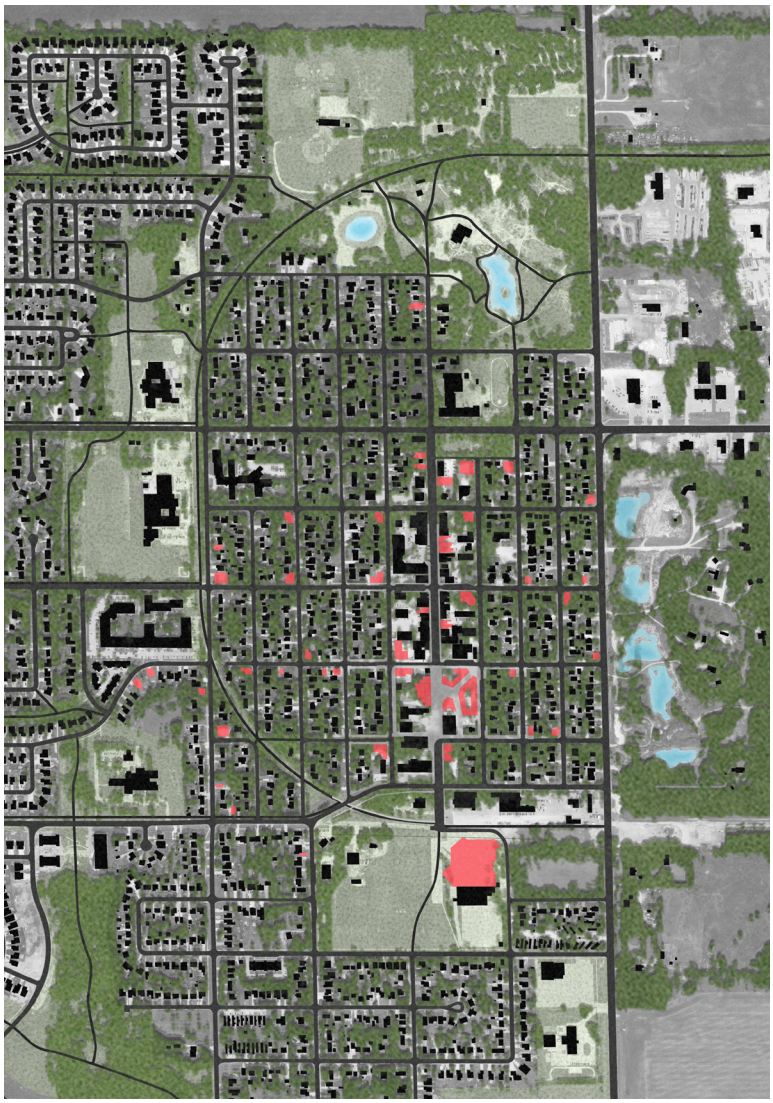
Map 52 (top left)
Plan overview of Stonewall in 2025. Annotations provide the locations for both the Main Street Growth Model (A) and the Intersection Growth Detail (B).

Figure 119 (top right)
Isometric model of Stonewall in 2025. This model has a breakaway that shows the pedestrian area, road area, and public street tree canopy.

Figure 120 (bottom left)
Detail isometric view of the intersection of 2nd Avenue South and 2nd Street East Stonewall in 2025.

2030

The first infill developments occur on parking lots and empty lots on and around Main Street. These lots are the first developments and must be designed carefully to ensure that they feed into future blocks, while maintaining a comfortable urban environment in the present. At this point, street tree planting and upgrades to Main Street will have begun. The hotel on Main Street will have been redeveloped, to allow for more rooms and a shared aquatics facility.



Plan Overview

New buildings

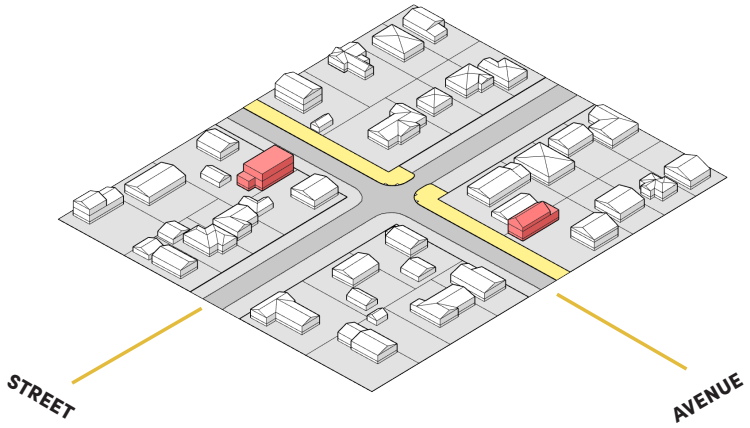
0 250 500 m

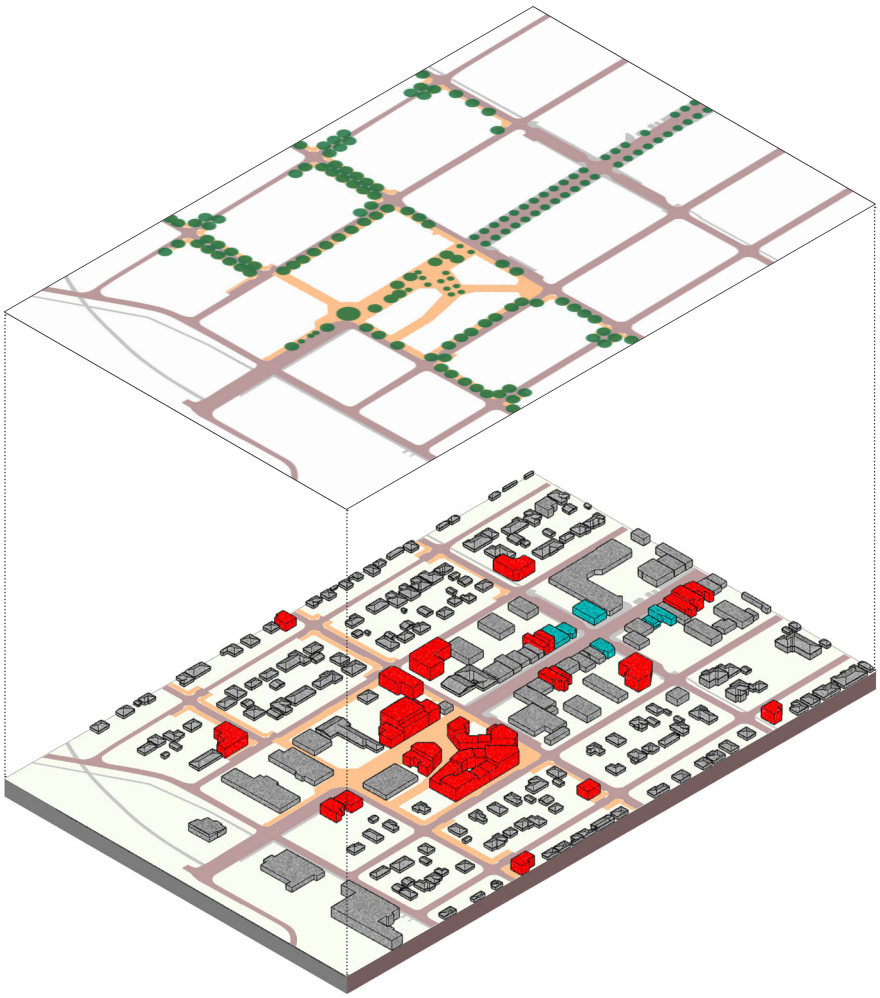
B. Intersection Growth Detail

Legend

New buildings

New sidewalks





A. Main Street Growth Model

Legend

- New buildings
- Historic buildings
- Existing buildings
- Pedestrian area
- Roads
- Juvenile tree
- Mature tree

Units in 2030

Detached units:	**108**
Duplex units:	**28**
Row-homes:	**0**
2 Bed Apts:	**90**
1 Bed Apts:	**82**
3 Bed Apts:	**25**
Studio Apts:	**72**
Total accumulative units:	**405**

Map 53 (top left)
Plan overview of Stonewall in 2030.

Figure 121 (top right)
Isometric model of Stonewall in 2030. Red buildings represent new development.

Figure 122 (bottom left)
Detail isometric view in 2030. A large sidewalk are added and new buildings have appeared.

2035

The population of Manitoba will see increases, leading to further development within this period. At this point, infill will begin to spread along Main Street. There are a few remaining empty lots, aside from the large strip mall parking lot. The Legion building has just completed a redevelopment and expansion. This has created a defined public space that is forming in front of it. The tree canopies around the hotel and redeveloped section of Main Street are coming into form. Some Avenues are beginning to see infill, and these avenues are being incrementally upgraded at the end of their maintenance cycle to reflect this growth.



Plan Overview

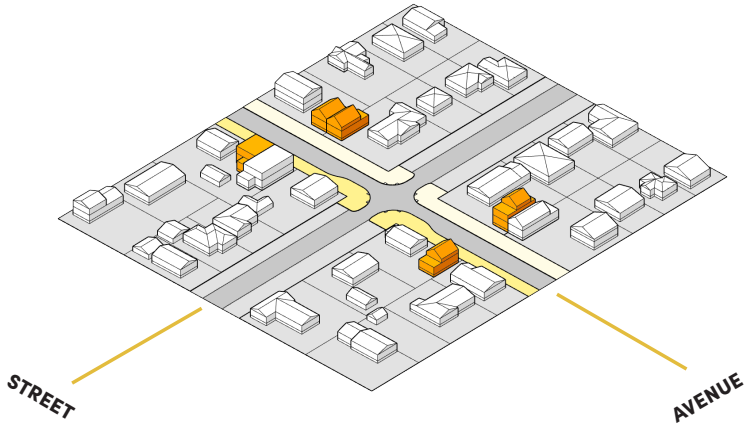
New buildings

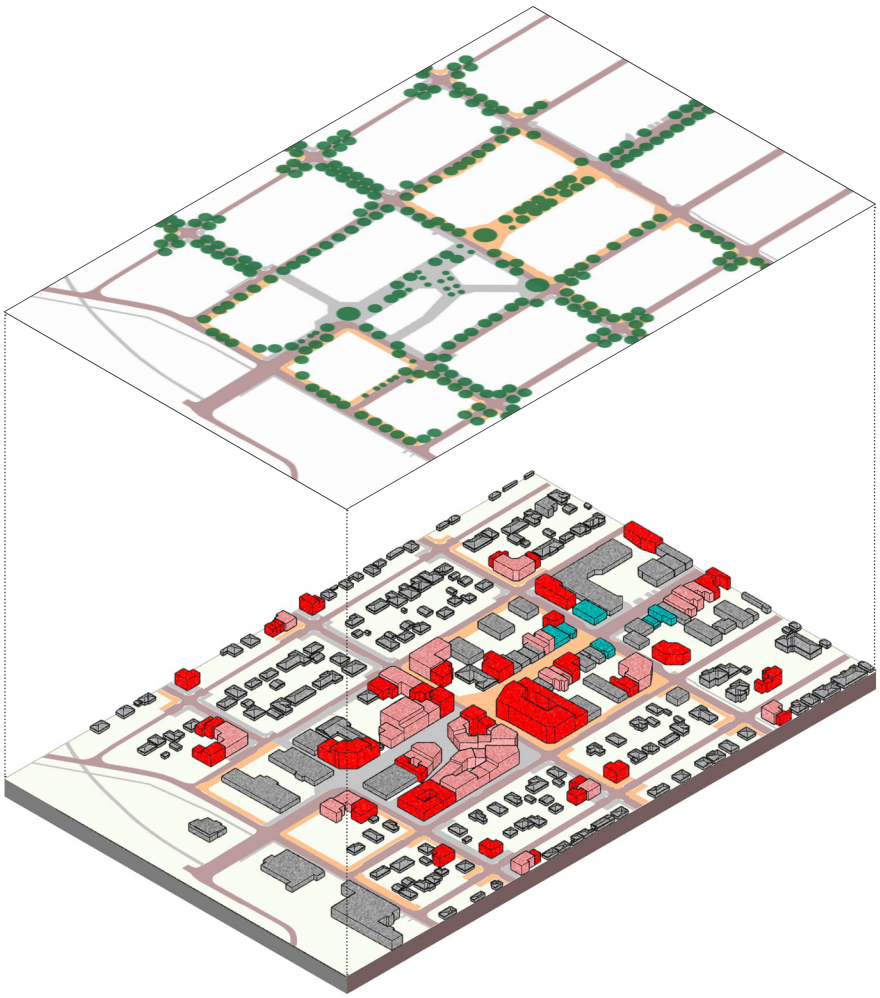
0 250 500 m

B. Intersection Growth detail

Legend

- New buildings
- New sidewalks
- Sidewalks





A. Main Street Growth Model

Legend

- New buildings
- Previous infill buildings
- Historic buildings
- Existing buildings
- Pedestrian area
- Roads
- Juvenile tree
- Mature tree

Units in 2035

Detached units:	**100**
Duplex units:	**28**
Row-homes:	**13**
2 Bed Apts:	**181**
1 Bed Apts:	**159**
3 Bed Apts:	**50**
Studio Apts:	**145**
Total accumulative units:	**676**

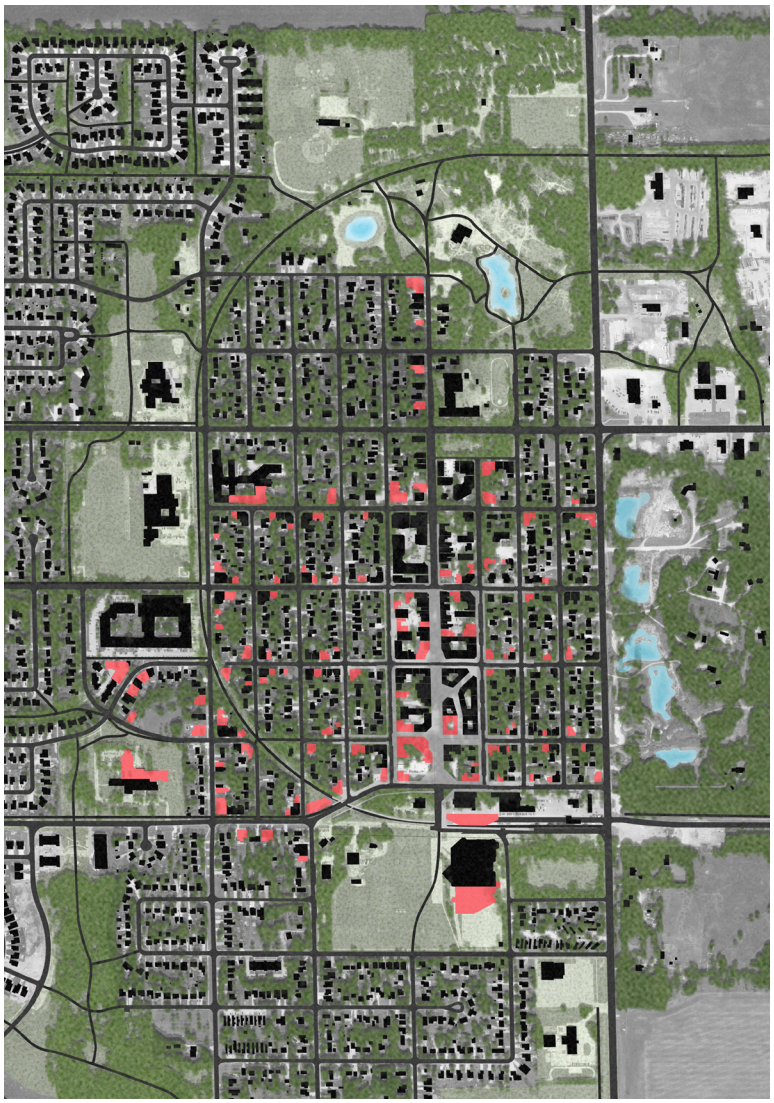
Map 54 (top left)
Plan overview of Stonewall in 2035.

Figure 123 (top right)
Isometric model of Stonewall in 2035. Pink buildings represent infill development that occurred in a previous increment.

Figure 124 (bottom left)
Detail isometric view in 2035. Sidewalks are now on both sides of the Avenue. Some lots have been subdivided to create denser infill.

2040

By now, Stonewall's regional public transportation connection has been re-established at the south end of Main Street, and a platform has been created. The addition of public transportation has spurred on further developments, and the expansion of sidewalks and active transportation links has stimulated a more walkable community. The final parking lot on Main Street is redeveloped with the regional library, the Town of Stonewall and developers to create a market square. This new public space involves closing off Main Street to traffic between 1st Avenue South, and the Legion Plaza. Avenues have continued to see infill, with many starting to have a semi-urban feel.



