

Back on Track: Prevention of Chronic Disease Through the Retrofit of
Winnipeg's Built Environment

by

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You no longer have to say, “samo uči sine”...

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ACRONYMS AND ABBREVIATIONS

DED - Dutch Elm Disease
CPR - Canadian Pacific Railway
MVPA - Moderate to Vigorous Physical Activity
WRHA - Winnipeg Regional Health Authority
PTSD - Post Traumatic Stress Disorder
U.S. - United States
UV - Ultraviolet
WHO - World Health Organization

ABSTRACT

We are in the midst of a chronic disease epidemic with a healthcare system that focuses on treatment rather than prevention. A system that spends a tremendous amount of money doing so while budget restraints are being put forward.

This design practicum aims to discover the impact that the built environment has on the health of Winnipeggers. It looks at the role the environment plays on the transition from infectious disease to chronic disease and what creates an environment that supports health and well-being.

It will then assess the current health of Winnipeg and use the discovered guidelines to offer three design interventions that can aid in the prevention of chronic disease and promote a healthy lifestyle.

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CHAPTER 1

LANDSCAPE AND HEALTH

An understanding of the relationship between landscape and health must be established through historical theories and successes.

Next, case studies which were discovered during a previous study in a Topics course (LARC 7400) demonstrate how projects respond to the need of improving health in communities and how greenspace can be incorporated within an urban context. They demonstrate how cities can be retrofitted to create accessible greenspace and active transportation links within neighbourhoods.

LANDSCAPE AND HEALTH

Nature, however broadly defined, has held such great value in the realm of the built environment for some time. How beneficial, or even detrimental can the environment that we live in and experience be to our greater health and well-being? “Much of the history of landscape architecture can be traced back to the need to create places that were beneficial for people’s health and wellbeing” (Landscape Institute, 2013 p.1). For the greater part, we have been successful in doing so. This success can be measured through statistical data such as increased life expectancy, lowered prevalence of certain diseases and self reported well-being. It is important to keep in mind that there are many other personal and social factors that contribute to one’s health and not just the physical environment alone (Ibid, p.1). Can we find the right balance of nature in the city to aid as a benefit to health while allowing for the advancement of civilizations? This remains the question to be asked and problem to be addressed. During the ancient times of the Bronze Age in Sumer and Dilmun, the word paradise was used to describe landscapes and were places where “human beings are untouched by illness” (Thompson, 2010, p.188). Ancient Greek writings spoke of ideal landscapes

such as turfs and forests where people performed various activities for recreation, while Roman texts mention countryside retreat for undisturbed relaxation, and the English landscapes, picturesque and therapeutic (Ibid, pp.188-189).

SOURCES OF PLEASURE

Humphry Repton wrote poetically of landscape characteristics that humans desired during the picturesque era in the later part of the 18th century. From his readings and work, it is implied that humans desired and depend on landscapes for pleasure. Humphry Repton was a landscape gardener who coined the term and was considered the successor to Capability Brown. Repton followed the traditions set by Brown but used nature to influence his landscape designs (Faiks, et al., 2001) in the late 18th and into the 19th century. He frequently compared the work of landscape gardening to landscape painting (Loudon, 1969, p.30). While a landscape painter simply places figures into an image, the gardener strives to understand the comfort and convenience placed set upon the figure in the landscape (Ibid, p.111).

Sources of Pleasure according to Repton (1969, pp.161-167):

- I. Congruity
- II. Utility
- III. Order
- IV. Symmetry
- V. Picturesque Effect
- VI. Intricacy
- VII. Simplicity
- VIII. Variety
- IX. Novelty
- X. Contrast
- XI. Continuity
- XII. Association
- XIII. Grandeur
- XIV. Appropriation
- XV. Animation
- XVI. Seasons

While all of these sources can be expanded on, Repton meticulously hints on the ways buildings should be incorporated within the landscape, how they should be contrasted with trees, water, fragrances of shrubbery, different views and approaches. How a scene must be animated by moving objects no matter how beautiful it may be (Ibid, 101).

“Whate’er its essence, or whate’er its name,
Whate’er its modes, ‘tis still in all the same;
‘Tis just congruity of parts combin’d
Must please the sense, and satisfy the mind”
(Repton, 1969, p.139)

Whatever elements or characteristics that a landscape provides, the combinations of them must benefit the greater good of the people and the right balance of elements are essential to this.

SANITATION ERA

During the seventeenth and eighteenth centuries, industrialization fostered the spread of disease such as cholera, typhoid, yellow fever and diphtheria (Dannenberg, Frumkin and Jackson, 2011, p.9). A time where the work of Frederick Law Olmsted becomes recognized. Best known for his design for Central Park, Frederick Law Olmsted was an influential landscape architect who recognized and anticipated the important relationship between urban planning and health early on. Along with

being a landscape architect and journalist, Olmsted was a secretary with the U.S Sanitary Commission which provided medical advice to physicians based on their findings (Frank, Engelke and Schmid, 2003, p.14). They associated poor health and disease to the city because of urban designers’ failures in providing basic design attributes of urban spaces (Ibid, p.15). “Olmsted attacked those aspects of urban design that led to overcrowding, poor drainage, and a lack of sanitation” (Ibid, p.15) and gained success in doing so. In fact, the typical lifespan of an American increased 30 years by the 20th century, and most of these reasons are associated to public health interventions while only a few are due to medical interventions (Dannenberg, Frumkin, Jackson 2011, p.12). Much of his success was due to his ability to organize and work professionally with a multi-disciplinary team.

Olmsted became concerned with the health and morals of citizens when population and commerce growth within towns generated conditions of confinement, corruption and control over people, which led people to be irritable both mentally and physically (Olmsted, 1870, p.339). This confinement and irritability, which he considered an evil, would continue to be “aggravated in the future, unless means are devised and adapted in advance to prevent it” (Ibid, p.339). It became apparent that open space and parks were to play a significant role in the health of people. Contradicting the urban form developed for commerce, open space breaks up the density of structures, allows for trees and plants to be grown, creates openings for natural light and purified air. Along with the sanitation and disinfection benefits of foliage and sunlight, open space provides an escape from the confining conditions for citizens (Frank, Engelke and Schmid, 2003, p.15). The great question that he asked was;

“what accommodations for recreation can we provide which shall be so agreeable and so accessible as to be efficiently attractive to the great body of citizens, and which, while giving decided gratification, shall also cause those who resort to them for pleasure to subject themselves, for the time being, to conditions strongly counteractive to the special, enervating conditions of the town?” (Olmsted, 1870, p.340).

He not only recognizes that there is a need for

spaces like parks, he even begins to question the characteristics and factors that draw people towards them for escape and recreation. This is a topic continually being researched over one hundred years later.

Olmsted recognized the importance of open space in the form of parks for both exertive and receptive recreation, which positively contributes towards physical and mental health, respectively (Ibid, p.341).

He also suggests that smaller parks, spread out through the urban fabric, which are easily accessible from home are much more beneficial than one large park area. This would be even more beneficial to the population if the spaces were connected (Ibid, p.341). The concept of incorporating smaller greenspaces (rather than destination parks), spread throughout a city and connected with corridors holds true still today as a design strategy and research topic.

Olmsted presents his claim for public parks using three essential principles (Ibid, p.337):

- The need to improve public health by sanitation measures and the use of trees to combat air and water pollution
- The need to combat urban vice and social degeneration
- The need to advance the cause of civilization by the provision of urban amenities

Even though Olmsted provides only three main principles, finer topics including physical health, environmental health, mental health, social interaction and the enrichment of human lives are all underlying and still relevant in today's principles and research.

His views on landscape and health were certainly reflected in his work when he designed Central Park as "he envisioned a place for all residents, irrespective of means or social class, to access the mental and physical health benefits of greenspace" (Dannenbergh, Frumkin and Jackson, 2011, p.131). Because of rapid urbanization and growth, he had little doubt that reserves of land for recreation, escape, social cohesion, and the well-being of people should be made as soon as possible (Olmsted, 1870, p.344). These principles remain no less valuable

in the twenty first century, as we recognize the importance of prevention rather than treatment.

HEALTH MAP

The built environment, according to Barton and Grant (2006) is an influential factor on their health map which shows forces that impact well-being.

The health map (figure 1.1) shows that people are affected by all the different spheres that extend from them. The built environment, while directly affecting the quality of space we live in and affecting the natural environment above it, alters and suggests and determines the activities we can perform. Furthermore, the activities we are offered alter the lifestyle that we adopt. The built environment snowballs as a factor in human well-being. The creation of a road for example impacts the pattern of human activity (travel), this activity impacts the natural environment (pollution) as well as the economic environment (destination choices), and affects people's lifestyle choices (walking vs. driving) which ultimately affects social networks and cohesion (Ibid, 2006).

Dahlgren and Whitehead (1991 cited in Landscape Institute, 2013 p.2) offer five principles of healthy places which carry similarities but expand on those suggested by Olmsted:

- Healthy places improve air, water and soil quality, incorporating measures that help us adapt to, and where possible, mitigate, climate change.
- Healthy places help overcome health inequalities and can promote healthy lifestyles.
- Healthy places make people feel comfortable and at ease, increasing social interaction and reducing anti-social behaviour, isolation and stress.
- Healthy places optimise opportunities for working, learning and development.
- Healthy places are restorative, uplifting and healing of both physical and mental health conditions.

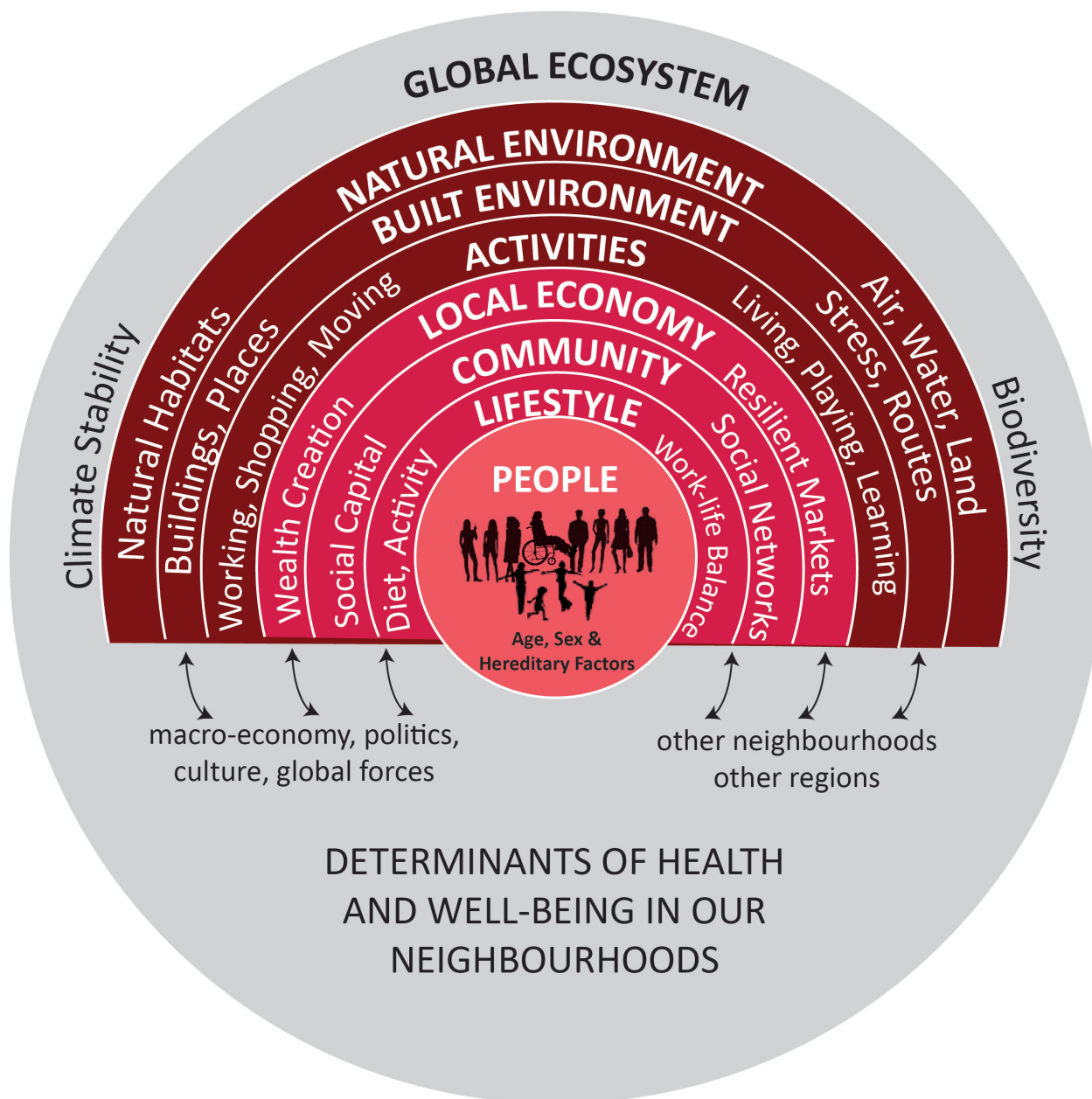


Figure 1.1 HEALTH MAP

Adapted from Barton and Grant, 2006

LEADING CAUSE OF DEATH

The Last 100 Years

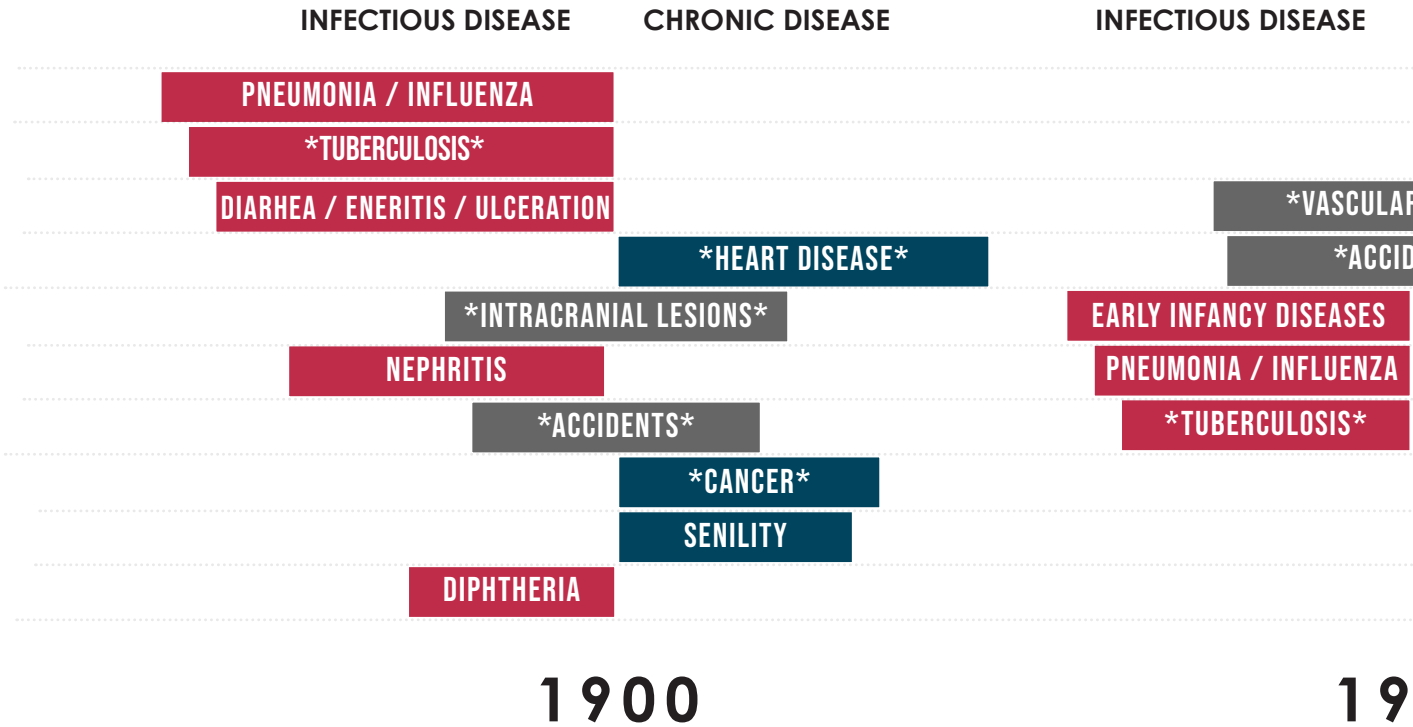


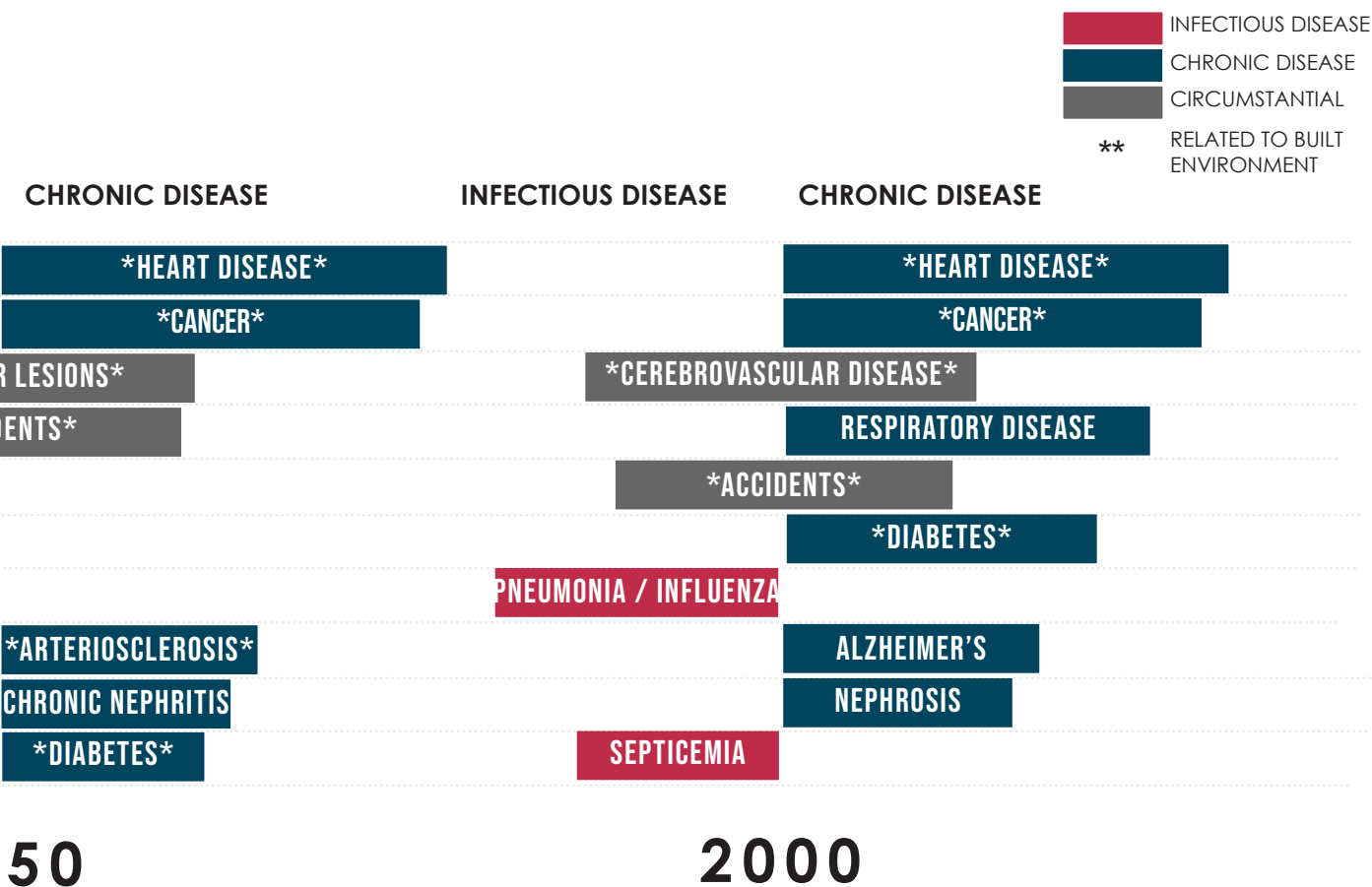
Figure 1.2 DISEASE TRANSITION

We now know that “the ways that cities, suburbs, and towns are designed and built impact the people who work, live and play in them” (Frank, Engelke and Schmid, 2003, p.1). Only a century ago, cities were very much walkable places as shops, schools and workplaces were close together and the built environment was designed for the human scale (Ibid, p.2). It has now become a very dispersed, decentralized landscape with different land uses focused on automobile transportation (Ibid, p.11).

Urban sprawl and increasing dependence on the automobile since the 1920s has caused careless planning, zoning and heavy investment in highways. People began to leave the urban environment, in search of more greenspace while leaving behind poverty and crime (Dannenberg, Frumkin, Jackson 2011, p.22). This continued after World War II and is known as the “White Flight” era where people

of European ancestry fled to suburbs or rural areas in American cities (Boustan, 2017). This in effect, increases the size of cities, separates the workplace from the home and increases reliance on the automobile.

The largest impact this has caused is the decline in our health and well-being both mentally and physically. Relying on vehicles decreases opportunities for physical activity and, along with it, social interactions. We once obtained physical activity from our jobs, commute and everyday tasks but “the modern city has changed all of this, creating environments in which it is less and less common to work physical activity into our everyday patterns of life” (Frank, Engelke and Schmid, 2003, pp.3-4). Because of this, we now use leisure time to perform physical activity. The distance between neighbourhoods along with road structures have



Adapted from Anderson 2002 cited in Dannenberg, Frumkin and Jackson, 2011

made walking and biking more difficult because of the size and concerns for safety (Ibid, p.4). Curved, island-like development in suburbs has increased travel distances between origin and destination points within a neighbourhood. Whereas a traditional grid-like structure creates greater connectivity between these points and more, shorter distance routes become available (Ibid, pp.99-101).

Interestingly, the design solutions in the built environment that addressed the issue of viral infection, bacteria and communicable diseases decades ago, now contribute to noncommunicable diseases and the onset of chronic disease which has become the leading cause of death in America (figure 1.2) (Ibid, 2003, p.36). Data from Anderson (2002 cited in Dannenberg, Frumkin and Jackson 2011, p.13) shows how the causes of death due to disease has transitioned in the last 100 years

with diseases relating to the built environment emphasised with an asterisk above.

A significant observation that can be made from this data is that tuberculosis (infectious disease), one of the leading causes of death in 1900, is now completely removed from the list. During this time, diabetes (chronic disease) has climbed to the sixth rank when it previously was not on the list.

Chronic diseases such as obesity, diabetes, cardiovascular disease and depression also put major financial stresses on our healthcare system as mentioned earlier. With more than fifty percent of the world's populations now living in urban environments (Dannenberg, Frumkin, Jackson 2011, p.352), with the forecast to increase to seventy five percent by 2050 (Giles-Corti, et al., 2016, p.2912), city planning and the built environment is becoming a

key part of the approach to reducing these patterns. In the 19th century, planning suppressed the spread and outbreak of infectious disease by improving sanitation and housing, and separating residents from industrial pollution (Ibid, p.2912) and in the 21st century;

“well planned cities have the potential to reduce non-communicable diseases and road trauma to promote health and well-being more broadly. Reducing automobile dependency, traffic exposure, pollution, noise and urban heat-island effects while enhancing mental health, contributing to climate change mitigation and promoting walking and cycling in safe, controllable and desirable ways” (Ibid, p.2912).

This can be accomplished as the planning and landscape architecture profession “plans, designs and manages our land resource in order to secure the best possible outcomes for people, the environment and the economy” (Landscape Institute, 2013). Although it is evident that landscape architects, planners and health professionals have recognized landscape as an asset, there is more work that needs to be done to drive policy change. While the design of the built environment has addressed problems such as infectious disease and sanitation issues in the past, it has also contributed to a massive problem known as chronic disease. Chronic disease issues such as obesity, diabetes, cardiovascular disease and depression are rising at an alarming rate and placing major stresses on our healthcare systems. 67% of healthcare costs in Canada are associated with chronic diseases (Elmslie, n.d.) and a shocking 86% is spent in the U.S (CDC, 2017). Spending on healthcare as well as stresses on our healthcare system could be reduced if greater investment was made in preventing ill health before it has a chance to occur (Landscape Institute, 2013, p.1) but services are “still too focused on treating ill health and dealing with acute need” (Kirby and Russel, 2015, p.1).

It costs thirty times more to support 1 kilometre of travel by car than it does by foot or bike (CBC, 2015). A cost benefit analysis completed by Wang, et al. (2005), showed that every \$1 invested into trails that promote physical activity, led to \$2.94 in medical benefits. Justifying the need for health promoting landscapes in monetary terms may create progress.

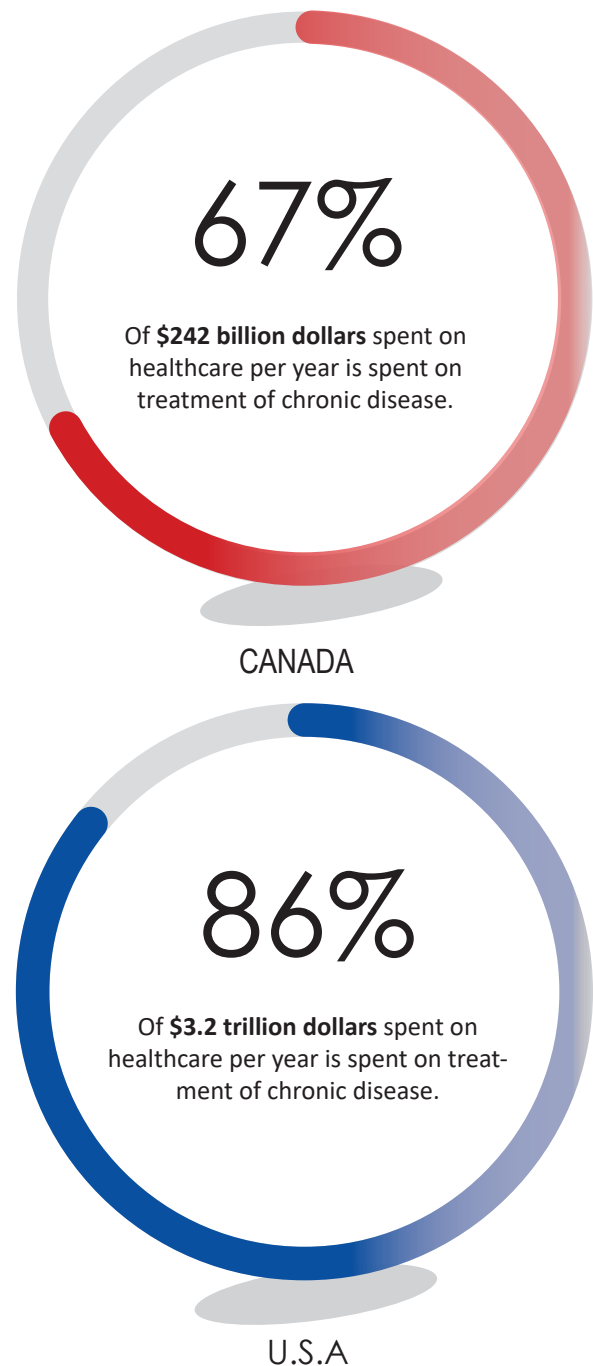


Figure 1.3 COST OF CHRONIC DISEASE

HEALTH AND GREEN SPACES

RECEPTIVE RECREATION

Therapeutic and restorative qualities of landscape have been recognized for centuries, and so, there has been a great deal of research, practice and application associated with it. Mental health can be affected by many environmental factors including noise and light levels, building layouts, access to nature, design of transportation systems as well as everyday products (Kirby and Russel, 2015, p.3). In terms of health, green space has the potential of addressing health problems in a preventative way (Morris 2006 cited in WHO, 2016, p.1). Therapeutic landscapes are heavily used in healthcare facilities to promote healing for patients suffering various stressors and are used actively or passively because both benefit the healing process (Marcus and Sachs, 2014, p.1) as well as benefiting staff. In fact, simply observing nature aids in psychological health benefits (Kaplan and Kaplan, 1989, p.156). Having access to greenspace within 400 meters of your residence can have significant mental health benefits (Sturm and Cohen, 2014, p.6). While directly benefiting an individual, the social cohesion of a neighbourhood benefits from the inclusion of greenspace and nature.

There has been various observational research done which has yielded fairly conclusive results cited in multiple publications. For example, patients recover faster with views of nature and prisoners seek less medical attention if they have a view of the outdoors (Marcus and Sachs, 2014, p.14). While this is expected and almost general knowledge, Rachel and Stephen Kaplan have focused their research on the psychological benefits of nature as well as preferences people have for nature in the built environment. This research technique used more than just observation in order to seek out specific beneficial characteristics. These findings surfaced at a time when we became aware that stresses have been created due to urbanization and population growth, which affect mental health (Kaplan and Kaplan, 1989, p.172). This research is being used to date, in order to support new findings and act as design guidelines for urban greenspace.

One of their major studies focused on discovering people's nature preferences. This was done by showing slides of various landscape images and collecting the responses from participants on which elements of the landscapes they preferred from the groupings they were shown. Surprisingly, according to Kaplan and Kaplan (Ibid,p.16), "people's responses to two-dimensional representation are similar to being in the setting themselves", something Humphry Repton may have argued in line with his book *An Enquiry Into The Changes in Landscape Gardening*. Some of their key findings in their preference study show that the balance between building and natural space is important to people when spatial configurations were observed (Ibid, p.23). Nature-dominated scenes were most preferred but the open space needed to be defined (Ibid, p.44) with different elements and not quite literally an open field. They also observed that one of the underlying criteria when selecting preference was the affordance of the scene (Ibid, p.32). This is essentially what the environment has to offer to the viewer, what type of activities can and cannot be undertaken in such a place. This demonstrated that preference was placed on settings where one could easily extract information from them (Ibid, p.49) as humans are very much aware of information and strongly oriented to spatial information (Ibid, p.4) reinforcing the important role aesthetics plays.