Plan Overview

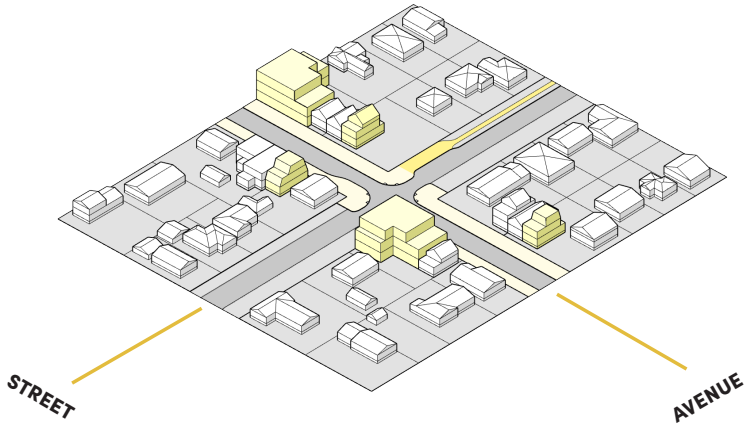
New buildings

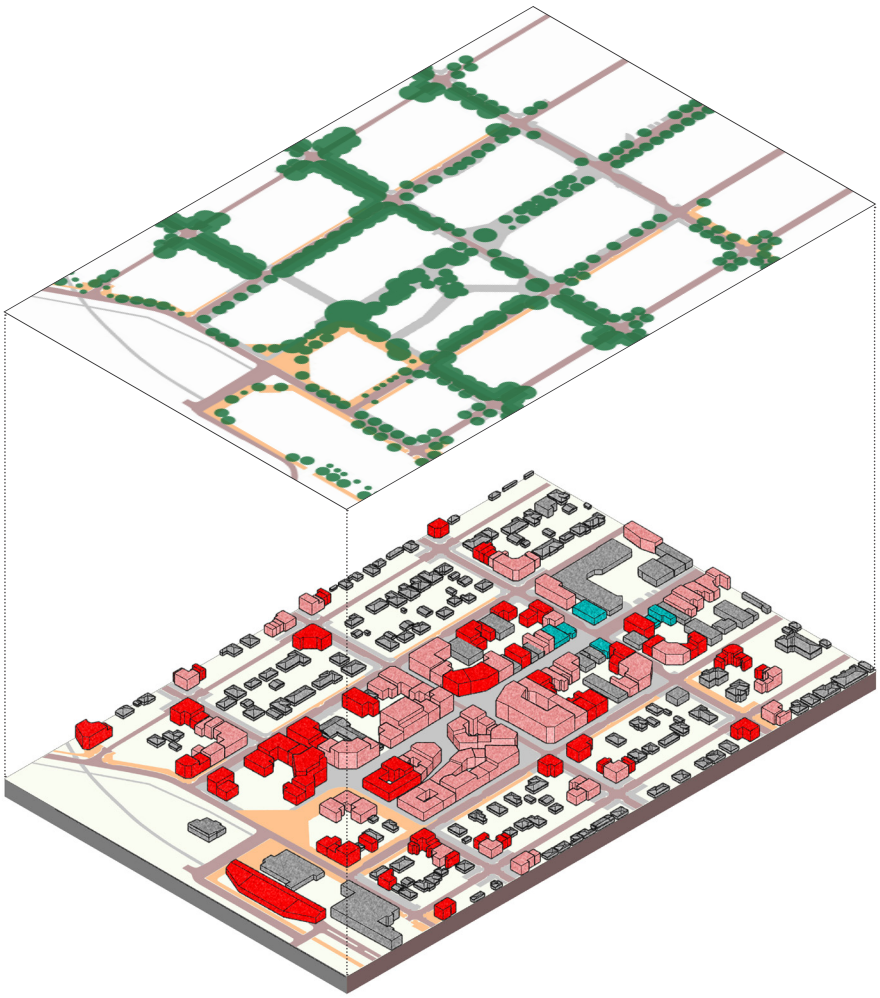
0 250 500 m

B. Intersection Growth detail

Legend

- New buildings
- New sidewalks
- Sidewalks





A. Main Street Growth Model

Legend

- New buildings
- Previous infill buildings
- Historic buildings
- Existing buildings
- Pedestrian area
- Roads
- Juvenile tree
- Mature tree

Units in 2040

Detached units:	**90**
Duplex units:	**26**
Row-homes:	**37**
2 Bed Apts:	**302**
1 Bed Apts:	**261**
3 Bed Apts:	**84**
Studio Apts:	**242**

Total accumulative units: 1042

Map 55 (top left)
Plan overview of Stonewall in 2040.

Figure 125 (top right)
Isometric model of Stonewall in 2040.

Figure 126 (bottom left)
Detail isometric view in 2035. Sidewalks have been built on part of the street. One of the corner lots is filled, containing a new apartment building with a corner store below.

2045

The success of the car-free portion of Main Street has created development between the market plaza and the new transit station, with the town's growing elderly population will be thriving as a result of the changes. This success has prompted the town to close off further portions of Main Street for pedestrian space. This includes the section of Main Street between Centre Avenue and 1st Avenue South. With Main Street now having a distinct form and elevated social function, development pressure has now spilled outwards continuing infill on the Avenues.



Plan Overview

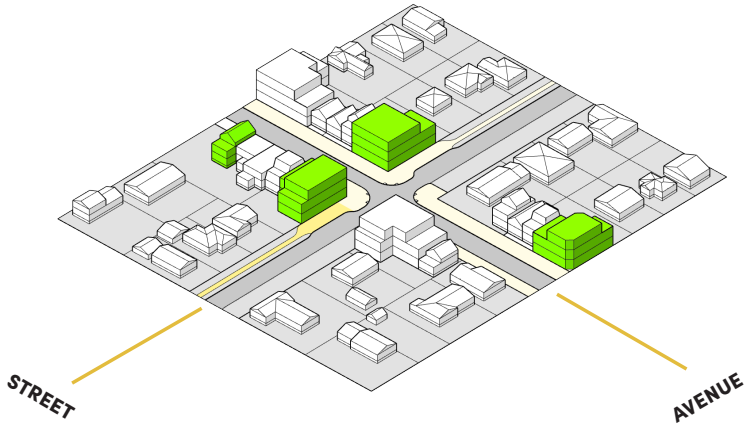
New buildings

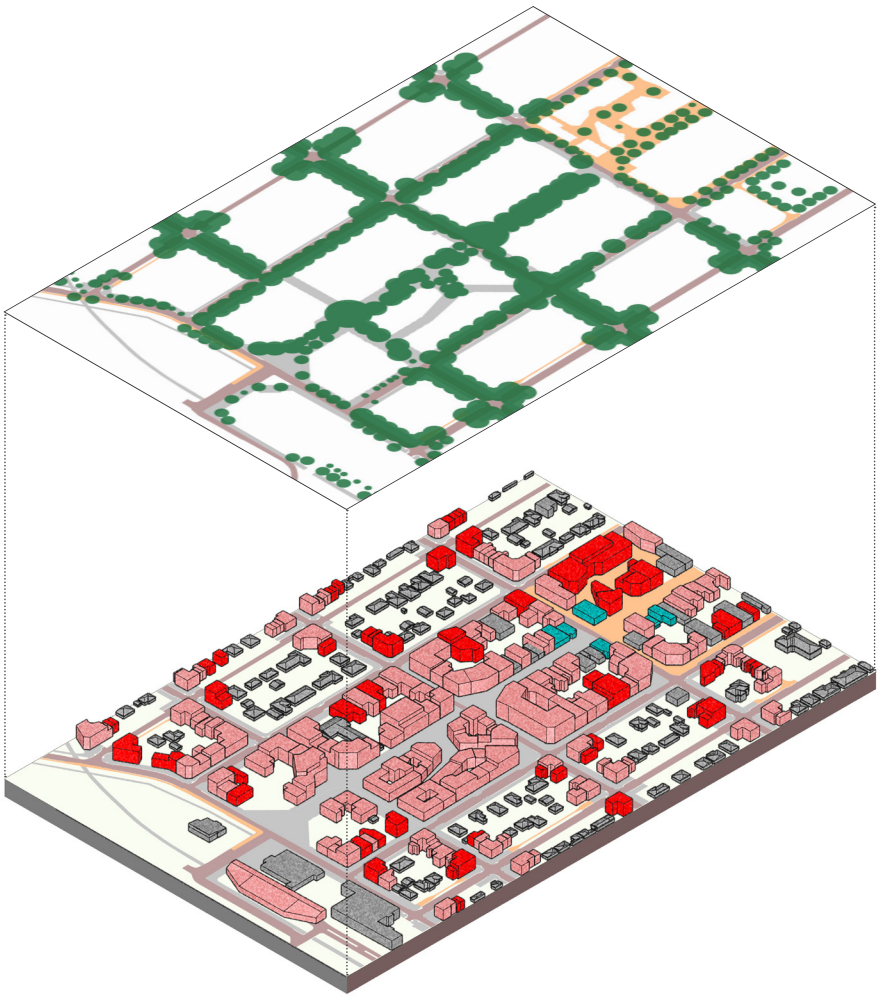
0 250 500 m

B. Intersection Growth detail

Legend

- New buildings
- New sidewalks
- Sidewalks





A. Main Street Growth Model

Legend

- New buildings
- Previous infill buildings
- Historic buildings
- Existing buildings
- Pedestrian area
- Roads
- Juvenile tree
- Mature tree

Units in 2045

Detached units:	**77**
Duplex units:	**18**
Row-homes:	**60**
2 Bed Apts:	**409**
1 Bed Apts:	**351**
3 Bed Apts:	**114**
Studio Apts:	**328**
Total accumulative units:	**1357**

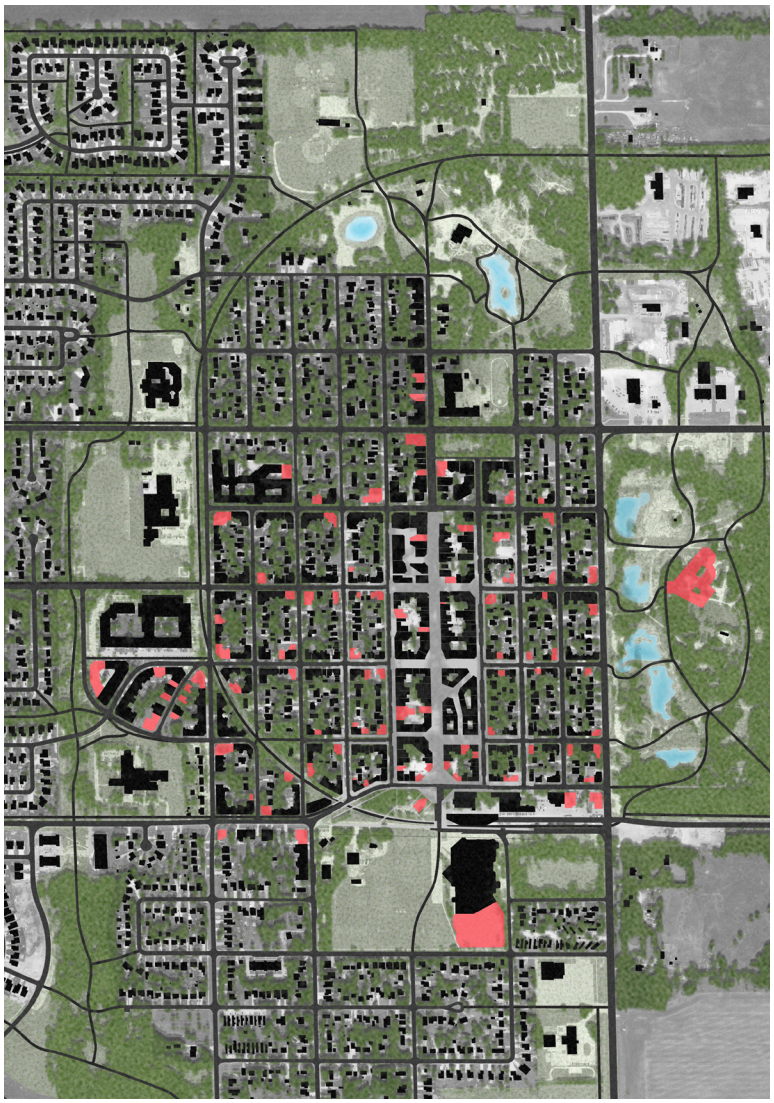
Map 56 (top left)
Plan overview of Stonewall in 2045.

Figure 127 (top right)
Isometric model of Stonewall in 2045.

Figure 128 (bottom left)
Detail isometric view in 2045. Sidewalks now run the length of the west side of 2nd Street East. Two new buildings have been built on the corner, echoing the previous mixed use corner lot development.

2050

The town has grown immensely at this point, and the need for a new town hall has become pertinent. With the goal of connecting the Main Street pedestrian space directly to the public transit hub, the town closes off the intersection of Main Street and 3rd Avenue South, to create a civic plaza. Fronting this plaza is a new town hall, with an elevated design, and use of local limestone. With an extended car-free space, and increasing public transportation use, the towns movement scheme has diversified, with many people walking and cycling.



Plan Overview

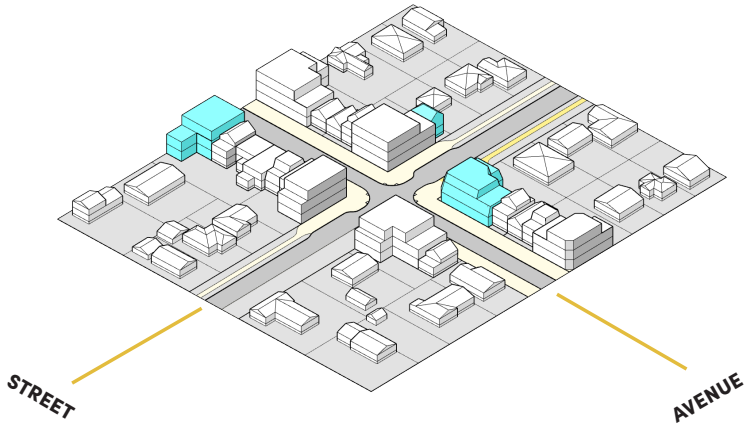
New buildings

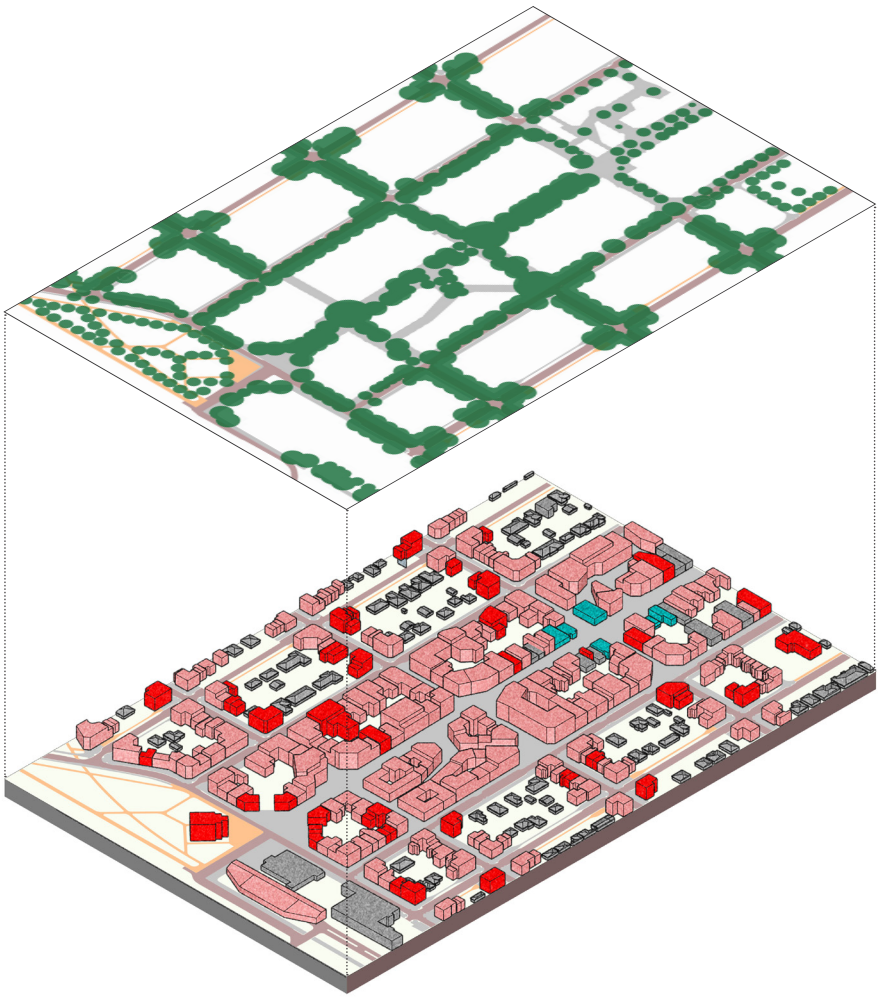
0 250 500 m

B. Intersection Growth detail

Legend

- New buildings
- New sidewalks
- Sidewalks





A. Main Street Growth Model

Legend

- New buildings
- Previous infill buildings
- Historic buildings
- Existing buildings
- Pedestrian area
- Roads
- Juvenile tree
- Mature tree

Units in 2050

Detached units:	**65**
Duplex units:	**12**
Row-homes:	**78**
2 Bed Apts:	**489**
1 Bed Apts:	**413**
3 Bed Apts:	**134**
Studio Apts:	**387**

Total accumulative units: 1572

Map 57 (top left)
Plan overview of Stonewall in 2050.

Figure 129 (top right)
Isometric model of Stonewall in 2050.

Figure 130 (bottom left)
Detail isometric view in 2050. The sidewalks have now begun to grow on the east side of 2nd Street East. The last corner lot of the intersection is filled, creating an activated local corner.