Overall, restorative landscapes act as places for people to escape their sources of mental degradation, stress or fatigue. Attention restoration theory, developed by Kaplan and Kaplan (1989, cited in WHO, 2016, p.4) realizes that stressors and sources of fatigue such as work or interacting with other people requires directed attention from an individual and this directed attention comes as a limited resource that we expend. It is found that involuntary attention in natural environments can restore a person psychologically and the amount of directed attention they have. Not all underlying mental health concerns are the same and neither should be the landscapes in which people seek refuge. It is important to bear in mind that a landscape that has positive effects for a person suffering from PTSD compared to the landscape for someone recovering from a surgery may carry different characteristics.

It is also important to note the four main categories people prefer in landscapes through these preference studies (Kaplan and Kaplan, 1989, pp.53-56).

These include:

- Coherence
- Complexity
- Legibility
- Mystery

These categories share similarities to the sources of pleasure Repton laid out 200 years prior.

Coherence is how organized a place is and aids in the understanding of an environment while complexity adds richness into a setting and creates opportunities for sensory engagement. Legibility aids in navigation, memory and the understanding of space while mystery inspires discovery and exploration, drawing people forward in search of more information. Interestingly, it was found that there is a great deal of consistency in nature preferences across a variety of demographics (Ibid, p.40). This suggests that, fundamentally, all humans require similar ingredients to function.

EXERTIVE RECREATION

According to the World Health Organization (2016, pp.5-6), increased physical activity improves cardiovascular health, mental health, aids in neurocognitive development and reduces risk of cancer, osteoporosis, reduces obesity and other chronic diseases. Physical inactivity is the fourth leading risk factor for mortality (Ibid, p5), is responsible for more than 5 million deaths per year in America (Sallis, et al., 2016 p.2207) and less than half of all Americans participate in healthprotective physical activity (Cohen, et al., 2007 p.509). In fact, obesity is now a bigger problem in the entire world than starvation (Dellorto, 2012). National Standards in the U.S. set a recommended guideline of 150 minutes of moderate to vigorous physical activity (MVPA) a week and less than 5% of adults are achieving this target. The number of health benefits physical activity provides make it a crucial component to any park or greenspace and strongly outweighs any potential hazards like UV radiation

exposure, allergy exposure and accidental injury (WHO, 2016, pp.12-13). Therefore, the built environment, parks and open space have become recognized as a factor in physical activity and population health, one that is more accessible to a wider population than an indoor gym (Bancroft, et al., 2015). Unfortunately, when communities are structured to prevent or discourage these activities, residents are unable to reach the goals and standards for physical activity in order to benefit their health (Frank Engelke and Schmid, 2003, p.39).

Traditional approaches and research on physical activity have targeted behavioural change in individuals through education, counseling and self-monitoring with little success. Focuses are now shifting towards environmental approaches and structural factors that are not in the control of a certain individual (Bedimo-Rung, Mowen and Cohen, 2005 p.159). Preaching behavioural change, something that we have control over, may not be as successful as changing structural components of the built environment that make recreation and physical activity easier to access. This method assumes that people's behaviour is dependent on the conditions of their surroundings according to Cohen, et al (2010, p.s9).

Like the health map developed by Barton and Grant (2006) (Figure 1.1), Frank, Engelke and Schmid (2003, p.7) developed a model highlighting the links and influences between the built environment, physical activity and public health.

In this model, built environment, consisting of land use patterns, urban design characteristics and transportation systems, collectively influences activity patterns and overall public health in a causal relationship.

Various research can provide insight and recommendations on greenspace usage and implementation to support physical activity in order to reach national guidelines of 150 minutes of moderate to vigorous physical activity (MVPA) a week per adult in the U.S (Cohen, et al., 2016, p.1). It was found that having a park within one mile of your home would make it four times more likely for you to visit at least once a week (Cohen, et al., 2007, p.513). The recommended amount of greenspace you should have access to within 300 metres of your

home is 2 ha, 20 ha within 2 kilometres and 100 ha within 5 km (Sarkar, et al., 2015). Lower income areas would see higher park usage if there were more organized activities in them (Cohen, et al., 2016, p.1). Park proximity and density have an overall positive association to physical activity (Bancroft, et al., 2015, p.27) and finally greater park access is associated with lower body mass index (Stark, et al., 2014, p.64). While these findings are not necessarily universal in the sense that you could apply them to any park in any city, the tools for discovering these correlations are at our disposal.

Research towards physical activity and green space is advancing quickly by looking at influences such as size, proximity and amenities that promote physical activity within parks. Characteristics of parks that promote physical activity continue to be researched, discovered and debated but “the conventional wisdom is that parks must be attractive and safe, and have a sufficient diversity of amenities and features to meet the needs of people with multiple different interests” (Jacobs, 1961 cited in Cohen et al, 2010 p.s9).

In summary, the three most important considerations for parks and health can be summarized with:

PARK PROXIMITY:

80% of park users come from within a three block radius (600m) distance from their homes (Bedimo-Rung, Mowen and Cohen, 2005 p.165). This is an important statistic which will be used as a baseline when considering potential intervention sites.

PARK SIZE:

While cities do need greenspace built into the urban form at all scales (Montgomery, C., 2013, p.120), it has been established that parks greater than six acres in size offer the greatest opportunity for physical activity. Smaller parks, under six acres in size, offer health benefits catered to mental health and can reduce stress, anxiety and depression (Stark, et al., 2014, p.66).

PARK FEATURES:

The amenities and features a park has to offer drastically affect the activities that can be performed, the health benefits it provides and the overall use of the park. The most important features for the benefit of physical activity become walking circuits and trails (Kaczynski Potwarka and Saelens, 2008, p.1451). In fact, parks with a paved trail were 26 times more likely to be used for physical activity (Ibid, p.1454).

CASE STUDIES

BIRKENHEAD PARK

Location: Merseyside, England

Size: 143 acres

Year Completed: 1847

Characteristics and Use:

Constructed because of concerns of overcrowding population and to improve healthy conditions by providing open space to residents. It became the first publicly funded public park (Tate, 2015, p.141) and currently works with local residents to promote park visiting as a prescribed remedy. Came from a realization that parks should be accessible and integrated into the community (Thompson, 2010).



Figure 1.4 BIRKENHEAD PARK
Image by Alan Tate



Figure 1.5 BIRKENHEAD PARK
Photograph by Eric The Fish (creative commons)

KLYDE WARREN PARK

Location: Dallas, Texas

Size: 5.2 acres

Year Completed: 2012

Characteristics and Use:

Provides neighbourhood connectivity, increases pedestrian use and acts as a gathering space. Provides programming in the park to promote use and participation. Reduces noise pollution and vehicular traffic as it is built as a deck on top of a road network (Klyde Warren Park, 2015). The park replaces air space and noise created by a below grade highway.



Figure 1.6 KLYDE WARREN PARK
Image by Kevin 1086 (creative commons)



Figure 1.7 KLYDE WARREN PARK
Google Earth

ATLANTA BELTLINE

Location: Atlanta, Georgia

Size: 22 miles, 1300 acres

Year Completed: ongoing

Characteristics and Use:

Repurposing 22 miles of unused rail line, the Atlanta Beltline connects 45 different neighbourhoods. It offers alternative transportation methods while improving public health and air quality. Developing 1300 acres of parkspace for recreation and upgrading 700 acres of existing parkland (Atlanta Beltline, 2013).



Figure 1.8 ATLANTA BELTLINE
Atlanta BeltLine, Inc.



Figure 1.9 ATLANTA BELTLINE
Atlanta BeltLine, Inc.



Figure 1.10 ATLANTA BELTLINE
Atlanta BeltLine, Inc.

BROOKLYN BRIDGE PARK

Location: Brooklyn, New York

Size: 1.3 miles, 85 acres

Year Completed: ongoing

Characteristics and Use:

Transformed from an industrial area into a parkspace. Offers a variety of activities and sporting fields to help induce interest and recreational opportunities (CityParksAlliance, 2017). Active transportation greenway provides connectivity between these different uses. Reducing noise pollution and providing a connection to the environment (Brooklyn Bridge Park, n.d.)



Figure 1.11 BROOKLYN BRIDGE PARK
Michael Van Valkenburgh Associates, Inc



Figure 1.12 BROOKLYN BRIDGE PARK
Michael Van Valkenburgh Associates, Inc



Figure 1.13 BROOKLYN BRIDGE PARK
Michael Van Valkenburgh Associates, Inc

CHAPTER 2

A LOOK AT WINNIPEG

This chapter looks at the growth patterns of Winnipeg, Manitoba, and how they align with planning practices, technological advancements as well as the introduction of the automobile. It will then look at health determinants of individual neighbourhoods as outlined by the WRHA. Looking at the available greenspace within the city and the existing active transportation network next may provide insight into the health status of these neighbourhoods and help determine suitable sites in need of intervention.

GROWTH OF WINNIPEG

Much like the times of the sanitation era, Winnipeg's growth can be attributed to the demand for more space. The suburban neighbourhoods were introduced and grew outwards from 1951-1971 (Distasio and Kaufman, 2015, p.51), post World War II. The automobile offered the possibility of spreading outwards and growing the city of Winnipeg, but how would this new form effect the health of its citizens?

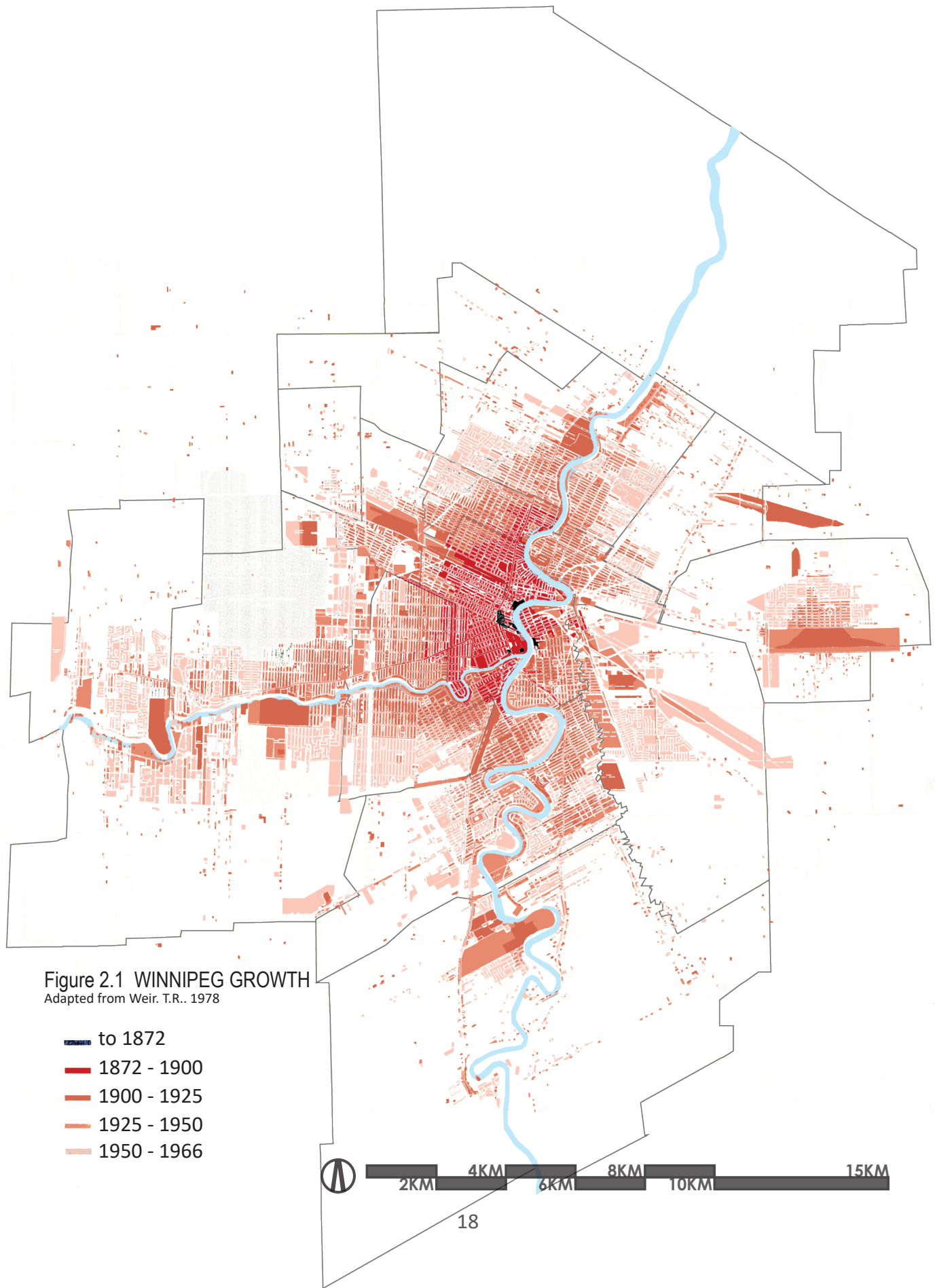


Figure 2.1 WINNIPEG GROWTH
Adapted from Weir, T.R., 1978

- to 1872
- 1872 - 1900
- 1900 - 1925
- 1925 - 1950
- 1950 - 1966



2KM

4KM

6KM

8KM

10KM

15KM

THE HEALTH OF WINNIPEG NEIGHBOURHOODS

The Winnipeg Regional Health Authority includes the following 25 areas within the city of Winnipeg (Figure 2.1). Looking at the prevalence of different chronic diseases within these areas helps determine which are in need of intervention. It is informative to note the recurrent characteristics within each area.

LEGEND		POPULATION
01A	St James Assiniboia W.	31,675
01B	St. James Assiniboia E.	28,215
002	Assiniboine South	37,680
03A	Fort Garry N.	30,900
03B	Fort Garry S.	35,550
04A	St. Vital N.	26,140
04B	St. Vital S.	34,625
05A	St. Boniface W.	15,085
05B	St. Boniface E.	36,470
006	Transcona	31,670
07A	River East S.	16,920
07B	River East W.	37,030
07C	River East E.	26,800
07D	River East N.	8,755
08A	Seven Oaks W.	23,120
08B	Seven Oaks E.	32,025
08C	Seven Oaks N.	4,360
09A	Inkster W.	16,280
09B	Inkster E.	12,395
10A	Point Douglas N.	24,295
10B	Point Douglas S.	14,360
11A	Downtown W.	35,085
11B	Downtown E.	29,875
12A	River Heights W.	35,565
12B	River Heights E.	21,565

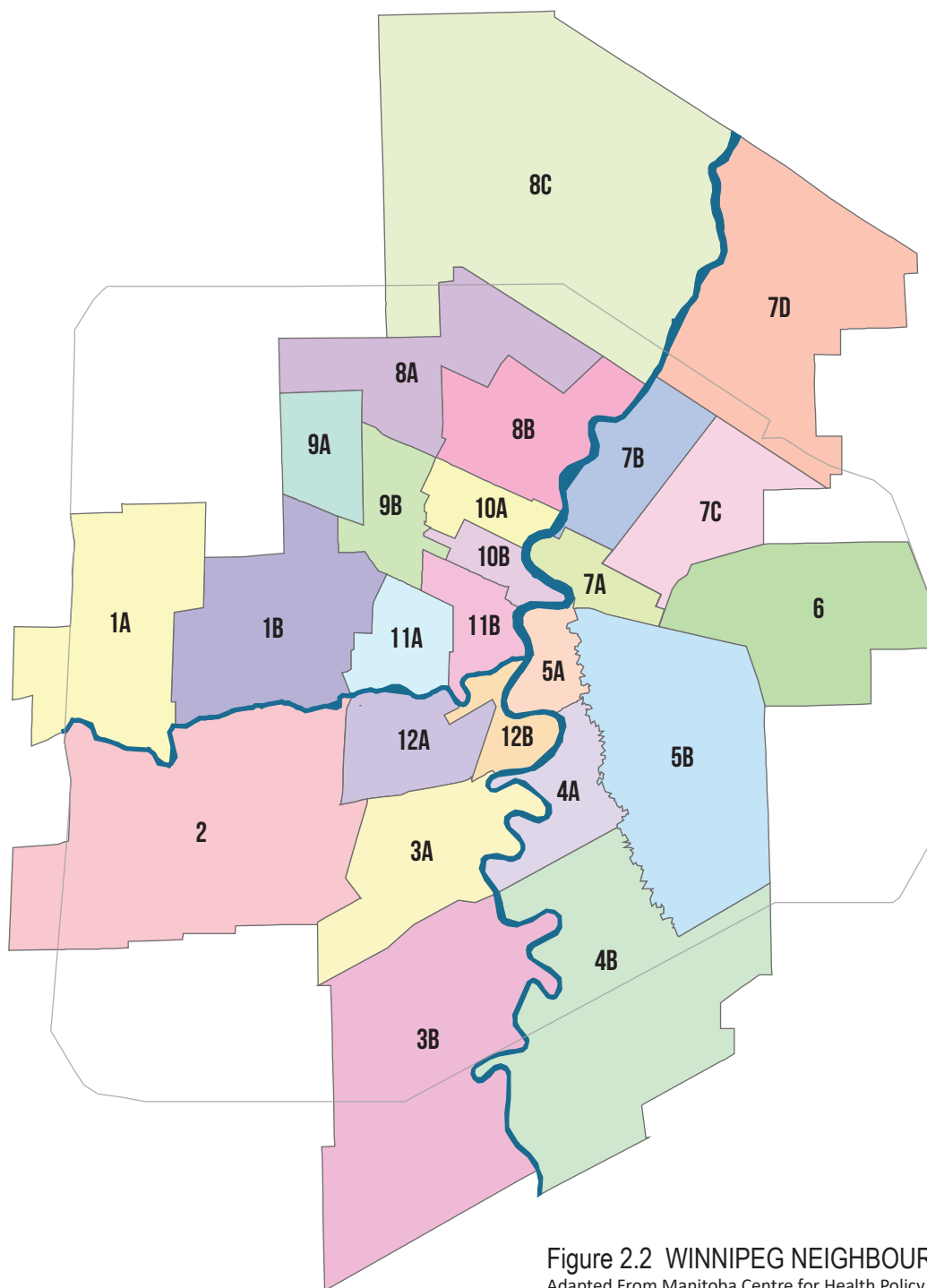
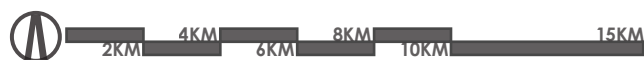
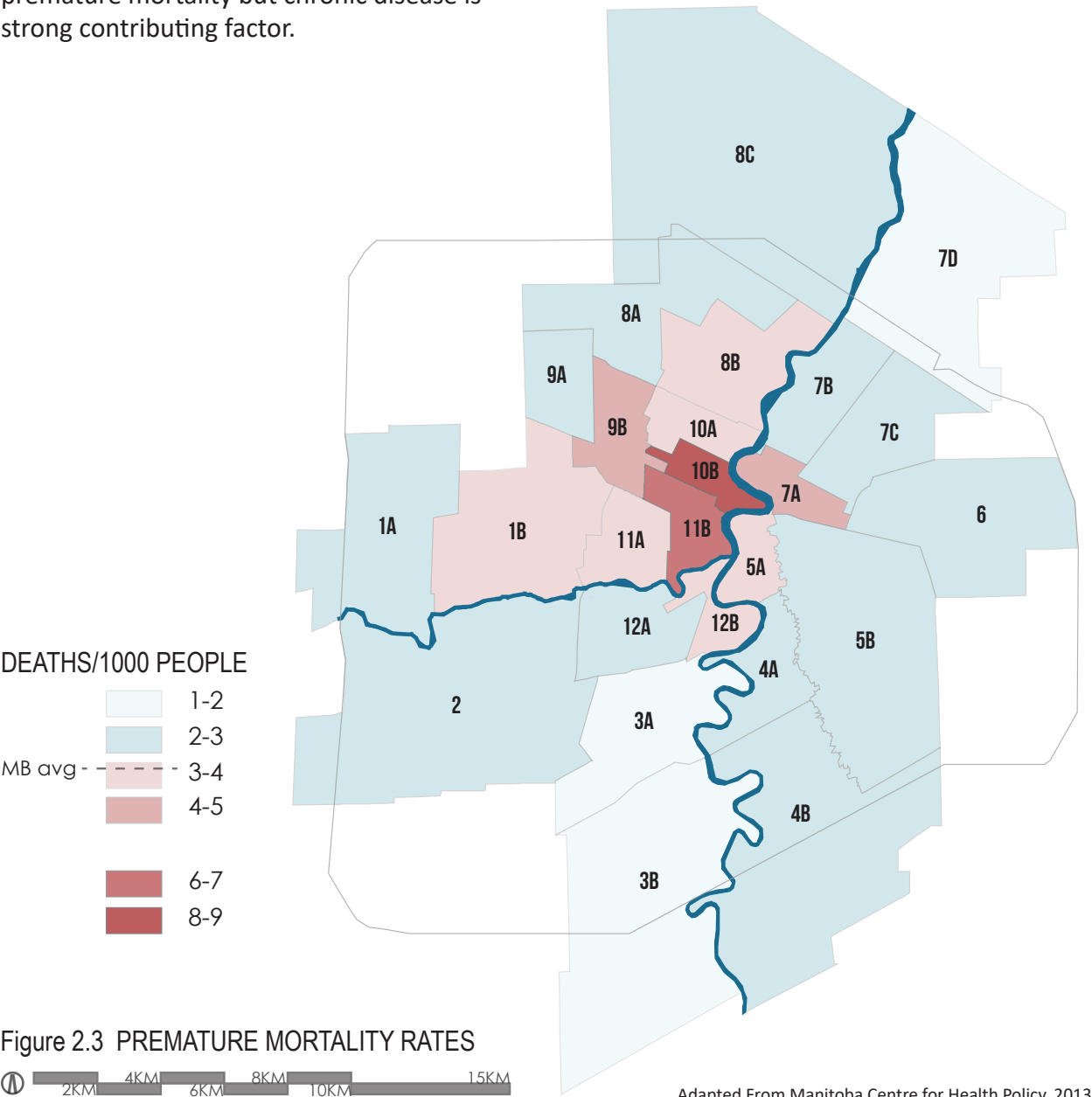


Figure 2.2 WINNIPEG NEIGHBOURHOODS
Adapted From Manitoba Centre for Health Policy, 2013



PREMATURE MORTALITY RATES

Premature mortality rates calculate the number of deaths before the age of 75 per 1,000 people. There are many factors that influence premature mortality but chronic disease is strong contributing factor.



SOCIOECONOMIC STATUS

Socioeconomic status measures levels of deprivation. It is a value determined by factors such as average household income, unemployment rate, education level, and single parent households. A lower value/score indicates better status and less deprivation.