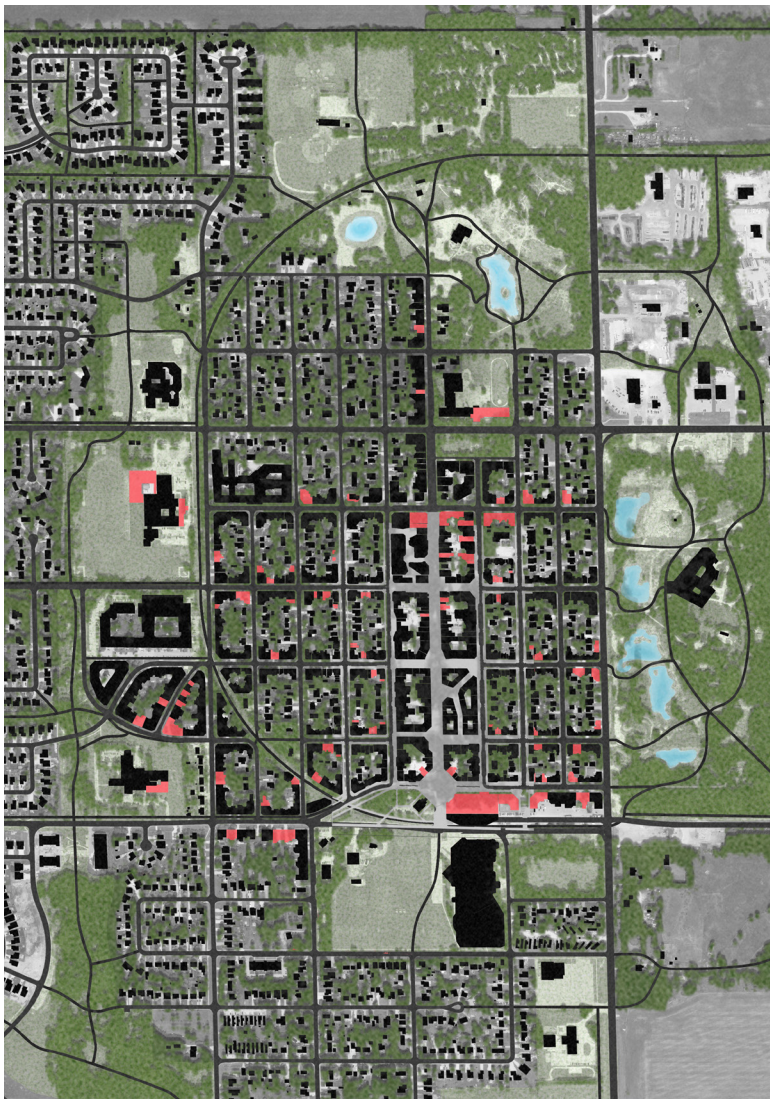
2055

Stonewall has seen a large increase in population, and this has reflected positively in the growth of Main Street's commercial, and social functions. The range of housing options near Main Street allow for flexibility in ones' housing career. Access to a variety of greenspaces help improve the quality of life, even for those who cannot maintain a garden. With this increased success, and overall regional growth, the town has seen the addition of a transportation centre. This centre incorporates housing, commercial, and community uses into an upgraded regional transitway. By 2055, much of the tree canopy has matured creating comfortable and cozy public spaces. With a healthy demographic balance, and thriving Main Street served by public transportation, growth has naturally continued down the towns avenues.

B. Intersection Growth detail

Legend

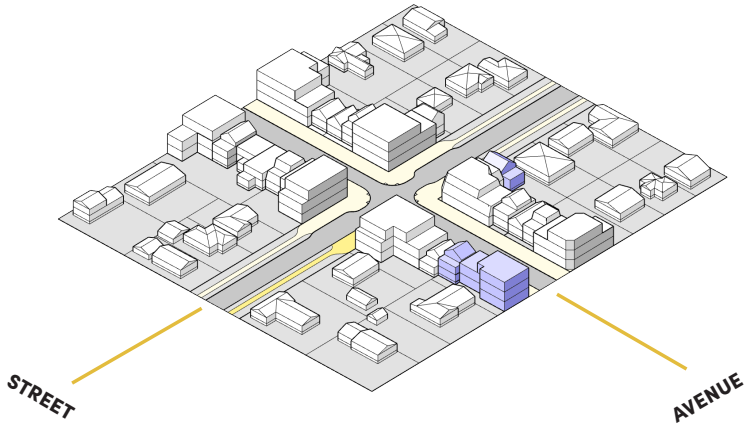
- New buildings
- New sidewalks
- Sidewalks

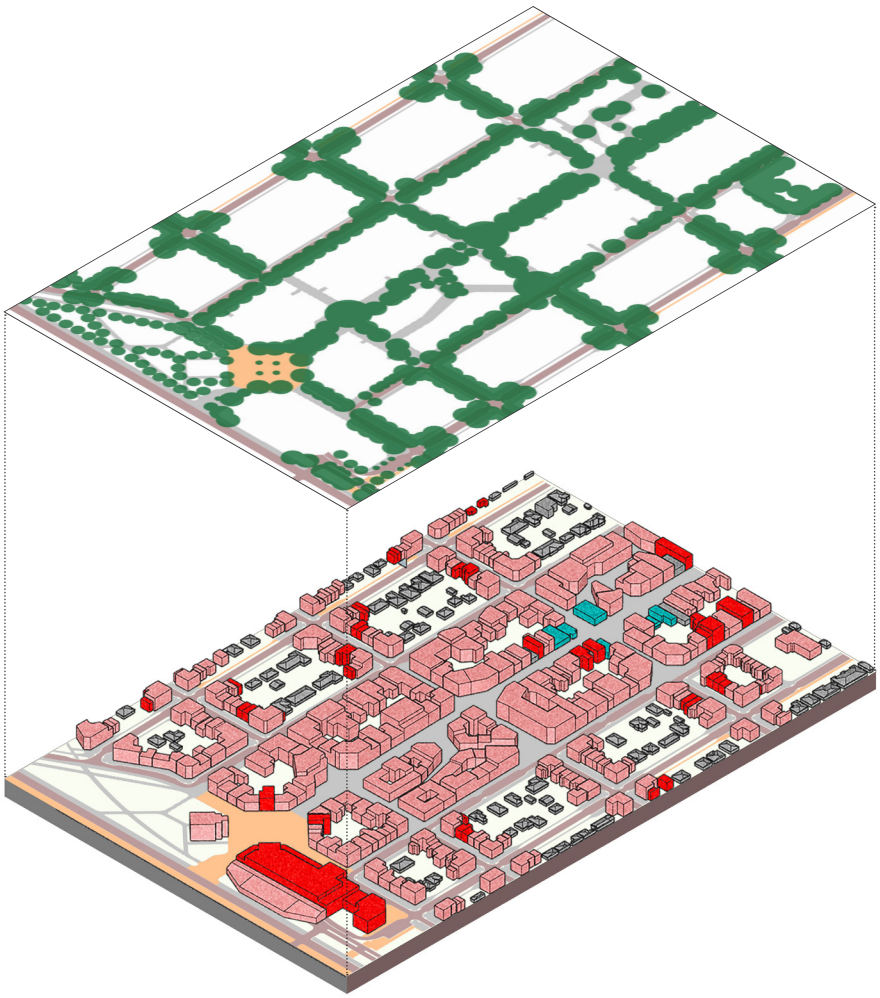


Plan Overview

New buildings

0 250 500 m





A. Main Street Growth Model

Legend

- New buildings
- Previous infill buildings
- Historic buildings
- Existing buildings
- Pedestrian area
- Roads
- Juvenile tree
- Mature tree

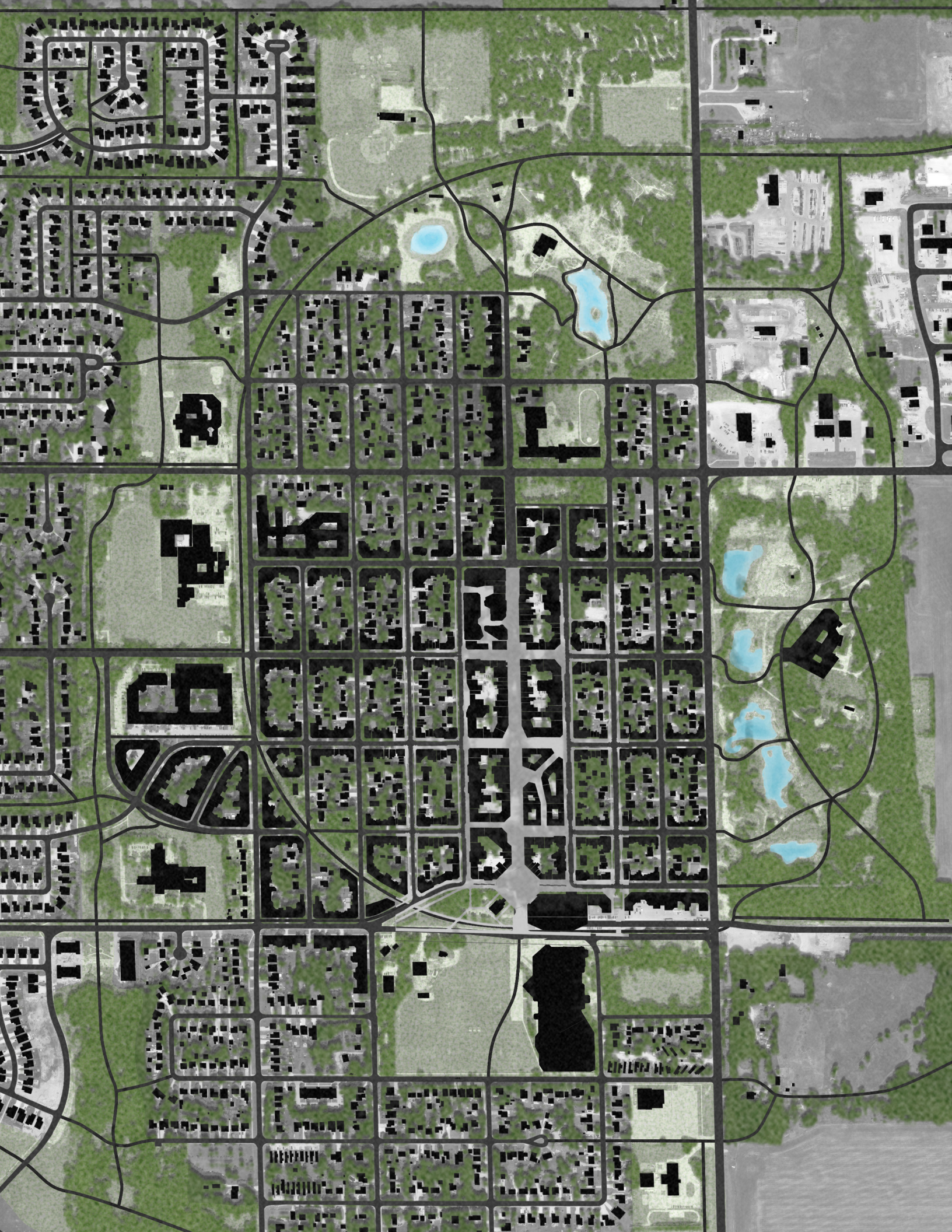
Units in 2055

Detached units:	**64**
Duplex units:	**12**
Row-homes:	**102**
2 Bed Apts:	**550**
1 Bed Apts:	**469**
3 Bed Apts:	**152**
Studio Apts:	**441**
Total accumulative units:	**1790**

Map 58 (top left)
Plan overview of Stonewall in 2055.

Figure 131 (top right)
Isometric model of Stonewall in 2055.

Figure 132 (bottom left)
Detail isometric view in 2055. Sidewalks are now on all streets and avenues. Avenues have begun to completely fill up with row homes and apartment buildings, creating comfortable and active corridors. These avenues also act as gateways to and from Main Street.



Atmosphere, spatial qualities and materials

By 2055, Main Street is the 'Shimmer in the Pearl' of Stonewall and an icon within the Winnipeg Social City. It not only serves the diverse and thriving population of Stonewall, but also the surrounding communities of Stony Mountain, Balmoral, Warren, and Teulon.

Main Street's characteristic limestone paving and planters create a unique urban environment. Local businesses are thriving and have solidified themselves into the fabric of Main Street. The forms of these buildings have become iconic, and representative of local materials and culture. This place making along with Stonewall's proximity to Quarry Provincial Park draw in many tourists to the region, with many visiting or rooming on Main Street.

Patios and display stands line the street, while the trees cast dappled sunlight that dances on the pavement. In the canopy above the sounds of leaves, squirrels and birds gently compliment the chatter of people below.

Map 59 (left)
Stonewall 2055 – after decades of incremental infill development.

Figure 133 (right)
A building - the 'Poplar Block', a prominent building on Main Street was constructed in 2038. First it was a tailor, but soon after, it was turned into a butchers shop and deli. In 2055, the building is home to 14 people.



Limestone planters along Main Street add visual interest and colour to everyday life, while also provide a ledge to rest on. During the spring and summer, the aromas of perennial flowers fill the streets. While in the winter, red and yellow twigs of dogwood contrast against white snow and pale limestone. Events like markets and festivals are common on Main Street, with the activation often spilling south into Veterans Memorial Park.

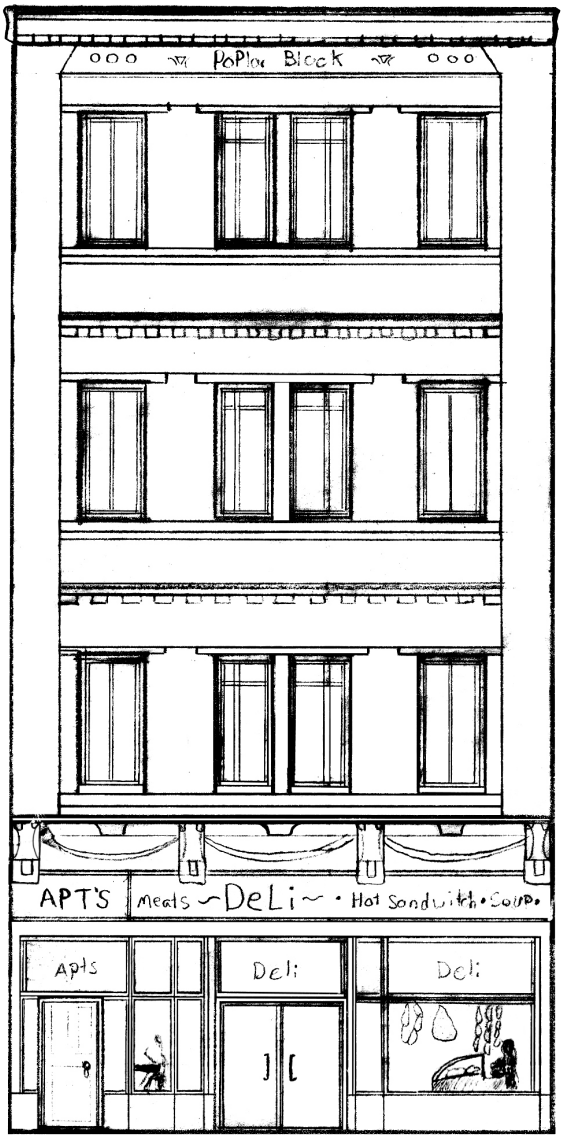
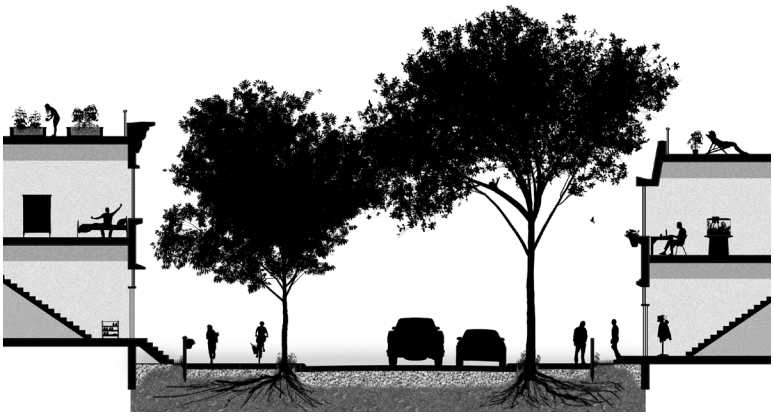




Figure 134 (above)
Details showing the program, canopy and spaces within Main Street in 2055. The extent of the pedestrian area is represented by the dashed red line. These spaces are explored further in the following sections.



A Centre Avenue



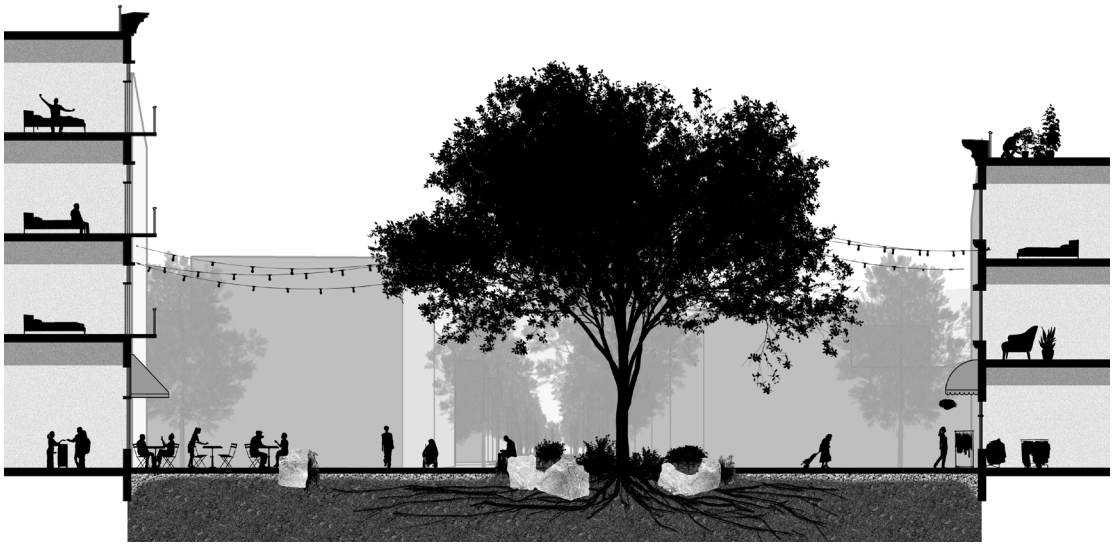
Figure 135
Re-imagined section of Centre Avenue in 2055.



B 1st Street West



Figure 136
Re-imagined section of 1st Street West in 2055.