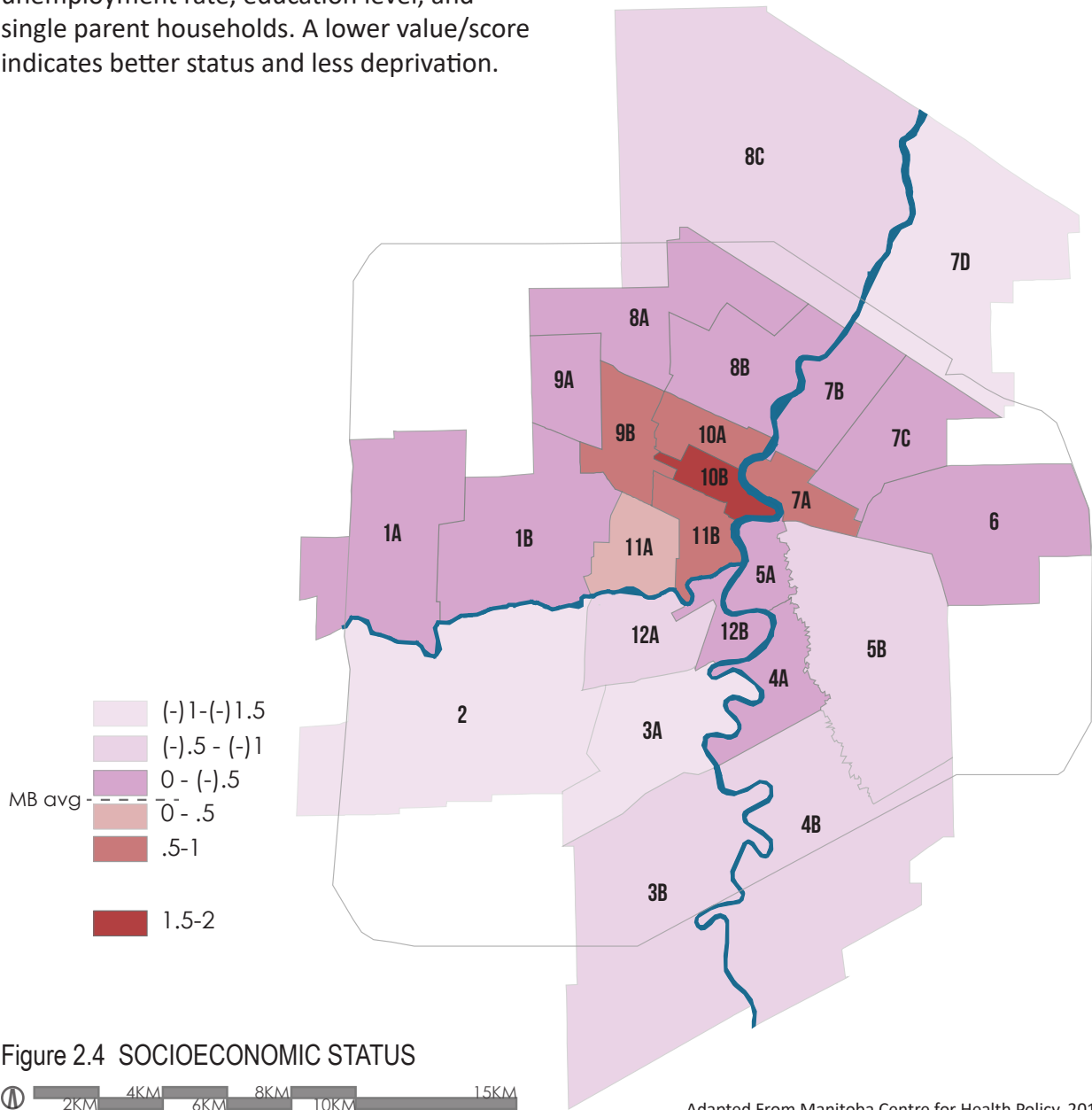


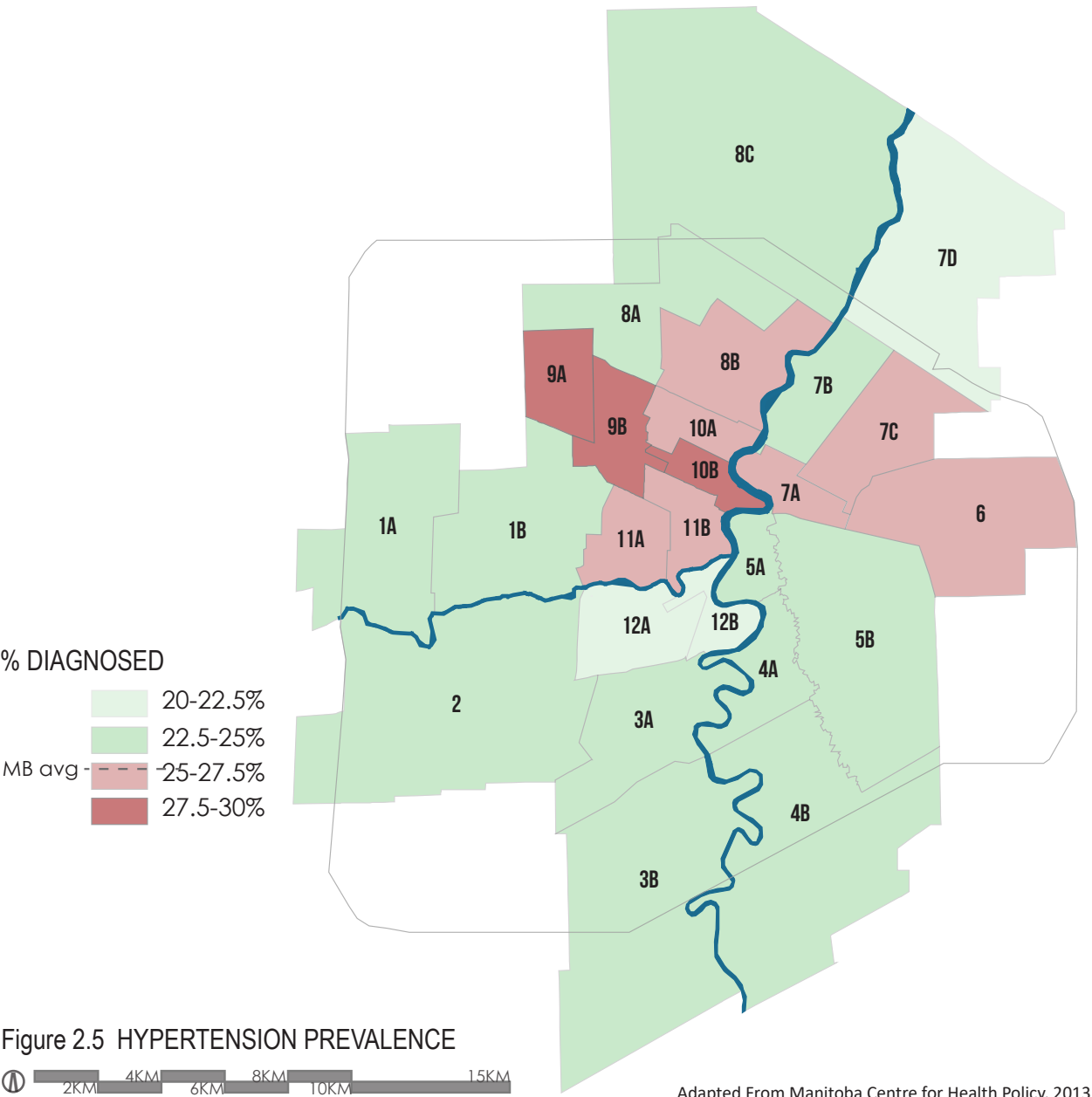
Figure 2.4 SOCIOECONOMIC STATUS



Adapted From Manitoba Centre for Health Policy, 2013

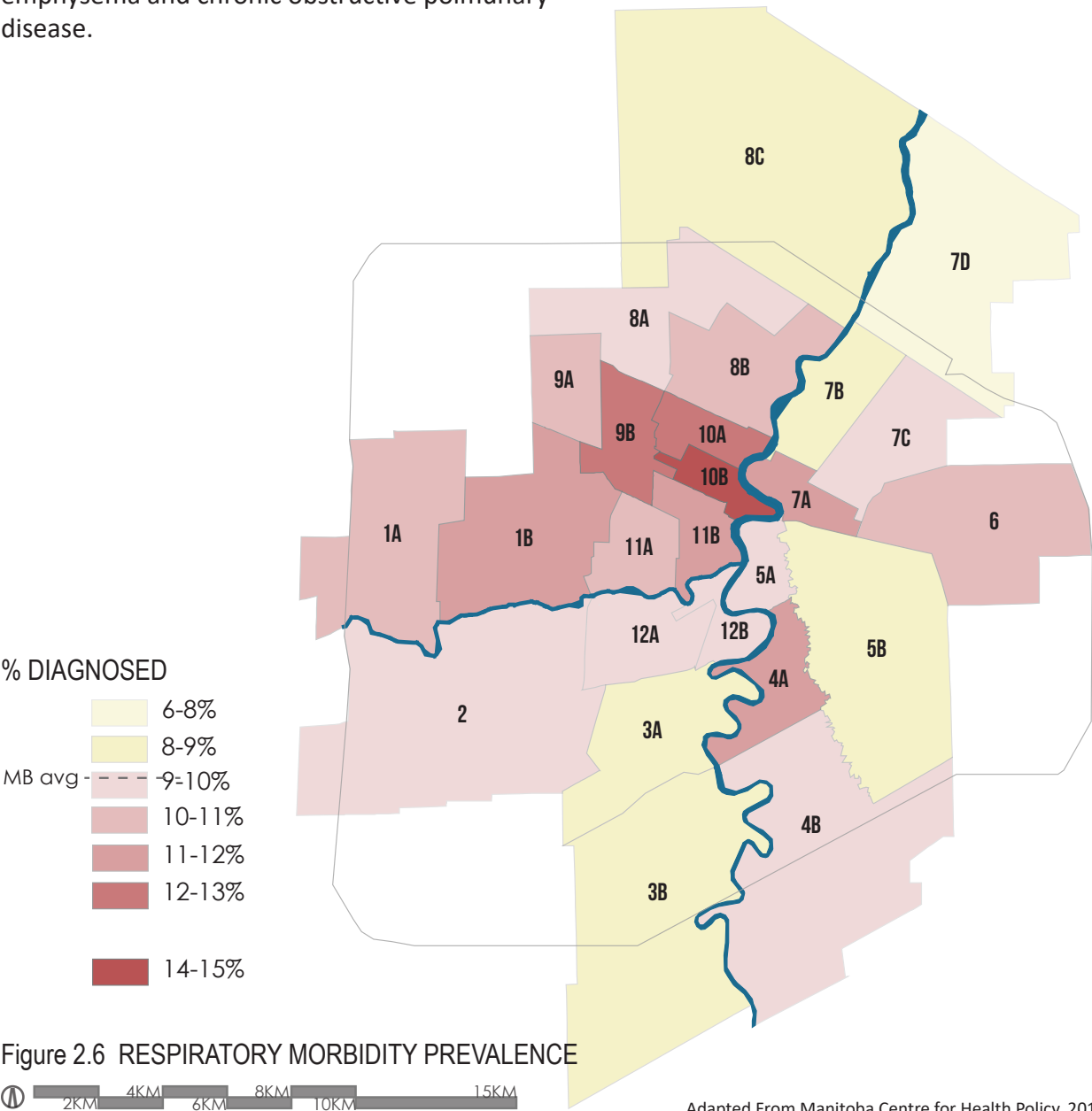
HYPERTENSION PREVALENCE

Percentage of residents over the age of 19 diagnosed with high blood pressure.



RESPIRATORY MORBIDITY PREVALENCE

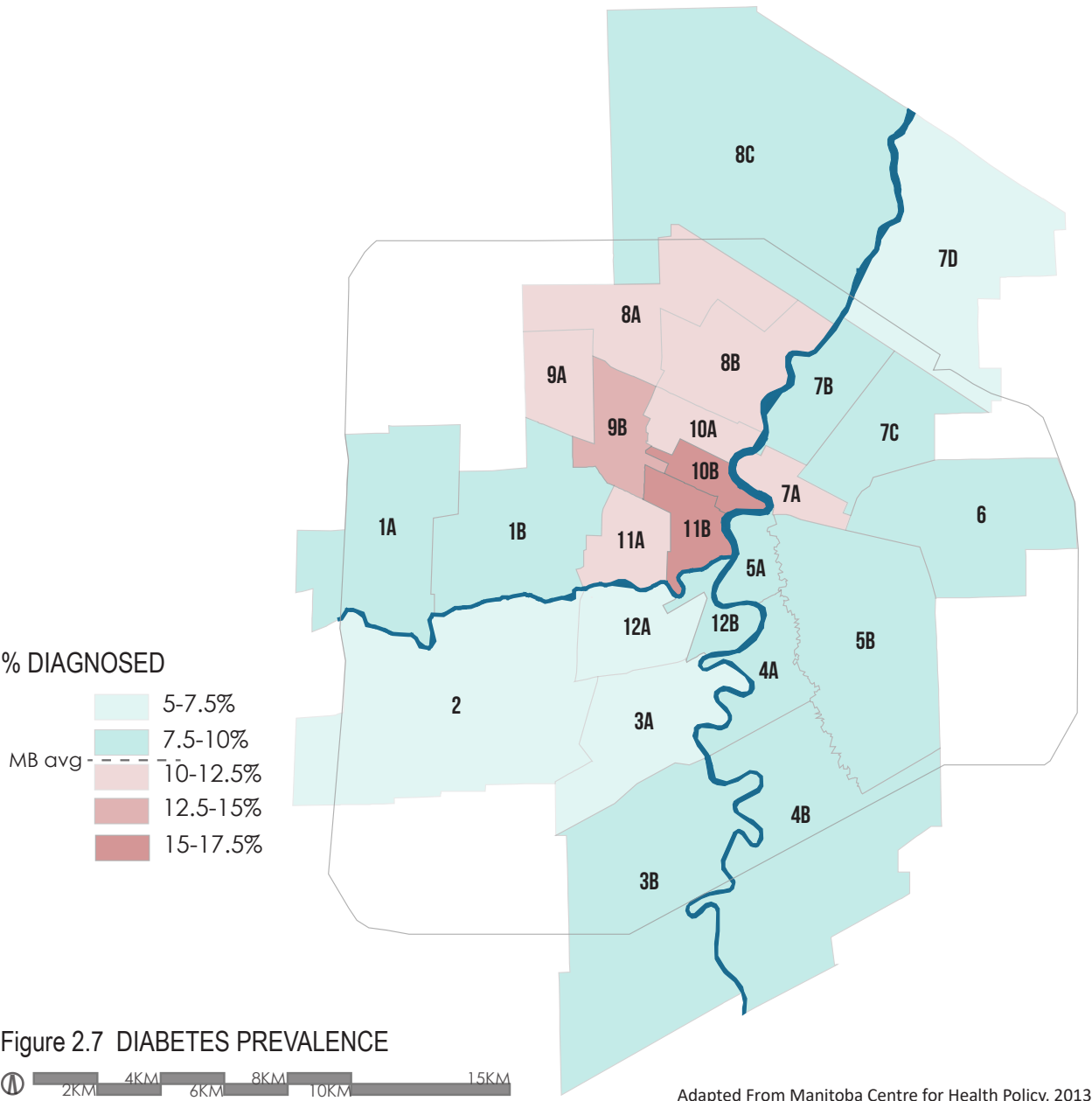
Respiratory morbidity measures the percentage of population which have a respiratory disease including asthma, chronic or acute brochitis, emphysema and chronic obstructive polmunary disease.



Adapted From Manitoba Centre for Health Policy, 2013

DIABETES PREVALENCE

Percentage of residents over the age of 19 diagnosed with type 1 or type 2 diabetes.



MOOD / ANXIETY DISORDERS PREVALENCE

The prevalence of mood and anxiety disorders measures the percent of residents over the age of 10 that are diagnosed and includes depression, anxiety and episodic mood disorders.

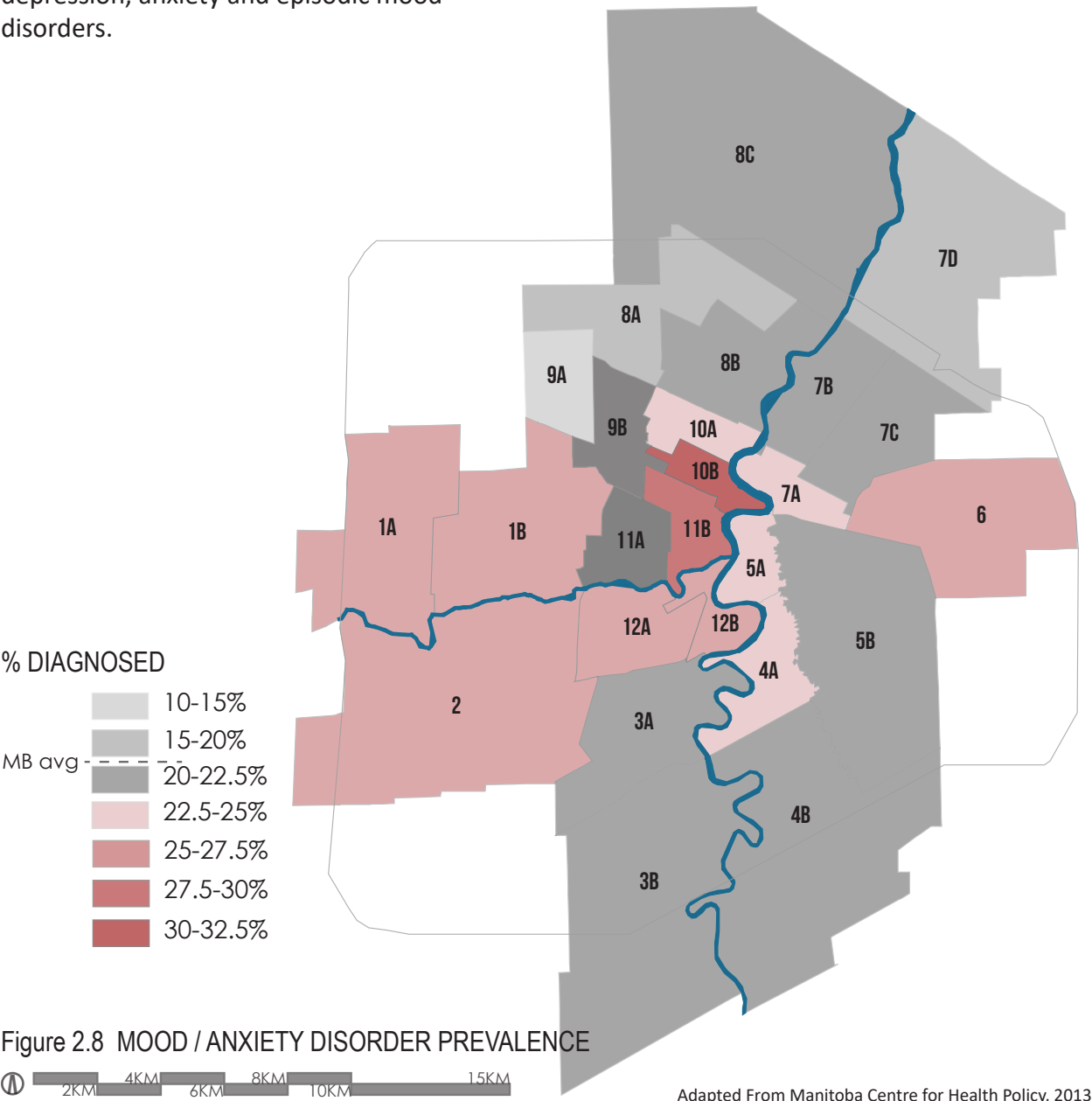


Figure 2.8 MOOD / ANXIETY DISORDER PREVALENCE

Adapted From Manitoba Centre for Health Policy, 2013

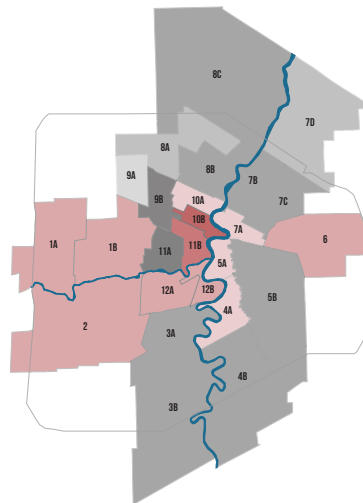
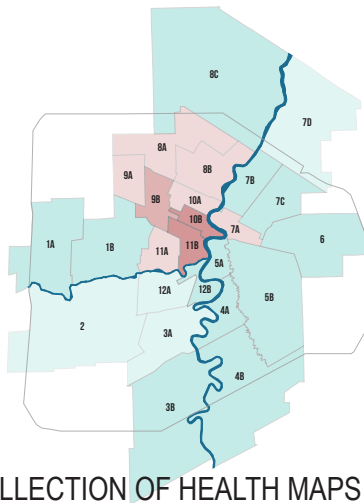
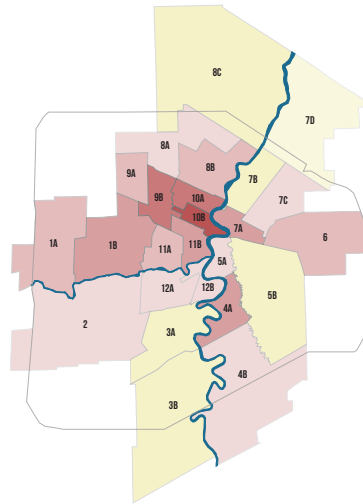
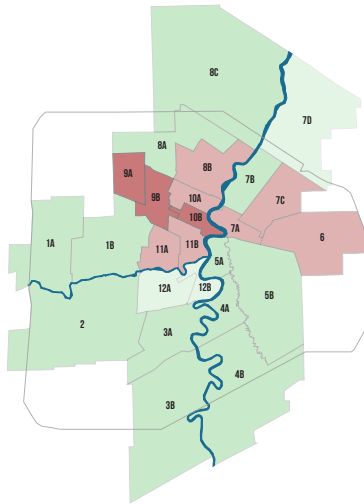
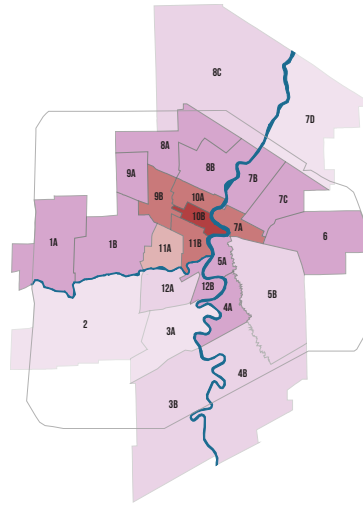
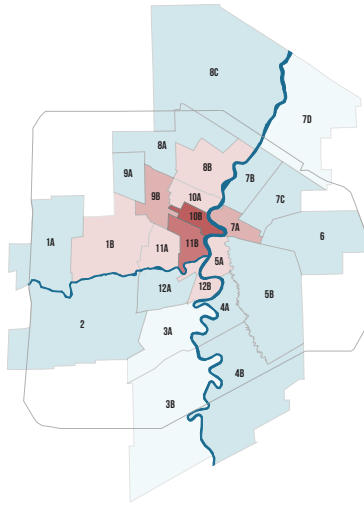


Figure 2.9 COLLECTION OF HEALTH MAPS

REFLECTIONS

It is instructive to note the repetition of these health determinants in certain areas when looking at the collection as a whole (figure 2.9). It becomes clear that certain areas within the city are unhealthier than others. Attention is brought to Point Douglas, the downtown core and Northwest Winnipeg. These areas have multiple determinants negatively affecting the overall health, bringing them lower than the Manitoba average in most situations. While there are certainly social factors at play in that affect the overall health of a neighbourhood, focus will be placed on the built environment and available greenspace.

GREEN SPACE AVAILABILITY

Based on earlier research of park size and proximity in relation to health, the next step was to move further and explore the relationship between park size, availability and neighbourhood health status in order to find a potential correlation in Winnipeg. First, looking at all of the available park space within the city provides a glimpse of how they are dispersed throughout (figure 2.10). Then, only selecting those greater than 6 acres in size and comparing their distribution (figure 2.11). These have the most opportunity for physical activity benefits which, in turn, is the best prevention to chronic diseases. A heat map was then developed in order to pin point areas that are not within close proximity to one of these parks (figure 2.12). This was compared with earlier findings on neighbourhood health and correlations were established between park proximity and poor health status. Findings suggest that poor health is associated to poor availability to green space. This helps determine suitable sites for design interventions.

Comparing these findings to the existing active transportation network in Winnipeg (figure 2.19) gives provides insight into the type of active transportation infrastructure that can benefit disease prevention. There is lots of work to be done given that 91 percent of residents mainly commute by automobile and only 2.1% by bicycle (figure 2.14).

PARK SPACE



Figure 2.10 WINNIPEG PARK SPACE

PARK SPACE GREATER THAN 6 ACRES

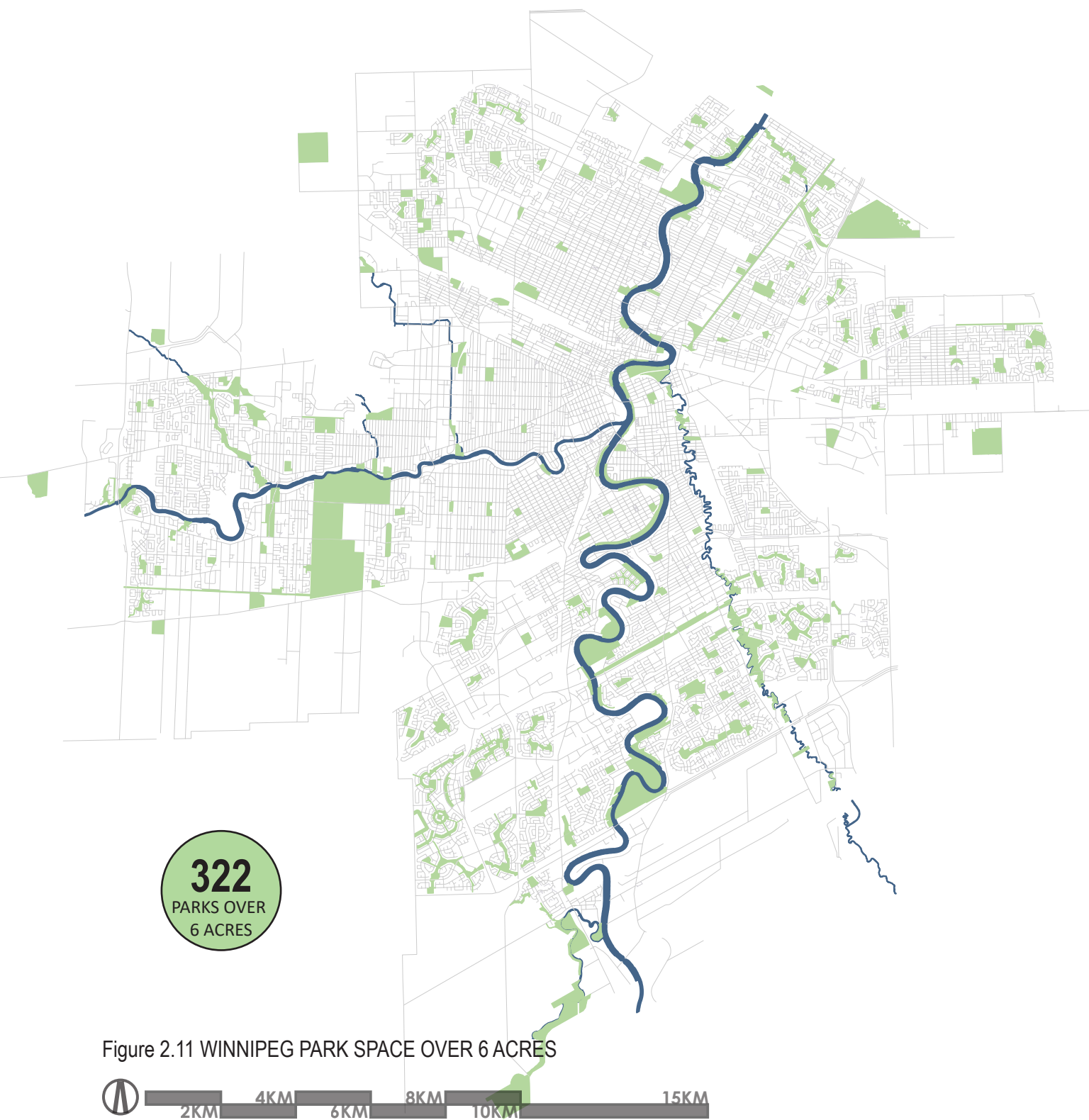
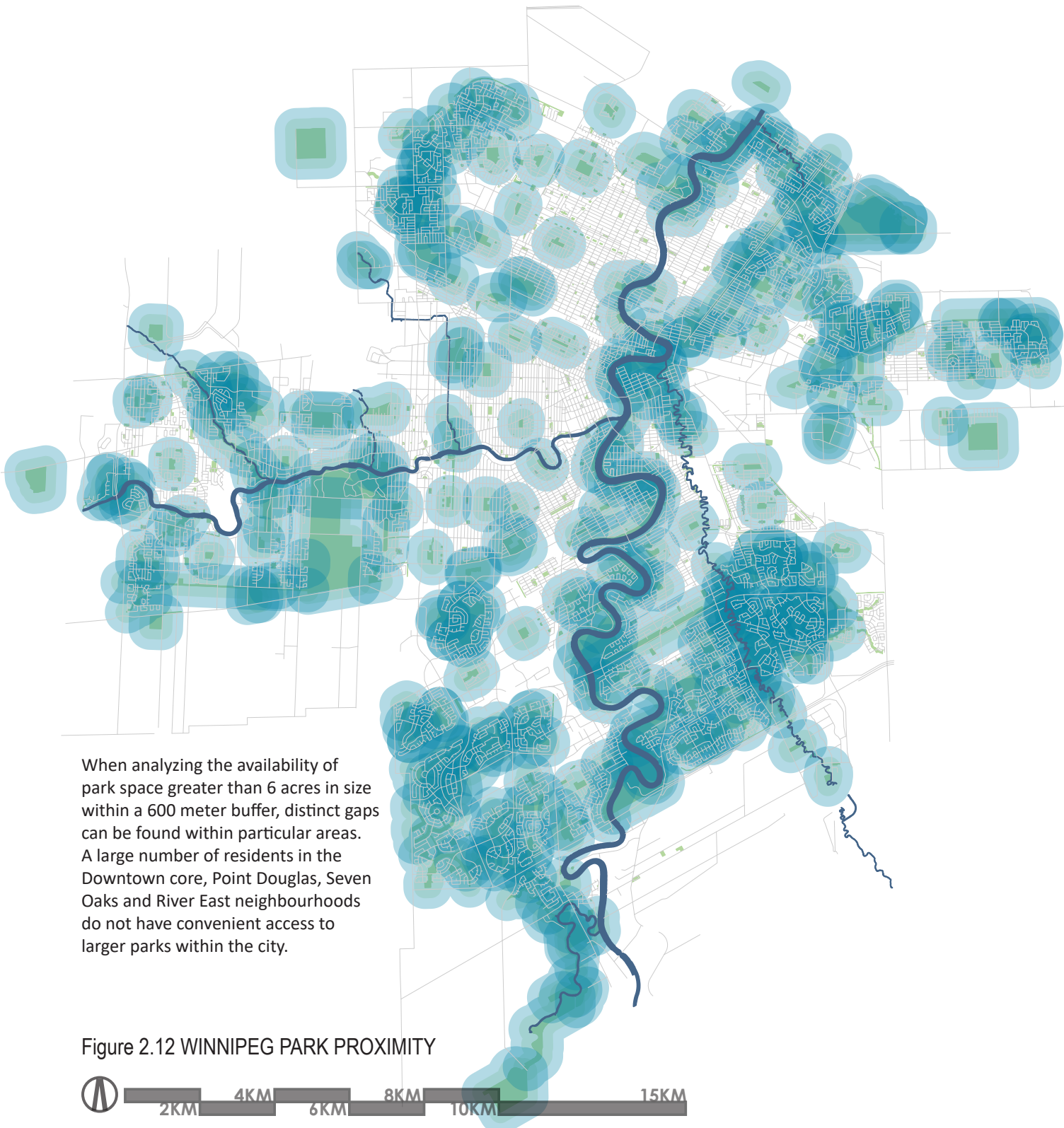


Figure 2.11 WINNIPEG PARK SPACE OVER 6 ACRES

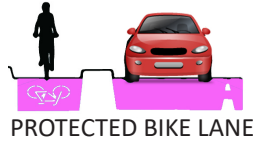
600m BUFFER



ACTIVE TRANSPORTATION



Shared pedestrian and cyclist routes that are physically separated from motor vehicles. Can be paved or unpaved surfaces. Cyclists yield to pedestrians.



Located within the road right-of-way, but are physically separated from motor vehicle travel lanes by curbs, planters, vehicle parking.



Provide separation from vehicles through painted buffers or posts.



Cycling routes on roadway designated by painted lanes and road markings.



Routes on streets with lower vehicle speeds and volume. Can include signage, bike signals, pavement markings such as humps and traffic circles.



Informal routes with no signage or designation. Cycling is permitted on all streets in Winnipeg.