C Main Street - Hotel Plaza



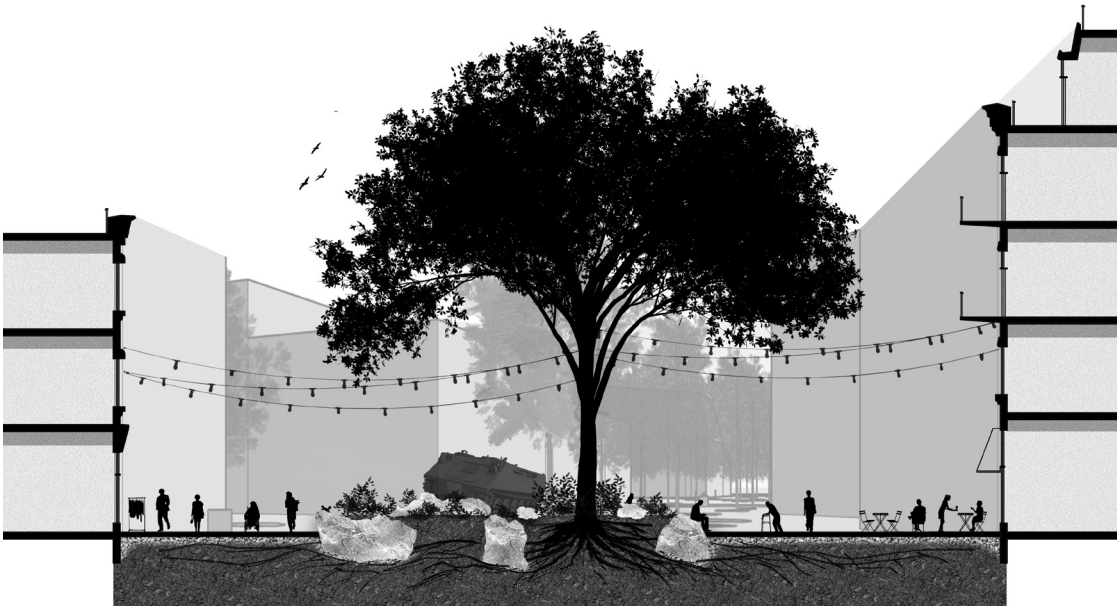
Figure 137
2055 Re-imagined section of Main Street at 1st avenue south



D Main Street - Market Grove



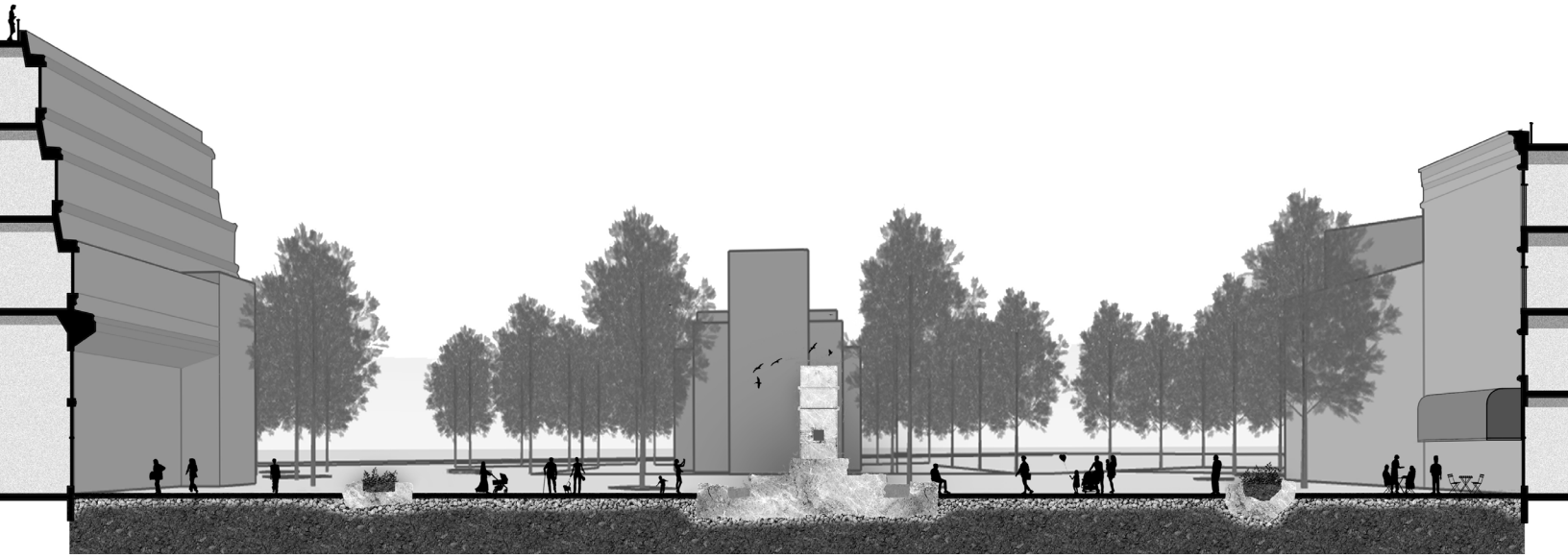
Figure 138
2055 Re-imagined section of Main Street between 1st avenue south and 2nd avenue south



E Main Street - Veterans Plaza



Figure 139
2055 Re-imagined section of Main Street between 2nd avenue south and 3rd avenue south



F Main Street - Town Square



Figure 140
2055 Re-imagined section of Main Street at 3rd avenue south

Note: this section is displayed at a smaller scale.

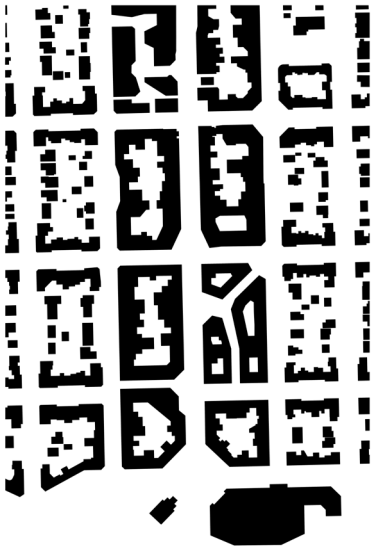
Living in Stonewall is comfortable. Residents can easily walk or take public transportation to work, errands and everyday events. This variety makes the commute more enjoyable, and allows for spontaneity in life. People often run into friends, neighbors or acquaintances and strike up a conversation.
People have not only formed closer relationships with each other, but with local businesses as well. Walking home, it is easy to stop and get groceries, visit a specialty store, or maybe even get a beer. The repertoire between store owners and the community has made many local shops core parts of the towns cultural identity.

Children walk to school on their own and explore the network of parks and forests with friends after classes. Main Street's programming considers children, with formal and informal play areas throughout the street. Limestone planters and forms act as forts and slides, while the splash-pad in front of the library is often bustling in the summer. The courtyards created by the block form allow for childcare to become more communal between parents.

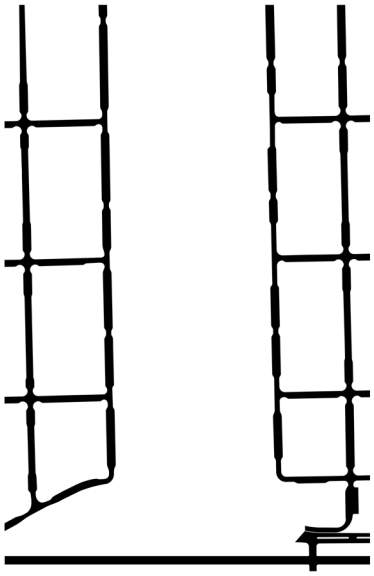
Older people in town have a range of options in their daily lives. There are many community programs people can get involved with, whether that be volunteering at a local event, to helping maintain the towns gardens. Retirees also have many options when it comes to housing. Whether they want an apartment with a view, a small house, or require specialized care, all of these options are available near Main Street.
For those who want to relax, there are many recreational opportunities, including the communal aquatics centre in the hotel, the community space and bar at the legion hall or the beauty of Quarry Park with its swimming hole. The trails, parks and forests throughout the town create many places to withdraw to. These parks include quiet hammock spots hidden in trees, platforms for picnics and quiet benches with great views.

Evenings in Stonewall are full of life. Quarry park echoes with the sounds of swimmers in the summer, and the sounds of skating in the winter. Trails weave throughout the town, making many routes for dog walkers, joggers, or just a quiet stroll. Main Street offers a more lively scene, with bars and restaurants that are open well into the night. As the sun sets, on a clear night, the stars gently dance above.

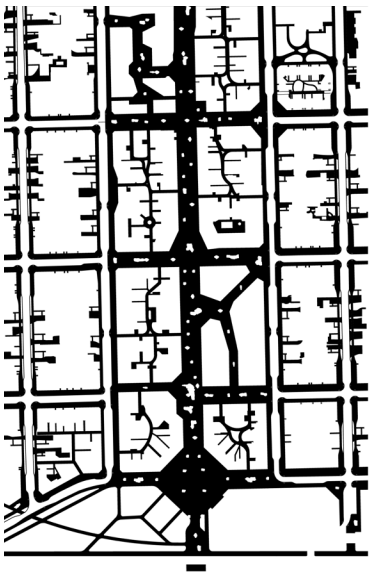
Figure 141 (right)
Sketches showing the constitutional components of the Main Street Plan. In isolation these diagrams are invaluable to understand each aspect of the plan. Starting with the building footprints, showing the edges of the urban space. Next, the streets show where cars and vehicles are permitted. The paved area represents all active transportation and pedestrian space - this includes plaza and brick surfaces. Finally, the bottom three layers represent the soft-scape and green-space, as well as the sizes of the 2055 canopy at two ages.



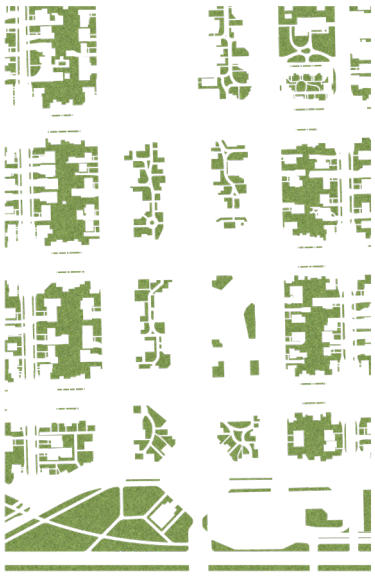
Buildings



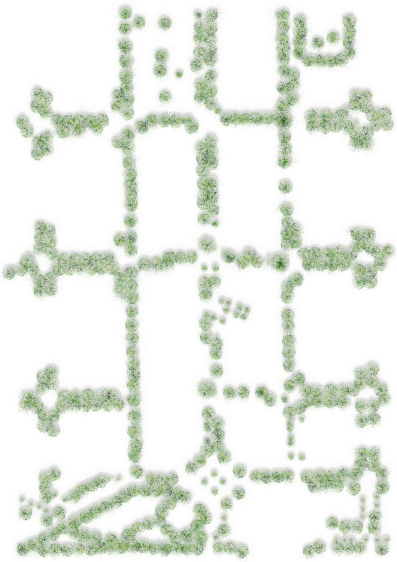
Streets



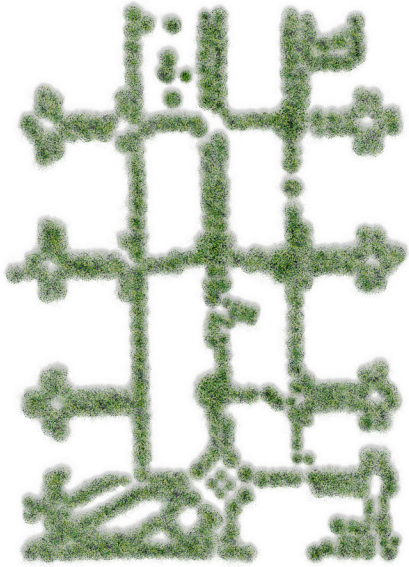
Paved area



Green / Park area

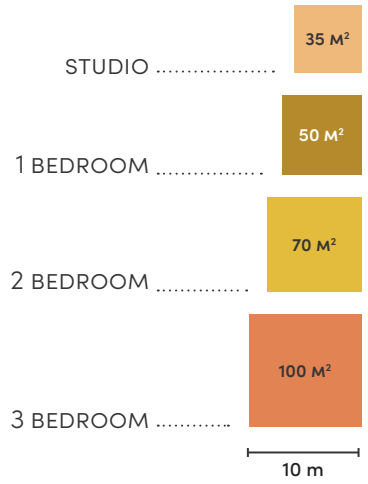


Canopy cover - young

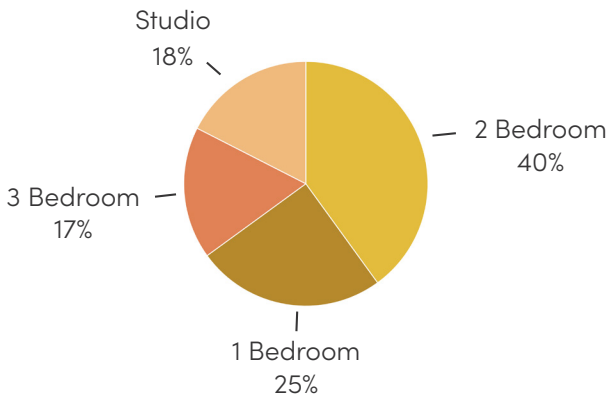


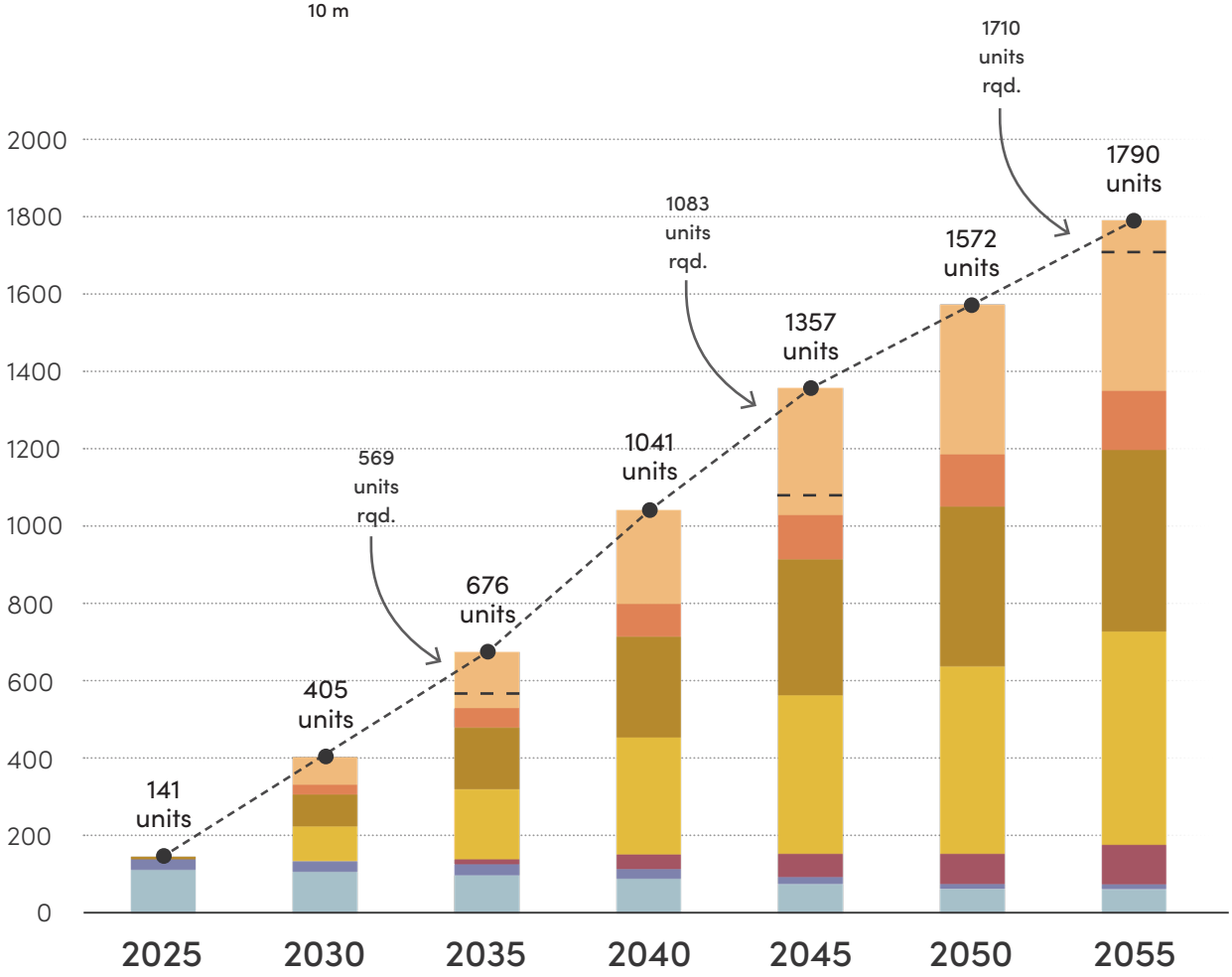
Canopy cover - mature

Assumed size of unit types



Assumed share of units





Legend

- 1 bedroom apartments
- 2 bedroom apartments
- 3 bedroom apartments
- Studio apartments
- Row homes
- Duplex's
- Detached houses

Conclusion

This scheme lets Stonewall grow naturally. Instead of building everything at once, this plan incrementally improves the towns infrastructure while increasing infill development. This is how towns naturally grew in the past and is tied to the ideas of historic urban development. This scheme follows the logic of Soft City, and its criteria for livable density. Specifically, the use of individual buildings that form into a larger enclosed block over time. These blocks provide climatic comfort, shared spaces, and a range of different housing options. This type of development permits logical incremental growth that is non-disruptive to people in the short term, and ecology in the long term.