Figure 2.13 BICYCLE INFRASTRUCTURE

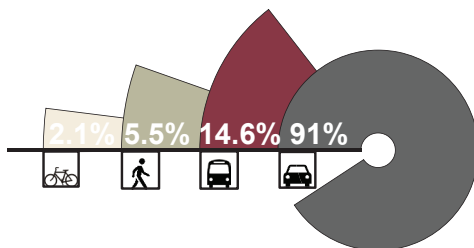


Figure 2.14 TRANSPORTATION MODES IN WINNIPEG



Figure 2.15
MULTI-USE PATH



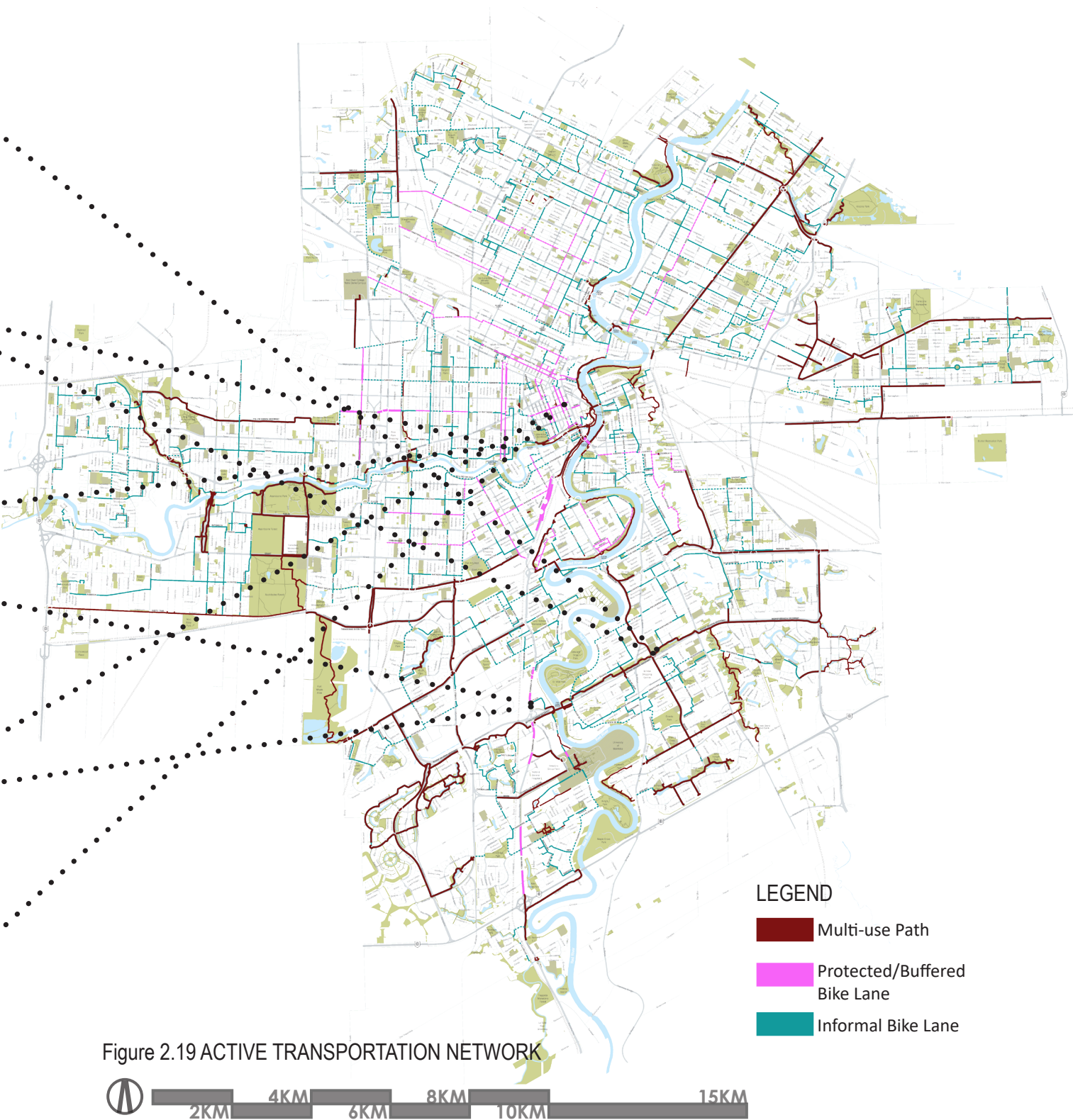
Figure 2.16
PROTECTED BIKE LANE



Figure 2.17
BUFFERED BIKE LANE



Figure 2.18
NEIGHBOURHOOD GREENWAY



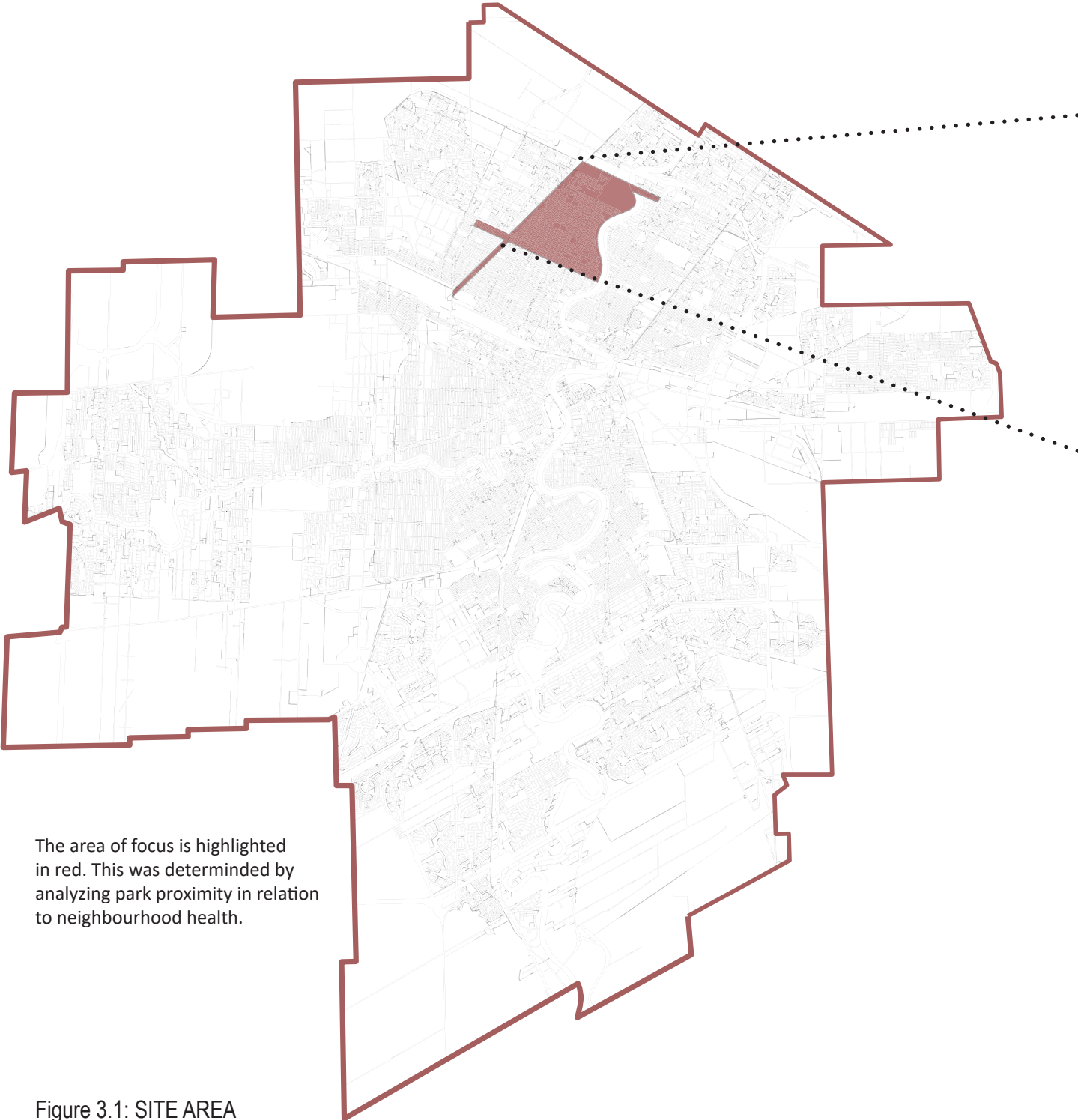
CHAPTER 3

DESIGN

Understanding the relationship between health and greenspace and the discoveries made by analyzing Winnipeg's built environment and health status, helps determine suitable sites for design interventions. Exploring the correlation between neighbourhood health and available green space in Winnipeg becomes the strongest driver behind the decisions made. Looking for potential available spaces that are presently underutilized within neighbourhoods becomes the next step.

The area of focus will include Seven Oaks East, Seven Oaks West and Point Douglas North. More commonly known as West Kildonan, Garden City and the North End. As displayed in figure 2.09 and 2.12, an area with poor health status amongst several chronic diseases and poor availability to larger parks that have the benefit to prevent these.

SITE SELECTION



The area of focus is highlighted in red. This was determined by analyzing park proximity in relation to neighbourhood health.

Figure 3.1: SITE AREA



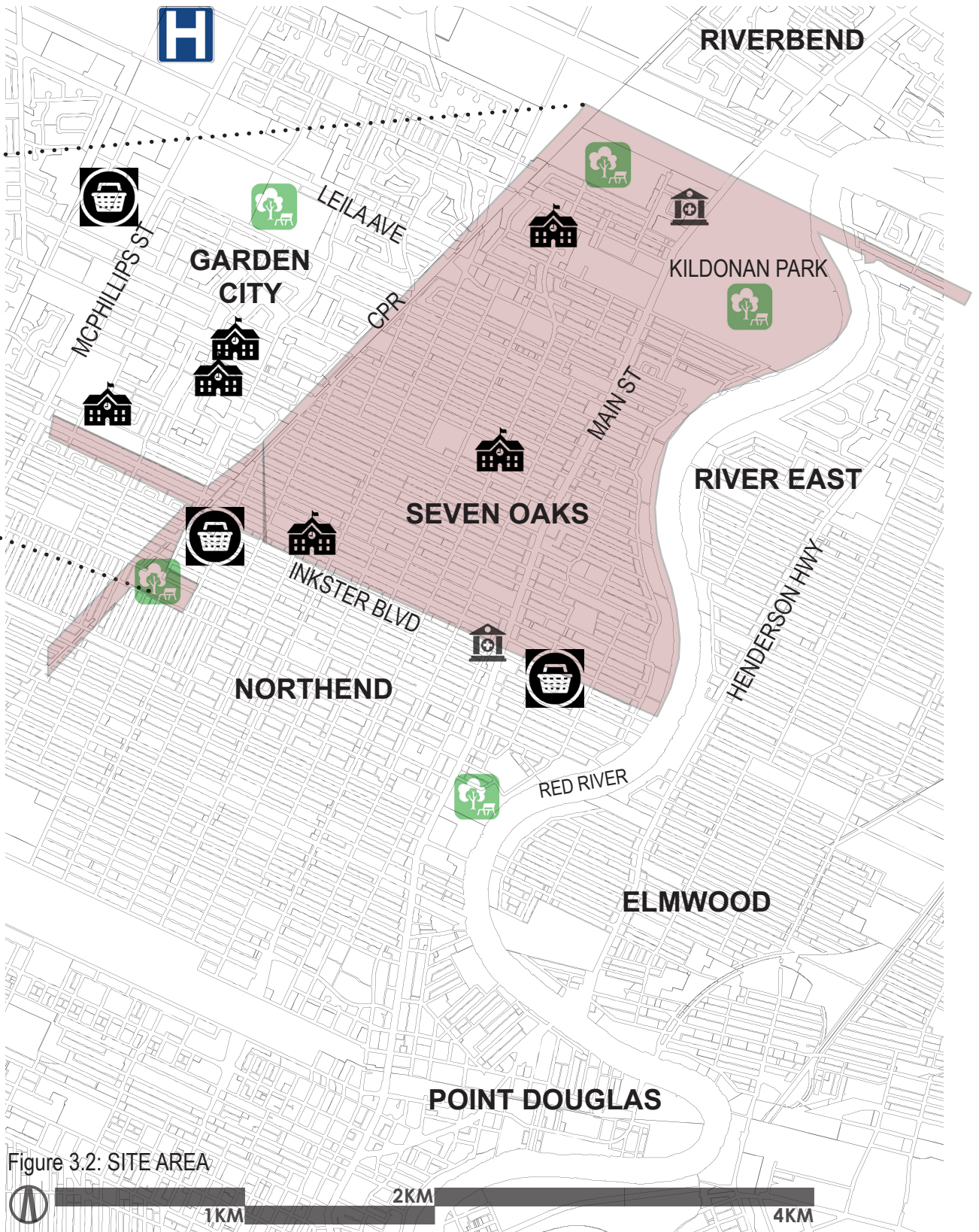


Figure 3.2: SITE AREA



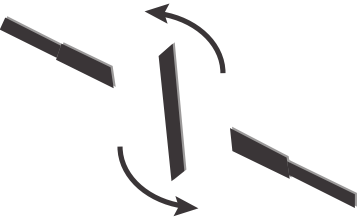
Figure 3.3: INTERVENTION SITES

The area of focus was selected based on negative health standing as well as the lack of green space availability. An area with higher than average diabetes, hypertension, respiratory morbidity and premature mortality rates. It includes the neighbourhoods of West Kildonan, Garden City and the North End. It extends from Henderson Highway on the East, Chief Pequis Trail to the North, McPhillips Street to the West and Inkster Boulevard to the South.

Three Intervention sites have been determined based on potential underutilized spaces within the area of focus along the new park route highlighted in arrows:

1. Bergen Cut-Off Bridge
2. CP Rail Line
3. Inkster Boulevard

BERGEN CUT-OFF



The first intervention focuses on re-purposing the Bergen Cutoff rail bridge and existing berm created for the rail line. This bridge was constructed in 1913 and shortly after in 1928 became unused (Manitoba Historical Society, 2017). The bridge lies south of the Chief Peguis Trail and spans the Red River from North Kildonan to Kildonan Park. The goal is to create a pedestrian bridge and entryway to better connect residents of North Kildonan into the park. Currently, residents would either have to drive to the park or cross the Kildonan Settlers Bridge which may discourage their use of the park.

- Repurpose as Pedestrian Bridge
- Access to Kildonan Park From East Kildonan
- Enhance Relationship With Red River
- Bridging Main Street
- Connection to Proposed Greenway



Figure 3.4: INTERVENTION 1 SITE



Figure 3.5
Existing Condition:
Bergen Cut-Off Berm
from Henderson Highway
to Red River.



Figure 3.6
Existing Condition:
Connection Point
into surrounding
neighbourhood
from Bergen Cut-Off Berm.



Figure 3.7
Existing Condition:
Bergen Cut-Off Bridge
from East Shore of Red
River with Kildonan Park
on the other side.







Figure 3.8
Existing Condition:
Bergen Cut Off Bridge
West shore of Red River
in Kildonan Park.



Figure 3.9
Existing Condition:
Kildonan Settlers Bridge,
part of Chief Peguis
Trail lies in the distance
from the West Shore of
Kildonan Park.



Figure 3.10
Existing Condition:
Existing North Winnipeg
Parkway Trail running
below the bridge from
Kildonan Park. A gentle
slope on the left connects
to the bridge.



Figure 3.11
Existing Condition:
Passing under the bridge
along the existing trail.



Figure 3.12
Existing Condition:
Trail connects into
Kildonan Park at the
northern edge.



Figure 3.13
Existing Condition:
Berm which supported a
rail bridge crossing over
Main Street by Kildonan
Park Golf Course.



Figure 3.14
Existing Condition:
View from berm looking
towards Main Street.





The Bergen Cutoff trail from Henderson Highway to the bridge would be treated with asphalt paving for better accessibility to encourage increased use. Added features such as lighting and seating provide safety and places to rest.

FIGURE 3.15: VIEW 1 - PROPOSED PERSPECTIVE ALONG BERGEN CUT-OFF TRAIL





FIGURE 3.16: PROPOSED BERGEN CUT-OFF SITE PLAN



A NEW PARK ENTRANCE

The middle section of the Bergen Cut-Off bridge rotates which allowed larger boats to pass along the Red River in the past. This would be returned to its closed position to complete the pedestrian connection from the East and West banks of the river along the berm once used as a rail line. This would allow residents of East Kildonan and the surrounding area a more accessible means of accessing Kildonan Park and connecting to existing trail networks in the area, making the park a part of the neighbourhood rather than a destination park.

..... Existing Trail Network



BERGEN CUT-OFF

Spanning the Red River, the Bergen Cut-Off bridge is nearly 300 metres long. Sitting unused for 90 years, the structural frame would require and undergo an extensive assessment and revitalization before being revamped.

It is more pedestrian friendly than the next nearest bridge, the Kildonan Settlers bridge as it is less elevated from the river and free of any vehicles. Providing the residents of North Kildonan a means of accessing the park without the use of a vehicle increases opportunities for physical activity and drastically reduces the perceived distance needed to travel to get to it. The height of the bridge will still allow for recreational boats to pass under as larger boats no longer travel down the river.