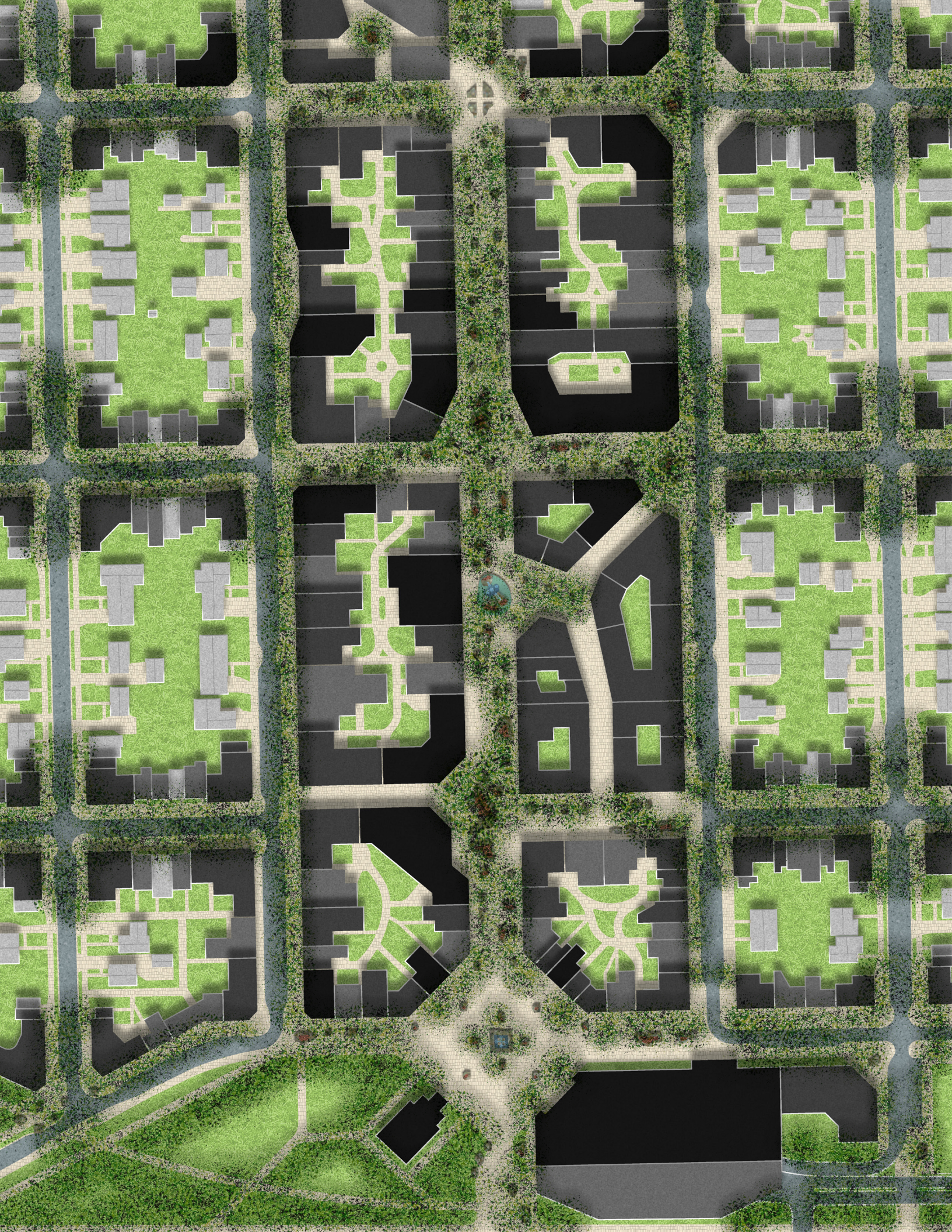
The estimations for Main Street's growth deliver a consistent growth rate, with escalation in the 2040's. These estimations show that by 2055, a total of 1790 dwelling units would be present on the Main Street site. This is an additional 1643 dwelling units in the heart of town, creating homes and new places to facilitate local commerce.

Figure 142 (left)
Diagrams and figures used to calculate the dwelling yield of the Main Street Model. These calculations make assumptions about the size of units, and the ratio of units. The plotted figures show the growth benchmarks laid out in the Residential Supply and Demand report, and how they compare to the yield of this exercise. This chart also display the diversification of unit types in around Main Street.

When paired with the addition of new housing types and public spaces, this plan helps fulfill the WHO's criteria for age friendly communities, by providing a range of quality outdoor spaces, housing types, activities, transportation options and opportunities for civic engagement.
This vision contrasts to the 50-year Residential Supply and Demand report laid out by the Town of Stonewall in 2020. The 2020 report recommends accommodating the housing deficit through urban expansion, a maneuver that would worsen demographic conditions, and make it harder to mitigate climate change. The Stone by Stone vision accommodates the housing deficit in a way that does not outwardly extend the urban fabric of Stonewall. Instead, incremental infill growth is used as a broader solution to the town's demographic problems, retaining its complete community status, and preparing it for the risks of climate change.

Stonewall becomes a place where one can live their whole life from birth to death, if they choose. The town has many options for employment, recreation and the ability to live many different housing types. This has made it an attractive place for newcomers into the region to settle within. This helps balance the towns demographics and allows for robust reactions to rapid fluctuations in population. The network of parks, greenspaces, sports fields and avenues with ecosystem services help alleviate and mitigate the effects of climate change.

With a solidified complete community, and a strong social fabric, Stonewalls potential is unlimited. From here, the torch can be passed on to the next generation, with the hopes that they too will continue to improve and foster a complete community.



Endnotes - Design Solution

209. "The Charter of the New Urbanism," CNU, August 15, 2024.
210. CNU, "The Charter of the New Urbanism," Congress for the New Urbanism, August 15, 2024, https://www.cnu.org/who-we-are/charter-new-urbanism, 1-9.
211. CNU, "The Charter of the New Urbanism," Congress for the New Urbanism, August 15, 2024, https://www.cnu.org/who-we-are/charter-new-urbanism, 3.
212. CNU, "The Charter of the New Urbanism," Congress for the New Urbanism, August 15, 2024, https://www.cnu.org/who-we-are/charter-new-urbanism, 17.
213. Peter Calthorpe, The next American Metropolis: Ecology, Community, and the American Dream (New York: Princeton Architectural Press, 1993), 56.
214. CNU, "The Charter of the New Urbanism," Congress for the New Urbanism, August 15, 2024, https://www.cnu.org/who-we-are/charter-new-urbanism, 12.
215. David Sim and Jan Gehl, Soft City: Building Density for Everyday Life (Washington: Island Press, 2019), 228-229.

Main Street - 2055

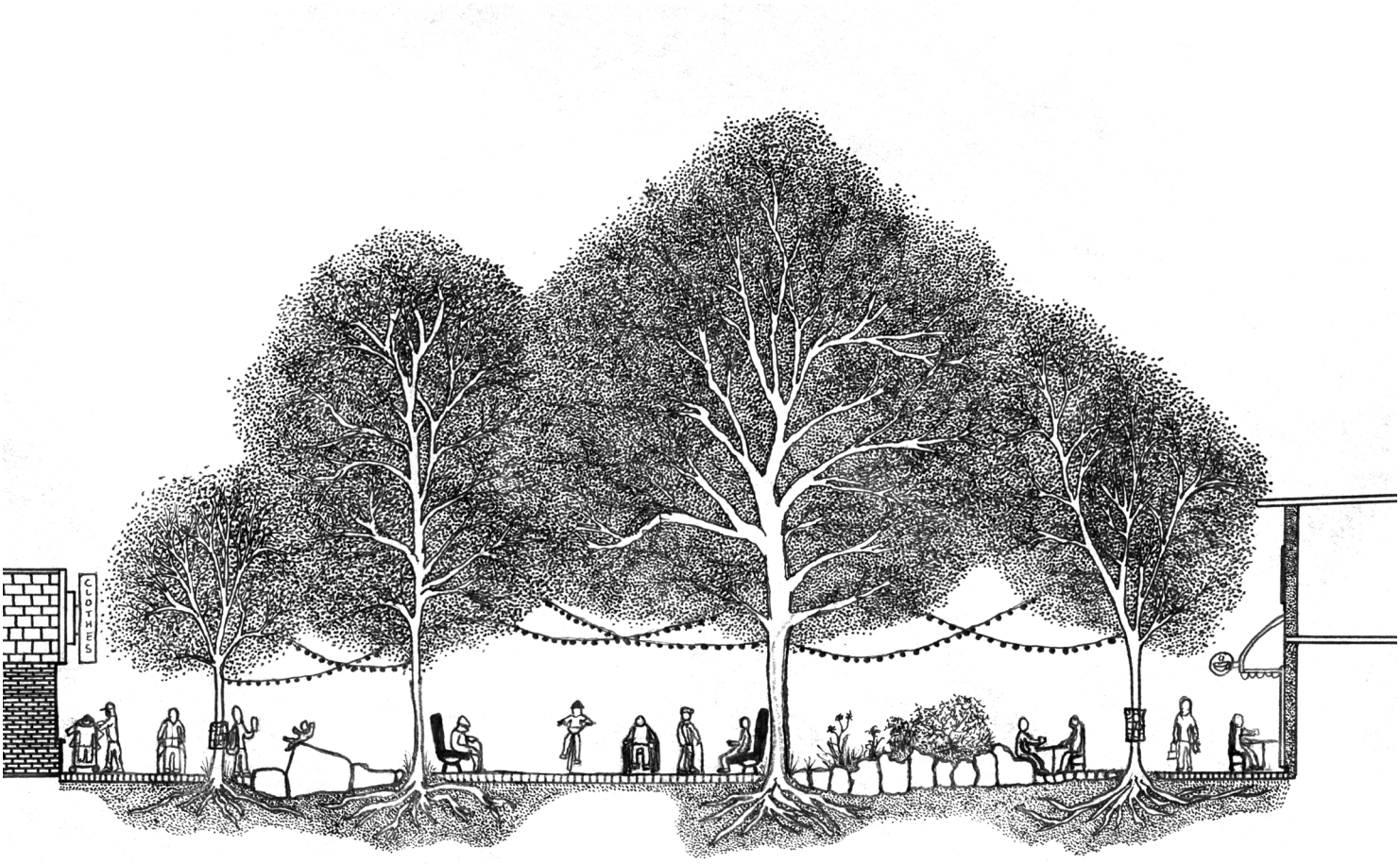
Figure 143 (left)
Detailed plan view of Main Street and its surroundings in 2055.





PART V
Reflection and Conclusions

Figure 144 (left)
View of the active quarries north east of Stonewall.
Personal photograph. January 13, 2025.



Main Street - Visionary Sketch

Reflection on Design

This design places the housing needs set by Stonewall into a 30-year vision. This vision imagines a future for both the region, and Stonewall itself. Informed by analysis, the design grows Stonewalls housing capacity through the intensification and diversification of its housing stock and accompanying infrastructure at local and regional scales. This growth regime addresses environmental threats posed by climate change while accommodating shifting demographics and an aging population.

Main Street becomes the focal point of the Northwest Winnipeg Social City, providing a plethora of services for Stonewall, and the broader region, in a way that focuses on community, and small-town identity. The regional scale of the vision reflects transportation corridors, and other interurban connections, showing how they interface with and enhance existing ecological features.

This vision is constructed though the assemblage of various principles and theories. Stitching together the concepts of urbanism landscape architecture and sociology to create a strategic urban design. Specifically, this vision explores the links between Peter Calthorpe's concepts of Transit Oriented Development, and David Sim's urban design recommendations from Soft City. The relationship between these two concepts allows for a more complex understanding of evolving Housing Careers in a small town setting.

Though the design is focused on a large regional site and a detailed portion of Main Street. These principles should be applied to the remainder of Stonewalls Main Street going north to Quarry Park. These sites where selected because they embody similar challenges to those faced by many small towns across Southern Manitoba. However, they also represent how urban growth has historically occurred, with a focus on Main Street, and its relationship to the broader region. The versatility in this vision allows it to be carefully applied as a solution to demographic and climatic issues faced by other Main Streets, Regional Centres and lands throughout the Winnipeg Metropolitan Region.

This scaled design exercise reveals that the solutions to urban and regional planning are extremely interconnected and must be viewed as two sides of the same coin. Doing this allows for a focused view of the urban area, while still engaging with the needs of the broader landscape. The regional and urban design represent how Urbanist principles can be effectively applied to an existing small community, and how these principles extend beyond a neighborhood, or street.

The Framework of the Winnipeg Social City allows for a concise and clear regional vision that each community can adopt and adapt to their specialized needs. By locating growth strategically in regional centres, while accommodating demographic and climate change threats, the region will be able to see robust growth and development well into the future.

Figure 145 (left)
Visionary sectional sketch imagining a slice of Main street before the buildings have been redeveloped.
Hand drawn sketch by author.

Areas for future research

The scope, of this report emphasizes a select region, and select social issues. As mentioned prior, this report only looks at one side of the story, and it would be deeply enriched by a focused study of the ecological aspects of Stonewall, and the greater Winnipeg Social City. This examination should relate the regional and urban plans in this report back to habitat restoration targets, and other regional ecological goals. This research should include solutions to transform drains into riparian corridors, alter and rehabilitate farmlands, and the large-scale restoration of marshlands. Another area of further analysis would be the planning, phasing and implementation of a potential regional public transportation network, and how it would interface with the landscape.

Further research and design work should be undertaken to refine certain portions of the vision. This includes a closer look at the paving, detailing and planting plans for the urban spaces on Main Street; the form and function of the new parks within Stonewall; the establishment of new quarry parks from defunct industrial quarries; a detailed architectural exploration of the form and function of infill buildings; and a refined investigation of the form, function and phasing of courtyard spaces.

Any further research on the topic is invaluable to understanding the future conditions of Stonewall, and the region.



Final thoughts

Stonewall and the Winnipeg Metropolitan Region have great potential in the face of climate change. Through the vision laid out in this report, the town and the region grow together strategically to alleviate demographic pressures and population demands, while providing room for ecological functions and services within the landscape.

Growth within urban areas is focused on providing a variety of dwelling options, within the core or town. This lets the town grow naturally and respond to changes in demographic makeup as well as influxes in population. The incremental growth analysis in this report resulted in slightly more units than the projected demands. This demonstrates the versatility of infill development, and how it can be used to fulfill many densities, with many dwelling types. Using infill strategically, urban areas can alleviate many challenges and improve quality of life for all residents.

Figure 146 (left)
View of the limestone kilns in Quarry Park. These kilns are currently undergoing a renovation to ensure they continue to be a lasting monument for the town of Stonewall. Personal photograph. August 24, 2024.

Growth in the regional context needs to provide equitable options for movement, for everyone. This includes public transportation, trails and paths, ecological corridors and safe highways. Providing a diversity in movement options makes urban areas more walkable and fosters transit-oriented development within urban cores. This is paired with limiting development to existing towns and urban areas while strengthening and expanding natural areas. Doing this allows the landscape to thrive for ecology and recreation. Sharing the landscape in this way also provides greater robustness in the face of climate change, specifically the availability of water.

The Stone by Stone vision should be used by other small towns as a guide to alleviate demographic challenges like aging in place and population uncertainty, while providing equitable, natural urban growth in the face of climate change. Building up a town in this way forms a comfortable and activated urban environment that enables quality social functions and honored cultural traditions. As seen in the palimpsest research, Stonewall has already developed a rich culture, with stories and urban traditions that have outlasted the original inhabitants.

Stonewall is still young. The decisions that are made today will be left to future generations, the children and grandchildren of today. In 2055, Stonewall should be a community that residents are proud to say that they built.



PART VI
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Figure 147 (left)
East side of Main Street, just south of Centre Avenue. Personal photograph. August 24, 2024.

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Maps 25 - 28: Osler, Tristan. Plan view collage of Stonewall and Precedent locations. GIS map made by author. Google imagery. Esri Imagery. 2024.

- Stonewall
  - Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.

- Norton Commons
  - Imagery ©2025 Airbus, CNES, / Airbus, Landsat / Copernicus, Maxar Technologies, Map data ©2025 Google.

- Parliament Street
  - Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.

- Pearl Street Mall
  - Imagery ©2025 Airbus, CNES, / Airbus, Landsat / Copernicus, Maxar Technologies, Map data ©2025 Google.

Map 29: Osler, Tristan. Plan view of Stonewall. GIS map made by author. Esri Imagery. 2024.

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Map 30: Osler, Tristan. Plan view of Norton Commons. GIS map made by author. Esri Imagery. 2024.

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Map 32: Osler, Tristan. Plan view of Pearl Street Mall. GIS map made by author. Esri Imagery. 2024.

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Map 39: Osler, Tristan. Growth of Stonewalls urban footprint from 1919-2020. Adapted from print maps and GIS Data. GIS map made by author. 2024.

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Map 41: Osler, Tristan. Buildings within Stonewall. GIS map made by author. Shapefile created by author.

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Map 42: Osler, Tristan. Plan view collage of Stonewall within its surroundings. GIS map made by author. Esri Imagery. 2024.

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Map 43: Osler, Tristan. SWOT – Main Street Stonewall - Strengths. Digital diagram made by author. 2024.

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Map 44: Osler, Tristan. SWOT – Main Street Stonewall - Weaknesses. Digital diagram made by author. 2024.

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Map 45: Osler, Tristan. SWOT – Main Street Stonewall - Opportunities. Digital diagram made by author. 2024.

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Map 46: Osler, Tristan. SWOT – Main Street Stonewall - Threats. Digital diagram made by author. 2024.

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Map 47: Osler, Tristan. A slice of Winnipeg Metropolitan Social City, showing the Northwest region in 2055. Digital image made by author. 2025.

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Map 48: Osler, Tristan. Map showing the regional scheme for the area around Stonewall in 2055. Digital diagram made by author. 2025.

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Map 49: Osler, Tristan. Stonewall's Town plan, and its immediate surroundings in 2055. Digital image made by author. 2025.

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Map 50: Osler, Tristan. Movement Network in Stonewall, 2055. Digital diagram made by author. 2025.

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Map 51: Osler, Tristan. Stonewall 2055 – Density plan and Amenities. Digital image made by author. 2025.

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Map 52: Osler, Tristan. Stonewall 2025 – Growth Increments. Digital image made by author. 2025.

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Map 53: Osler, Tristan. Stonewall 2030 – Growth Increments. Digital image made by author. 2025

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Map 54: Osler, Tristan. Stonewall 2035 – Growth Increments. Digital image made by author. 2025.

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Map 55: Osler, Tristan. Stonewall 2040 – Growth Increments. Digital image made by author. 2025.

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Map 56: Osler, Tristan. Stonewall 2045 – Growth Increments. Digital image made by author. 2025.

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Map 57: Osler, Tristan. Stonewall 2050 – Growth Increments. Digital image made by author. 2025.

- Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.

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- Osler, Tristan. Stonewall Building Inventory. Shapefile. August 2024. GIS shapefile derived from Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.

Map 58: Osler, Tristan. Stonewall 2055 – Growth Increments. Digital image made by author. 2025.

- Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.

- Government of Canada, Natural Resources Canada. NRN Manitoba GEOPACKAGE. 2024. Open Government Licence – Canada. https://open.canada.ca/data/en/dataset/3d282116-e556-400c-9306-ca1a3cada77f. August 2025.

- Osler, Tristan. Stonewall Building Inventory. Shapefile. August 2024. GIS shapefile derived from Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.

Map 59: Osler, Tristan. Stonewall 2055 – Final Vision. Digital image made by author. 2025.

- Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.

- Government of Canada, Natural Resources Canada. NRN Manitoba GEOPACKAGE. 2024. Open Government Licence – Canada. https://open.canada.ca/data/en/dataset/3d282116-e556-400c-9306-ca1a3cada77f. August 2025.

- Osler, Tristan. Stonewall Building Inventory. Shapefile. August 2024. GIS shapefile derived from Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.

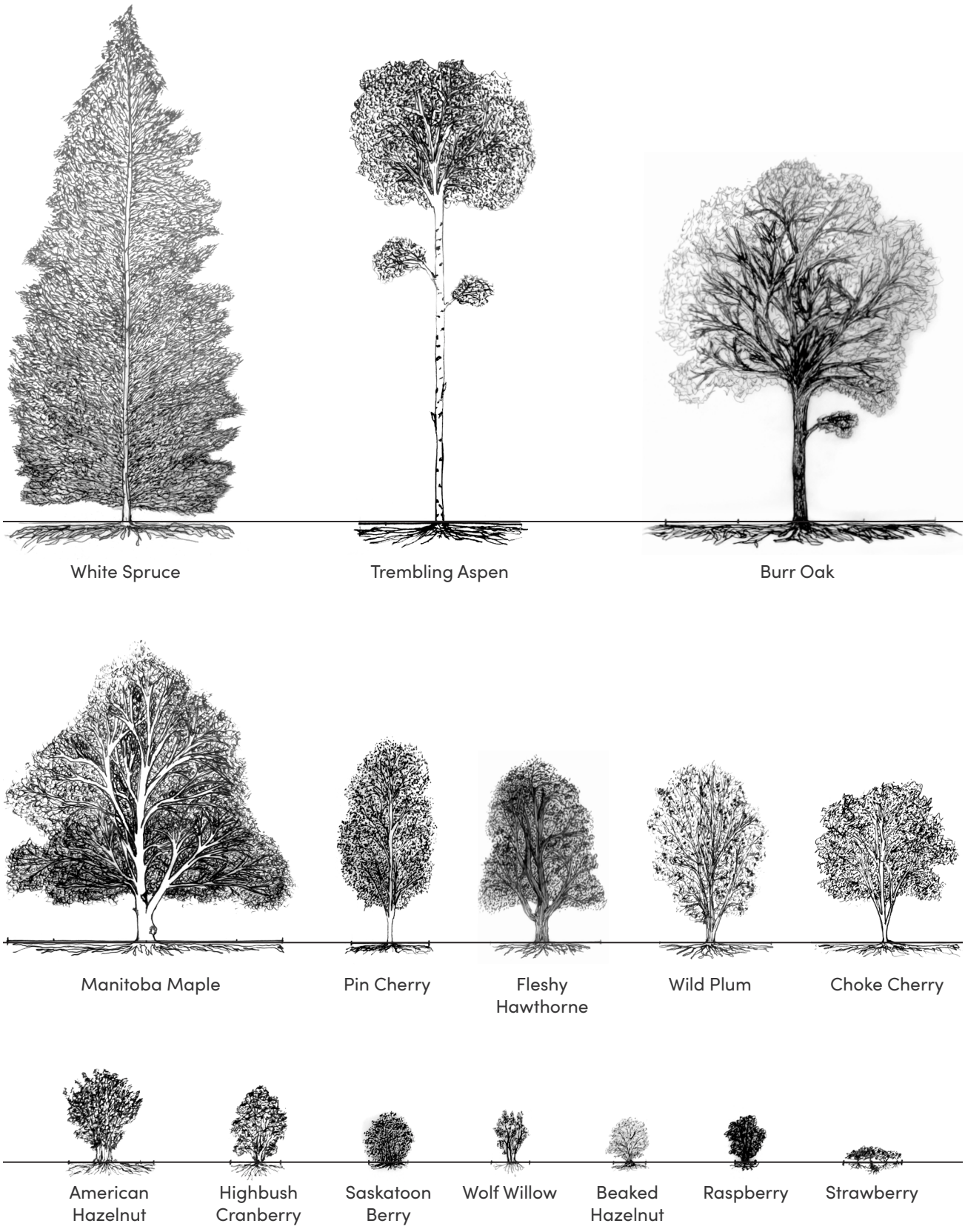
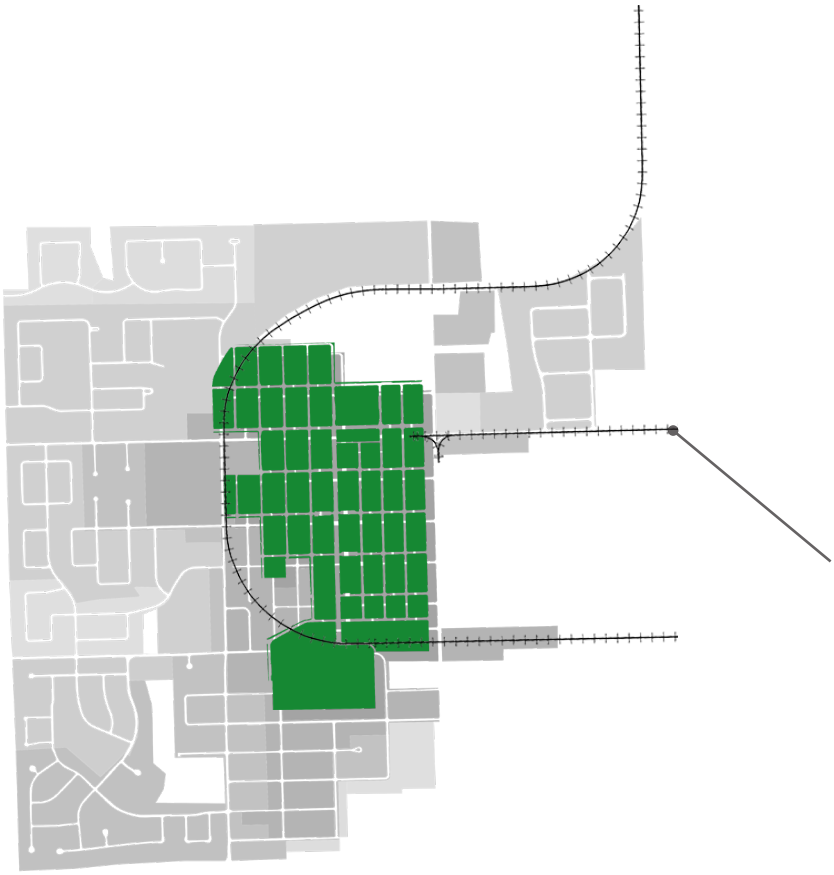


Figure 148 (above)
Various trees and woody species present in the Stonewall area. Hand drawn ink sketches by author.

PART VII
Appendix

Stonewall's Growth over time:

Figure 149 (pages 272-275)
Diagrams depicting the growth and development of Stonewall from 1919-2025. These diagrams were created through the analysis of historical mapping, and available Google Earth satellite imagery



1919 - 1949

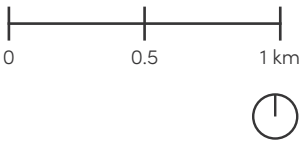
1919 population: 1128
1949 population: 1036

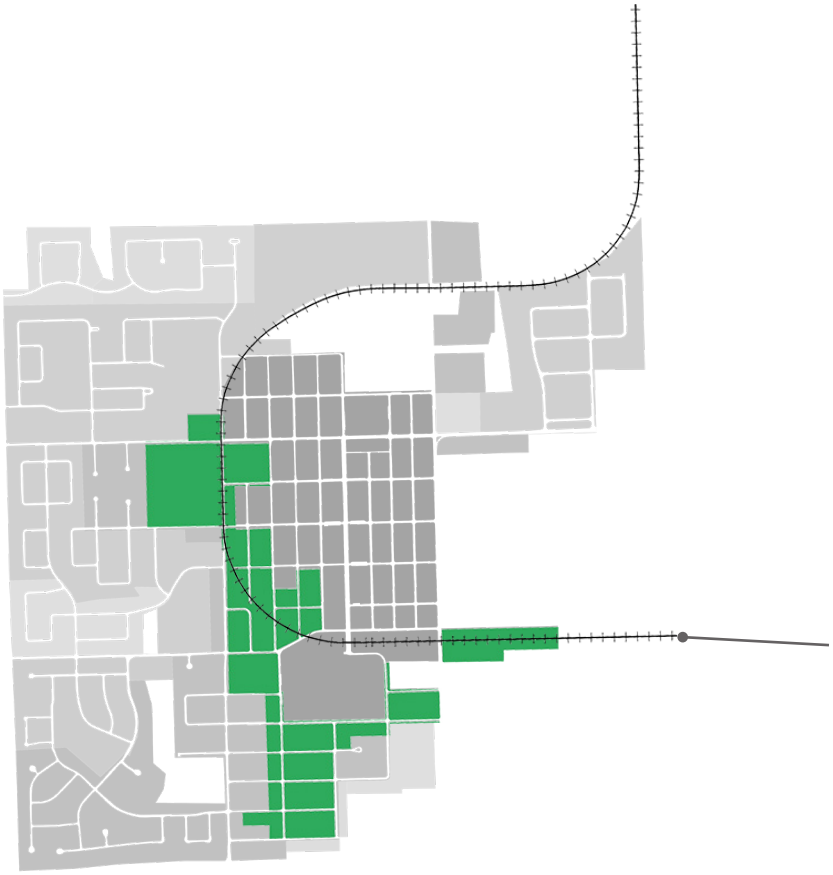
8% population decline

Total road length: 12,818 m
Total road area: 28,7820 m^2

12m (278 m^2) of road per person in 1949.

Streetcar interurban line (1914-1936)





1949 - 1968

1949 population: 1036
1968 population: 1579

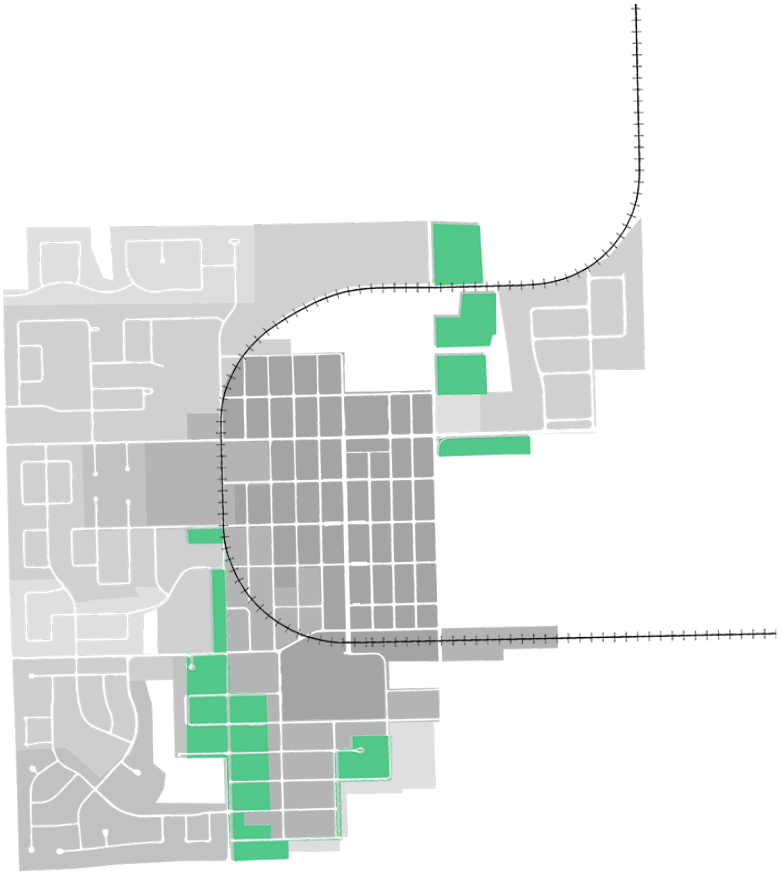
52% population growth

Total road length:18,212 m
Total road area: 39,3352 m^2

12m (249 m^2) of road per person in 1968.

CP Railway (Passenger service: 1880s - early 50s)
Replaced with bus service.

0 0.5 1 km



1968 - 1981

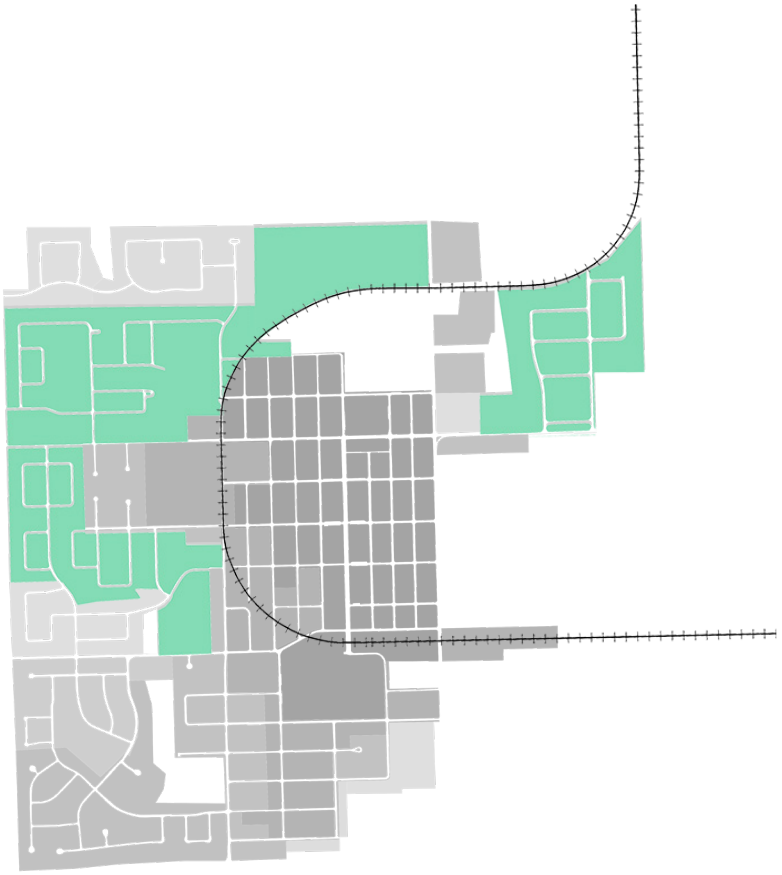
1968 population: 1579
1981 population: 2210

40% population growth

Total road length: 23,897 m
Total road area: 51,4232 m^2

11m (233 m^2)of road per person in 1981.

0 0.5 1 km



1981 - 2000

1981 population: 2210
2000 population: 3947

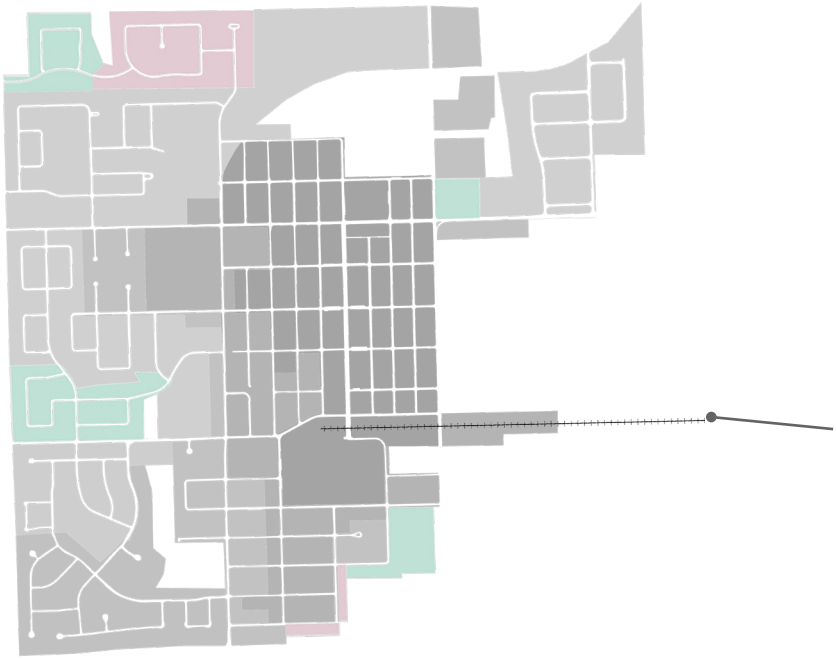
79% population growth

Total road length: 33,661 m
Total road area: 74,4008 m^2

9m (188 m^2) of road per person in 2000.

Bus service removed in the mid 80s. Freight service slowing on existing tracks.

0 0.5 1 km



2000 - 2015

2000 population: 3947
2015 population: 4754

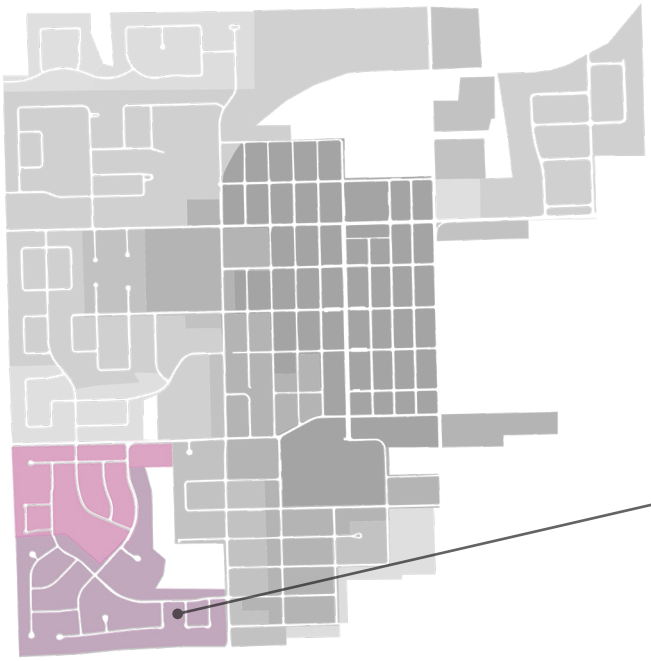
20% population growth

Total road length: 37,945 m
Total road area: 83,8242 m^2

8m (176 m^2) of road per person in 2015.

Curve removed in ca. 2010. Remainder of CP Railway removed around 2014. No public transit.

0 0.5 1 km



2015 - onward

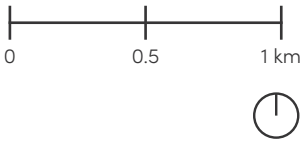
2024 population: 5,046

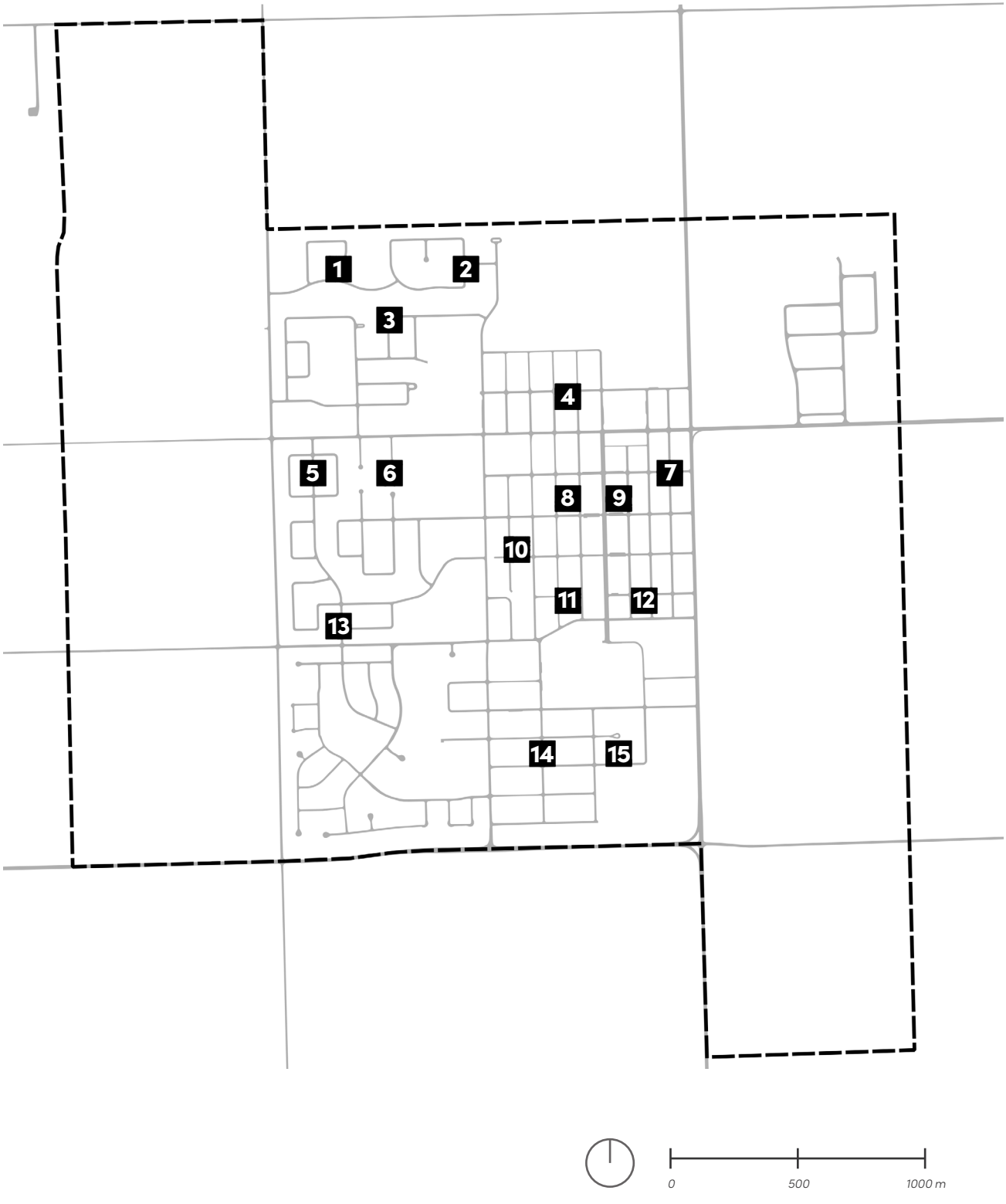
Total road length: 39,839 m
Total road area: 89,5976 m^2

No public transit.

8 meters of road per person in 2024

Planned development.




1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
0
500
1000 m

Landuse Analysis Grid Map:

Figure 150 (pages 276 - 280)
GIS landuse analysis. GIS data created by author.
Diagrams created by author.



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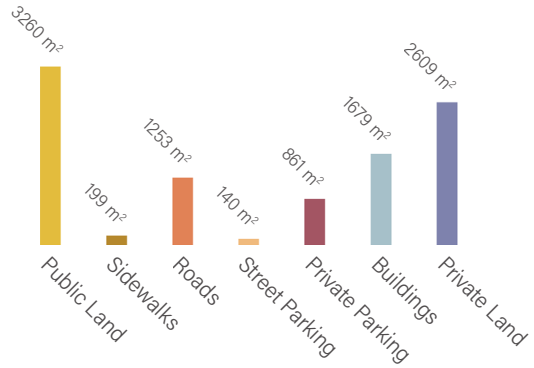

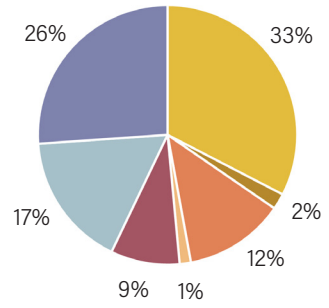

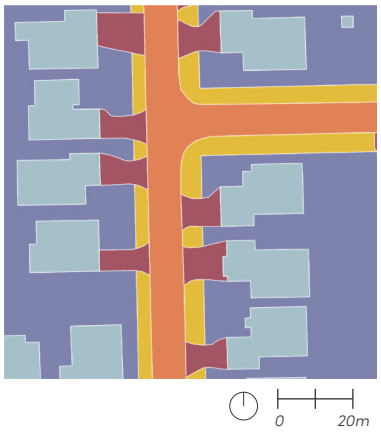

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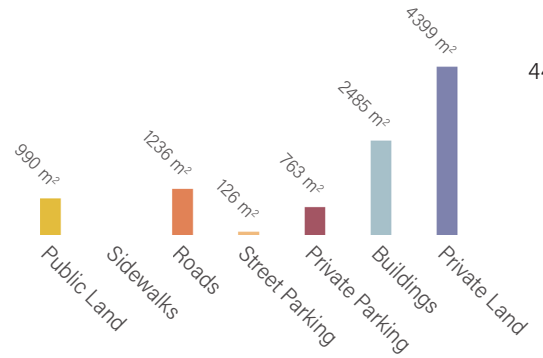

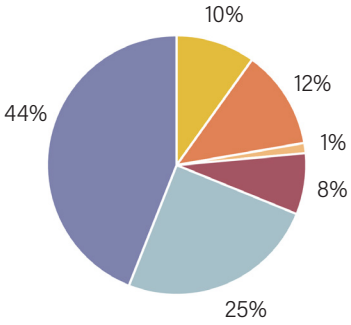

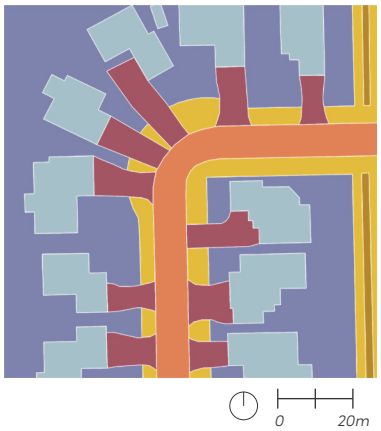

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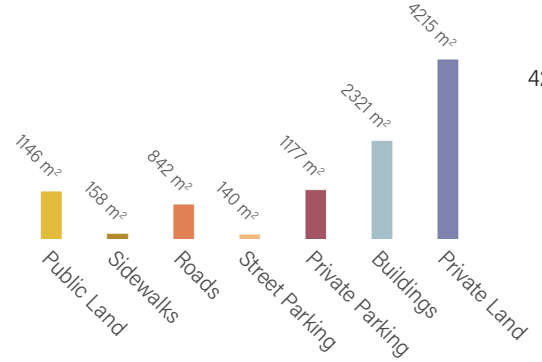

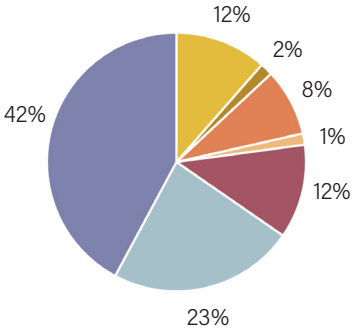



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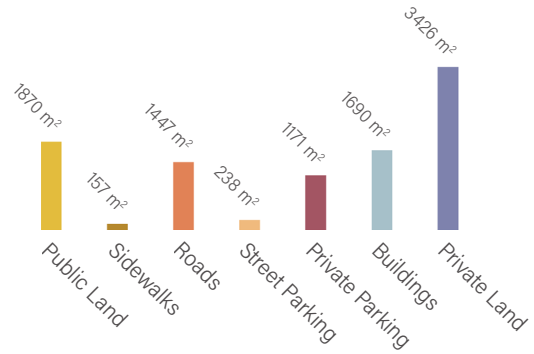

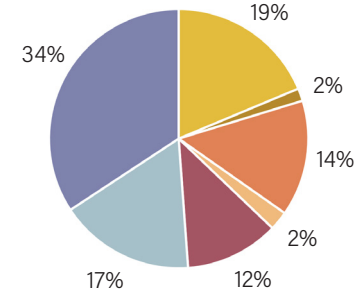

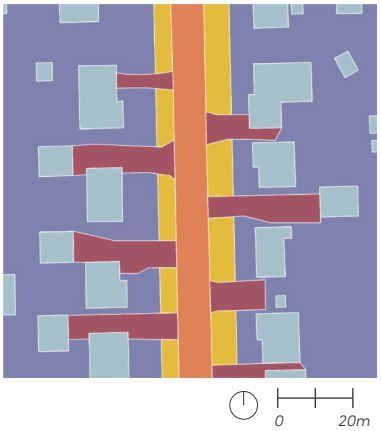

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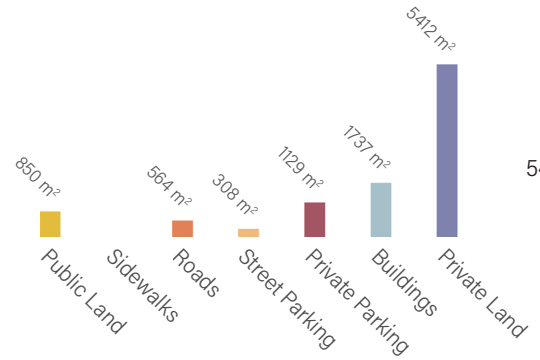

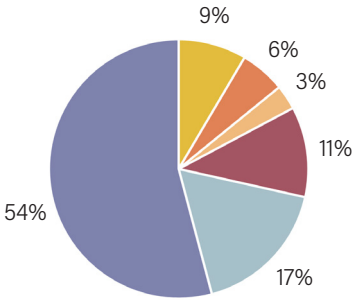

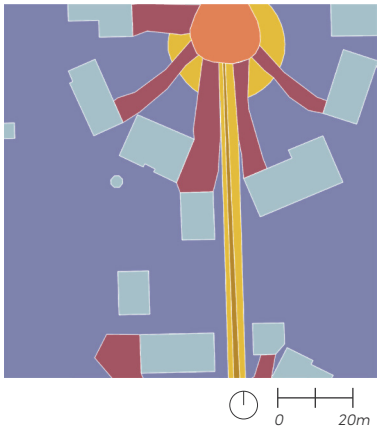

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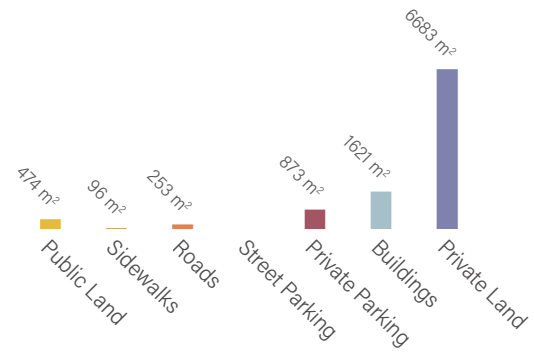

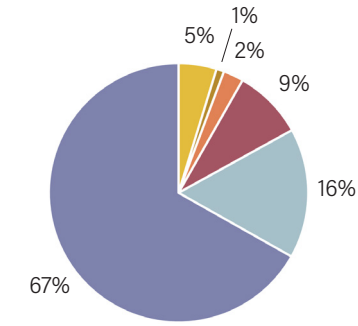

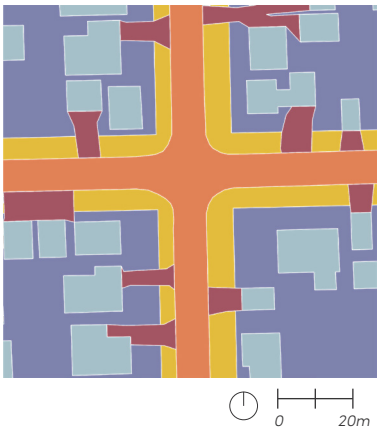

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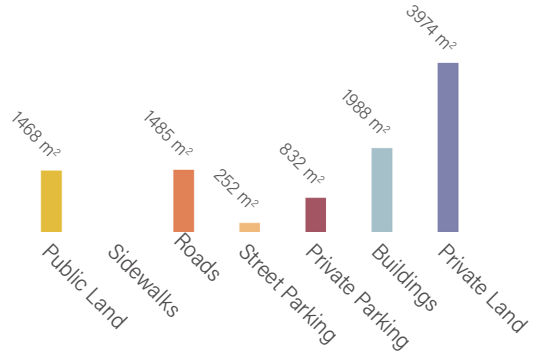

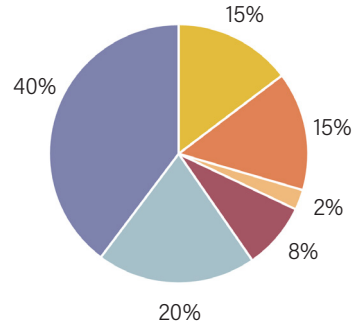



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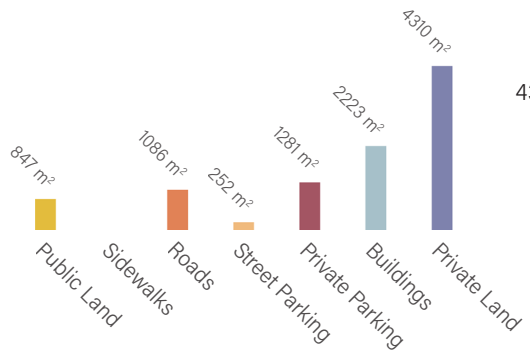

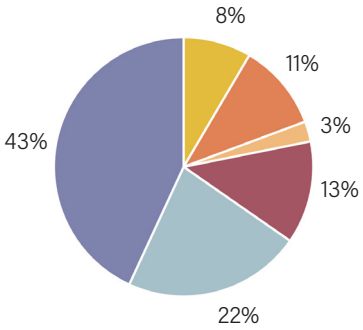

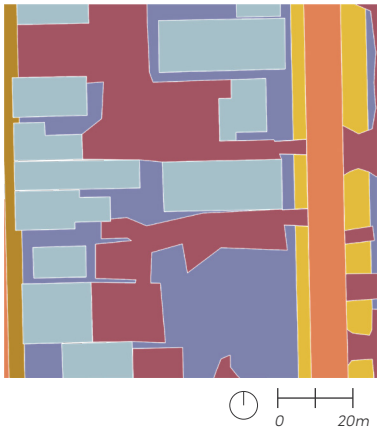

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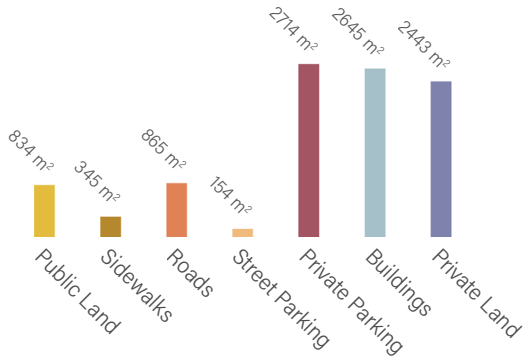

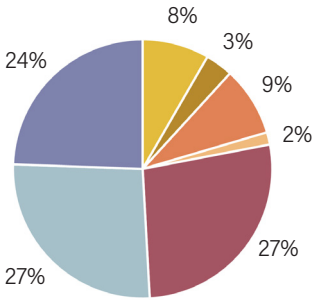

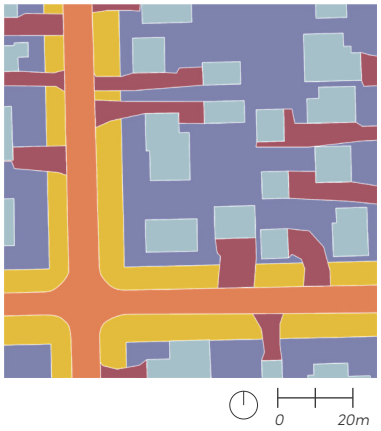

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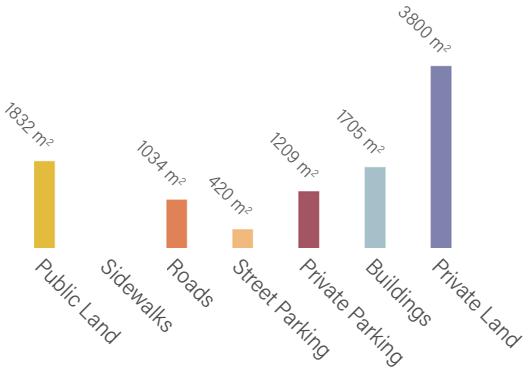

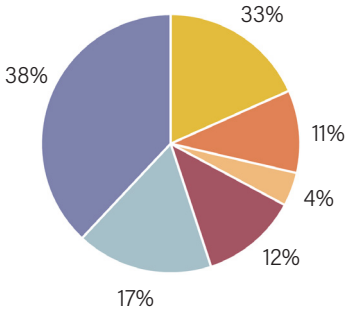



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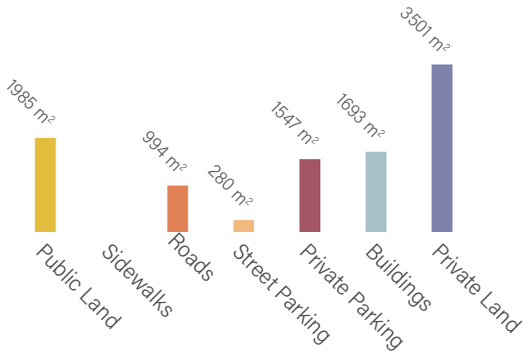

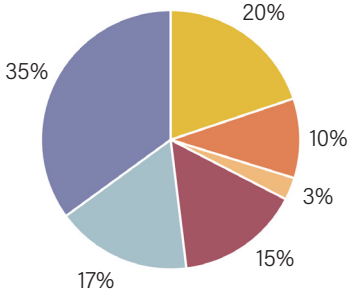

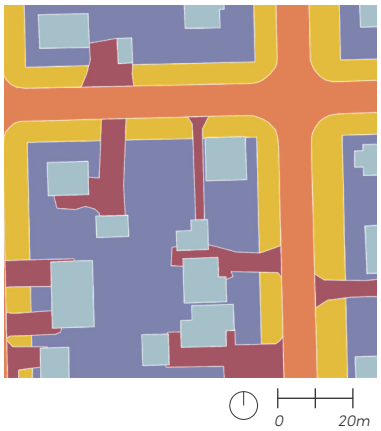

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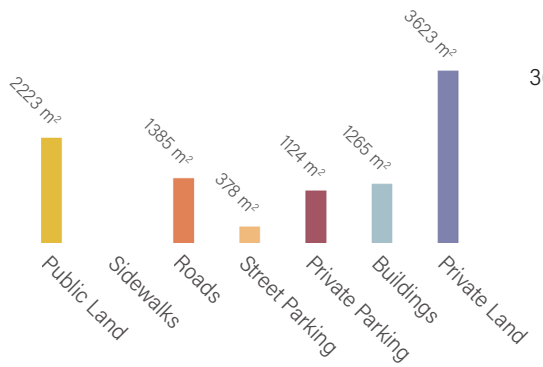

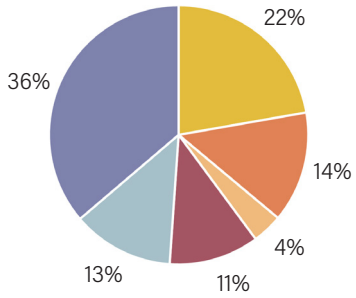

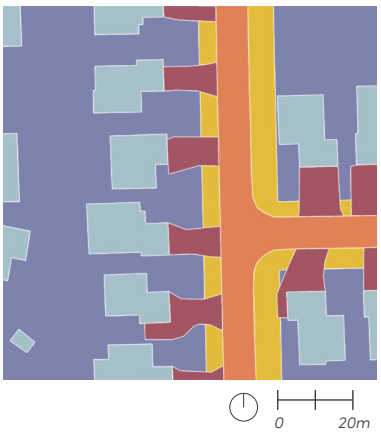

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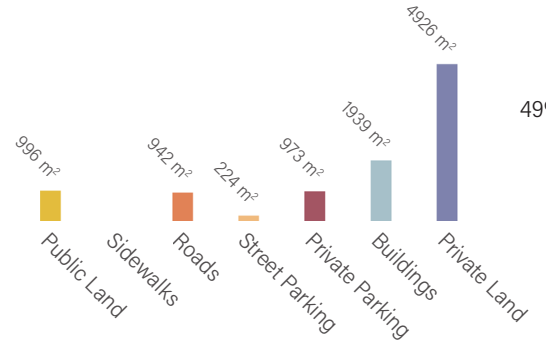

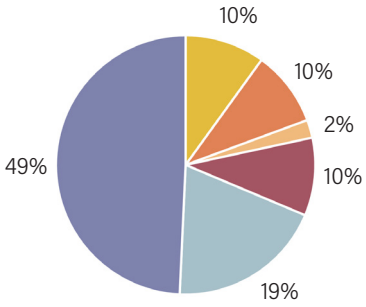

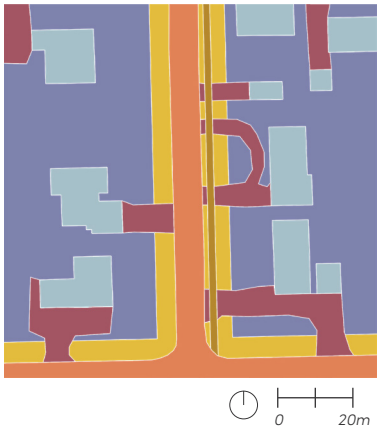

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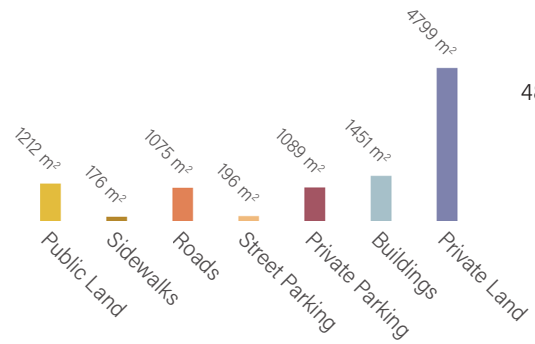
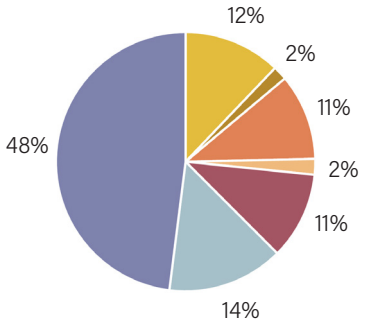
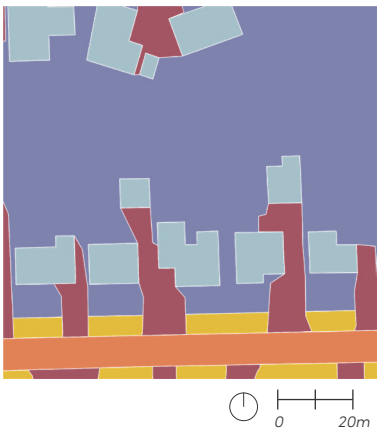
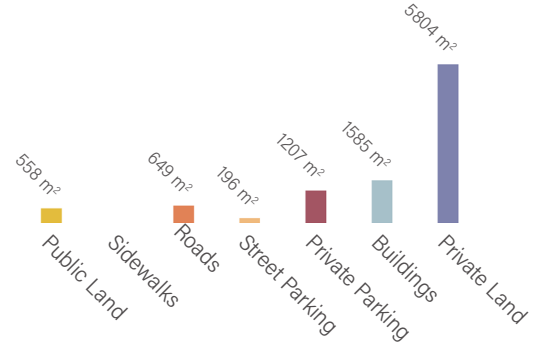
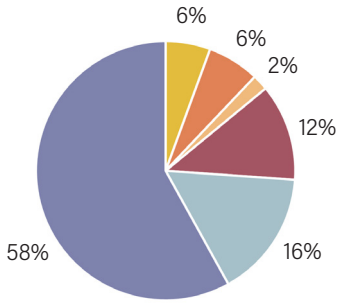






GRID 15

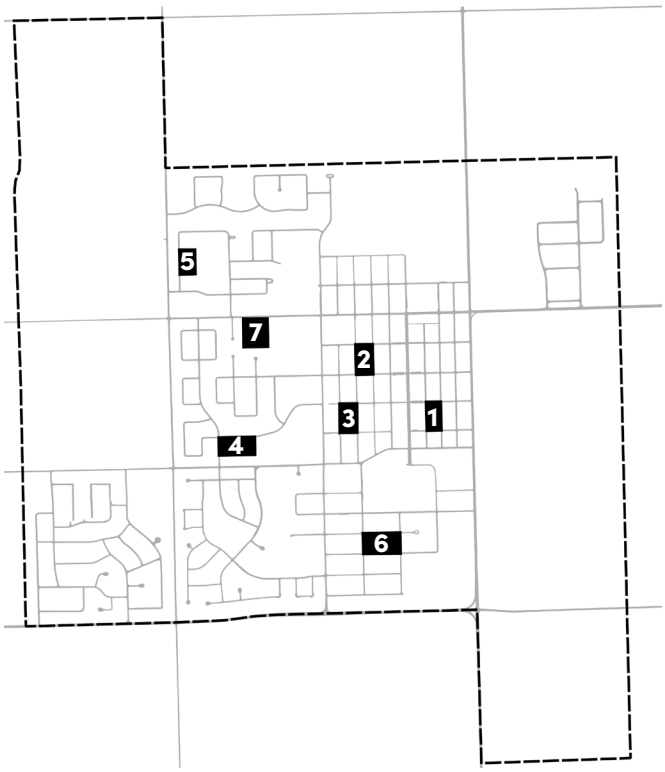




Landuse Analysis Grid Map:

Figure 151 (pages 281 - 283)
GIS density analysis. GIS data for this analysis was created by the author, and parking calculations were determined via both a spacial and visual analysis of each grid.

Assumptions:
2.4 people per household on average.
1.9 cars per household on average.
1 Parking space is [2.75 x 5.3 m], This is doubled and rounded to allow for parking, and egress into vehicles [30 m2 needed for 1 car to park].

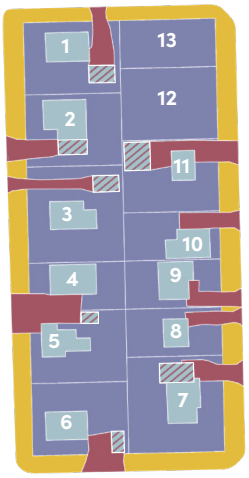


Key map

0 0.5 1 km

Legend

- Private land
- Public land
- House
- Driveway
- Garage parking



Block 1

Lot Information
- 13 lots, at 625 m^2 on average.
- Sum of lot area: **8123 m^2**

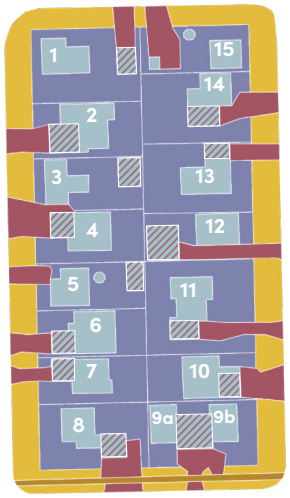
Density Information
- 11 dwellings, with an average of 1.75 floors, and footprints totaling at 1426 m^2
- Sum of building area: **3011 m^2**

0 20 40 m

Residents
- 16 dwelling units = **26 residents** and **21 cars**

Parking:
- Total driveway area: 1248 m^2 = 41 spaces.
- 7 garage spaces
- **47 parking spaces total.**

Total FAR: 37%
13 Dwellings per hectare



Block 2

Lot Information
- 15 lots, at 704 m^2 on average.
- Sum of lot area: **10,565 m^2**

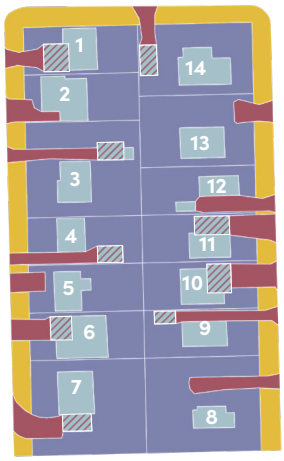
Density Information
- 16 dwellings (1 duplex), with an average of 1.75 floors, and footprints totaling at 2903 m^2
- Sum of building area: **4865 m^2**

0 20 40 m

Residents
- 16 dwelling units = **38 residents** and **30 cars**

Parking:
- Total driveway area: 1715 m^2 = 57 spaces.
- 25 garage spaces
- **82 parking spaces total.**

Total FAR: 46%
15 Dwellings per hectare



Block 3

Lot Information
- 14 lots, at 720 m^2 on average.
- Sum of lot area: **10,086 m^2**

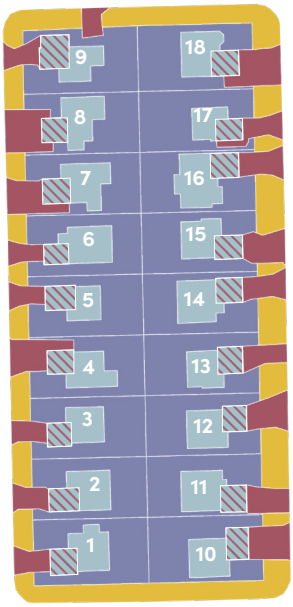
Density Information
- 14 dwellings, with an average of 1.75 floors, and footprints totaling at 2140 m^2
- Sum of building area: **4113 m^2**

0 20 40 m

Residents
- 16 dwelling units = **34 residents** and **27 cars**

Parking:
- Total driveway area: 1715 m^2 = 46 spaces.
- 12 garage spaces
- **58 parking spaces total.**

Total FAR: 41%
14 Dwellings per hectare



Block 4

Lot Information
- 18 lots, at 781 m^2 on average.
- Sum of lot area: **14,054 m^2**

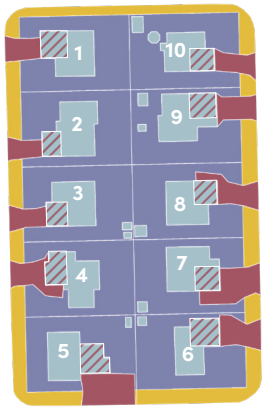
Density Information
- 18 dwellings, with an average of 2.25 floors, and footprints totaling at 3925 m^2
- Sum of building area: **8772 m^2**

0 20 40 m

Residents
- 16 dwelling units = **43 residents** and **34 cars**

Parking:
- Total driveway area: 2188 m^2 = 73 spaces.
- 38 garage spaces
- **111 parking spaces total.**

Total FAR: 62%
13 Dwellings per hectare



Block 5

Lot Information
- 10 lots, at 828 m^2 on average.
- Sum of lot area: **8279 m^2**

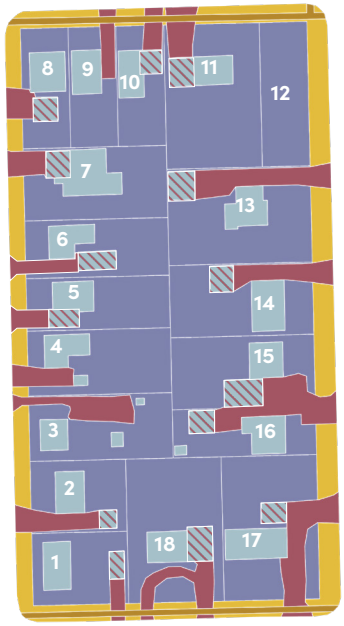
Density Information
- 10 dwellings, with an average of 2 floors, and footprints totaling at 2219 m^2
- Sum of building area: **4753 m^2**



Residents
- 10 dwelling units = **24 residents** and **19 cars**

Parking:
- Total driveway area: 1118 m^2 = 37 spaces.
- 21 garage spaces
- **58 parking spaces total.**

Total FAR: 57%
12 Dwellings per hectare



Block 6

Lot Information
- 18 lots, at 932 m^2 on average.
- Sum of lot area: **16,772 m^2**

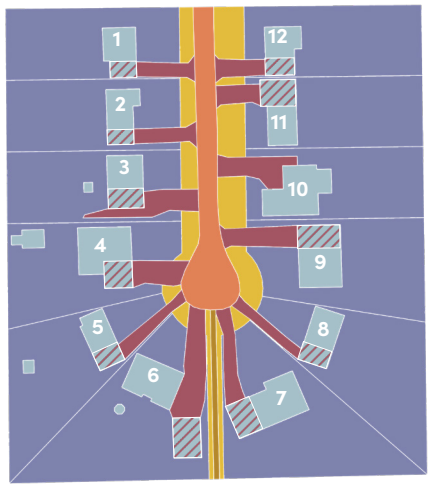
Density Information
- 17 dwellings, with an average of 1.75 floors, and footprints totaling at 2729 m^2
- Sum of building area: **4811 m^2**



Residents
- 17 dwelling units = **41 residents** and **32 cars**

Parking:
- Total driveway area: 2401 m^2 = 80 spaces.
- 23 garage spaces
- **103 parking spaces total.**

Total FAR: 29%
10 Dwellings per hectare



Block 7

Lot Information
- 12 lots, at 1420 m^2 on average.
- Sum of lot area: **17,040 m^2**

Density Information
- 12 dwellings, with an average of 1.75 floors, and footprints totaling at 2543 m^2
- Sum of building area: **3976 m^2**



Residents
- 10 dwelling units = **29 residents** and **23 cars**

Parking:
- Total driveway area: 1649 m^2 = 55 spaces.
- 18 garage spaces
- **73 parking spaces total.**

Total FAR: 62%
7 Dwellings per hectare

Figure 152 (back cover)
Main Street, looking south from Centre Avenue.
Personal photograph. August 24, 2024.


LOUNGE