Figure 3.17 shows the entire span of the Red River. The shore on the West side becomes more suitable for formal recreation as it connects into Kildonan Park. Future opportunities such as water taxi stops, fishing docks and ice skating trails can be considered with such infrastructure in place to support it. Existing trail networks such as the North Winnipeg Parkway and Kildonan Parkway would be complimented and better utilized with the addition of this retrofit. Figure 3.18 better shows the gentle slope of the riparian river bank and the existing trail network that runs underneath of the bridge that runs from Chief Peguis Trail and into Kildonan Park.

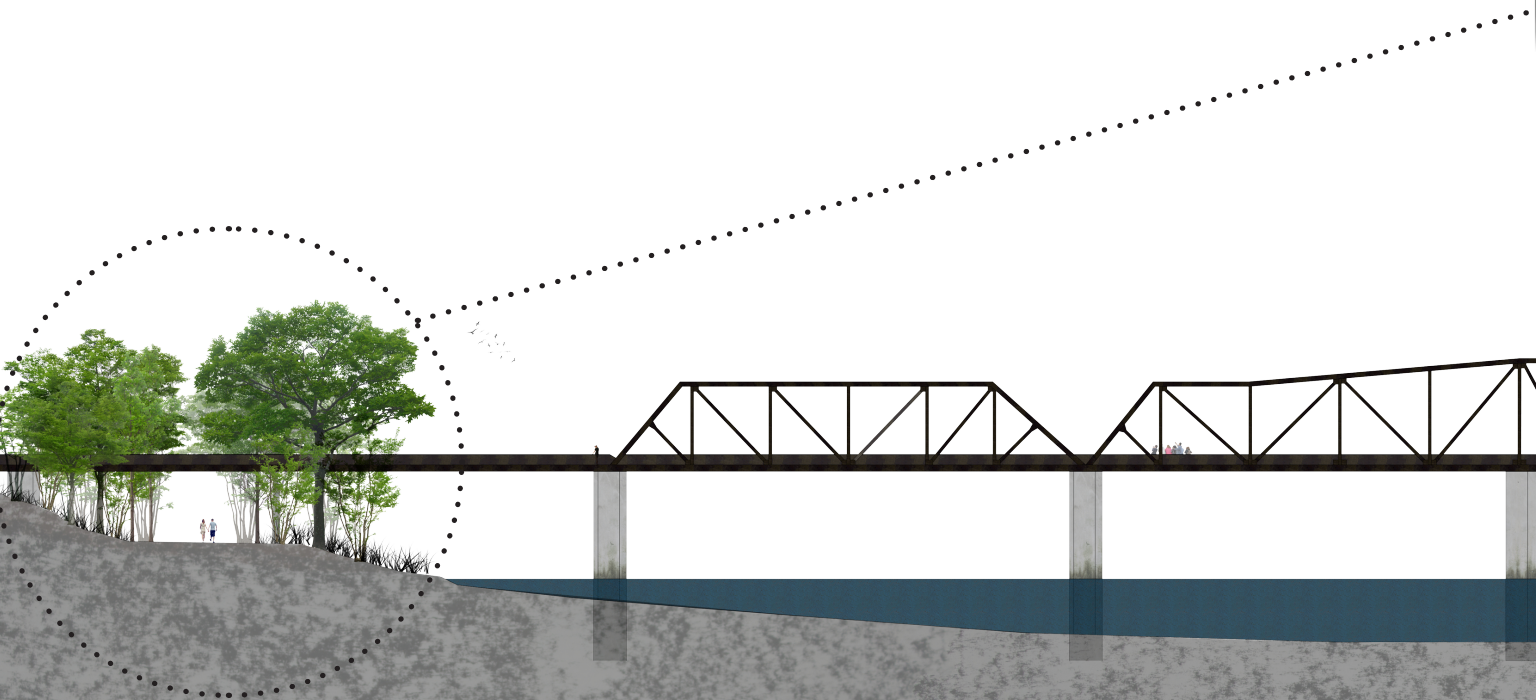
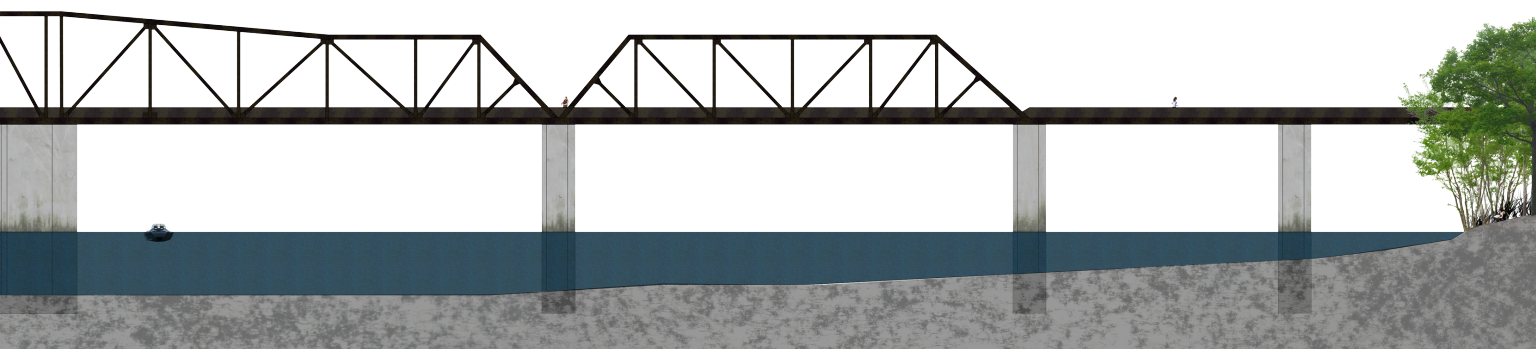


FIGURE 3.17: 1B: NORTH SECTION ELEVATION





FIGURE 3.18: 1A: NORTH SECTION ELEVATION



BERGEN CUT-OFF

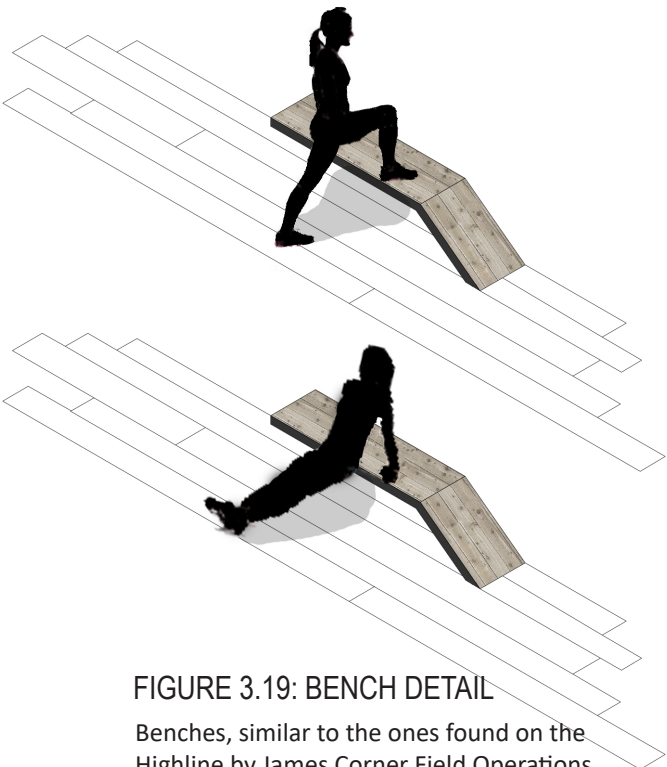


FIGURE 3.19: BENCH DETAIL

Benches, similar to the ones found on the Highline by James Corner Field Operations, extrude from the deck surface and provide opportunities for stretching or strength training exercises and of course, much deserved rest along the trail.

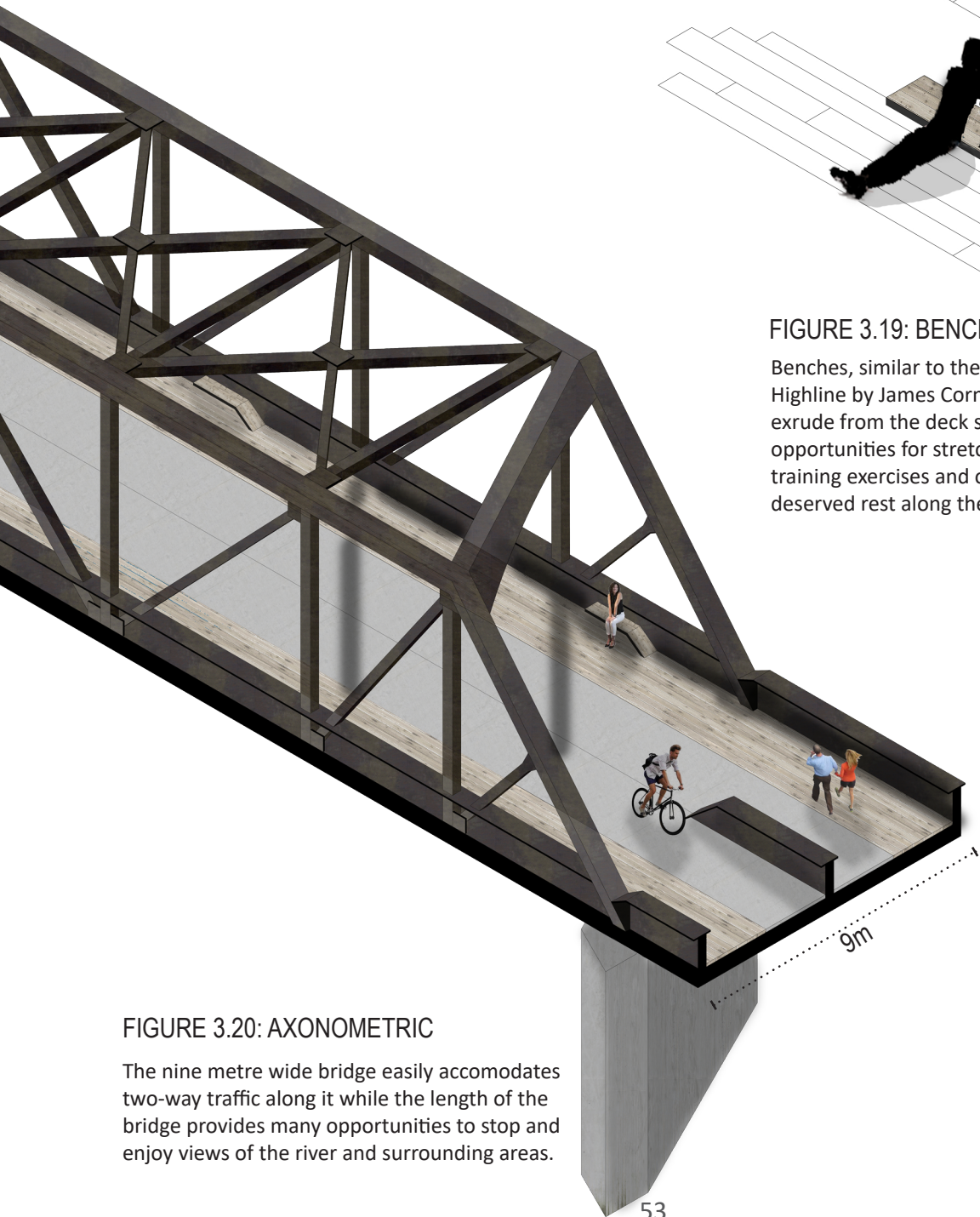


FIGURE 3.20: AXONOMETRIC

The nine metre wide bridge easily accomodates two-way traffic along it while the length of the bridge provides many opportunities to stop and enjoy views of the river and surrounding areas.

The bridge surface is treated with two separate materials, pre-cast concrete slabs and wood decking (figure 3.20) which allows for water to drain through into the river below and not pool on the surface. Wood decking is placed on the outside edge of the bridge so that slower pedestrian traffic can enjoy the surrounding views. The rough, uneven surface texture discourages cyclists and rollerbladers from travelling here, making it safer for pedestrians. The concrete surface in the middle of the bridge better accommodates bicycles and rollerblades.

A cross section of the bridge and lower trail (figure 3.21) shows the interaction that visitors can have with the riparian forest through either the river bed or amongst its canopy along the bridge. Trees that have adapted and grown through the frame of the bridge are left and encouraged to continue doing so while the decking is placed around it.



The new entrance to the Kildonan Park becomes a natural area for residents to enjoy and explore.

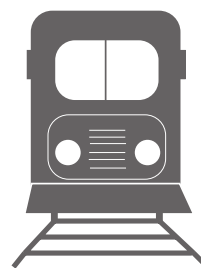


FIGURE 3.21: 1C: EAST SECTION ELEVATION



RAILWAY GREENWAY

2



The second intervention is placed alongside the section of Canadian Pacific Railway that cuts through the Northwest portion of Winnipeg through Garden City, West Kildonan and the North End. Currently, the space along the tracks is used informally by cyclists and pedestrians. The greenway connects to the proposed Bergen Cut-Off trail behind Vince Leah and continues for over three kilometres to Sinclair Park Community Centre. The goal of the greenway is to create a linear park that better connects pedestrians to surrounding neighbourhoods in a safer manner while promoting physical activity.

- Connect Intersecting Neighbourhoods
- Serve as an Active Corridor / Linear Park
- Pedestrian Separated Right-of-Way
- Emphasize Long Views



Figure 3.22: INTERVENTION 2 SITE

Figure 3.23
Existing Condition:
Berm crosses Main St. Adjacent to the North Winnipeg water treatment facility where unused CP rail remains.



Figure 3.24
Existing Condition:
The old rail line runs behind Vince Leah Community Centre.



Figure 3.25
Existing Condition:
The potential greenspace borders the property line of the large sports fields at Vince Leah.





Figure 3.26
Existing Condition:
 Unused portion of track (right) from the Bergen Cut-Off trail that ties into the used portion of CP rail line.



Figure 3.27
Existing Condition:
 Unprogrammed park space along the rail line being used as informal private gardens.



Figure 3.28
Existing Condition:
 Vast, un-programmed park space will be the focus of this intervention.

Figure 3.29
Existing Condition:
Long, distant views can
be experienced along the
route of the tracks.



Figure 3.30
Existing Condition:
Wide, linear areas of land
left un-used along the
rail line that separates
neighbourhoods.



Figure 3.31
Existing Condition:
One of many connection
points into surrounding
neighbourhoods.



RAILWAY GREENWAY

The proposed linear park is comprised of a two-way, 12 foot wide asphalt path to facilitate pedestrians, wheelchairs, cyclists and rollerbladers along the entire length of the greenway. The edge of the path consists of grass to facilitate runners with a lower impact surface if desired. The grass edge can double as a cross country skiing trail in winter months. The path is strategically placed along the train track as the tracks dissect multiple neighbourhoods in a straight manner, which allows for the fastest route of travel as opposed to the street layout. While most of the greenway is narrow, it does open up to wide sections of underutilized space which is further developed with more programming (figure 3.33).

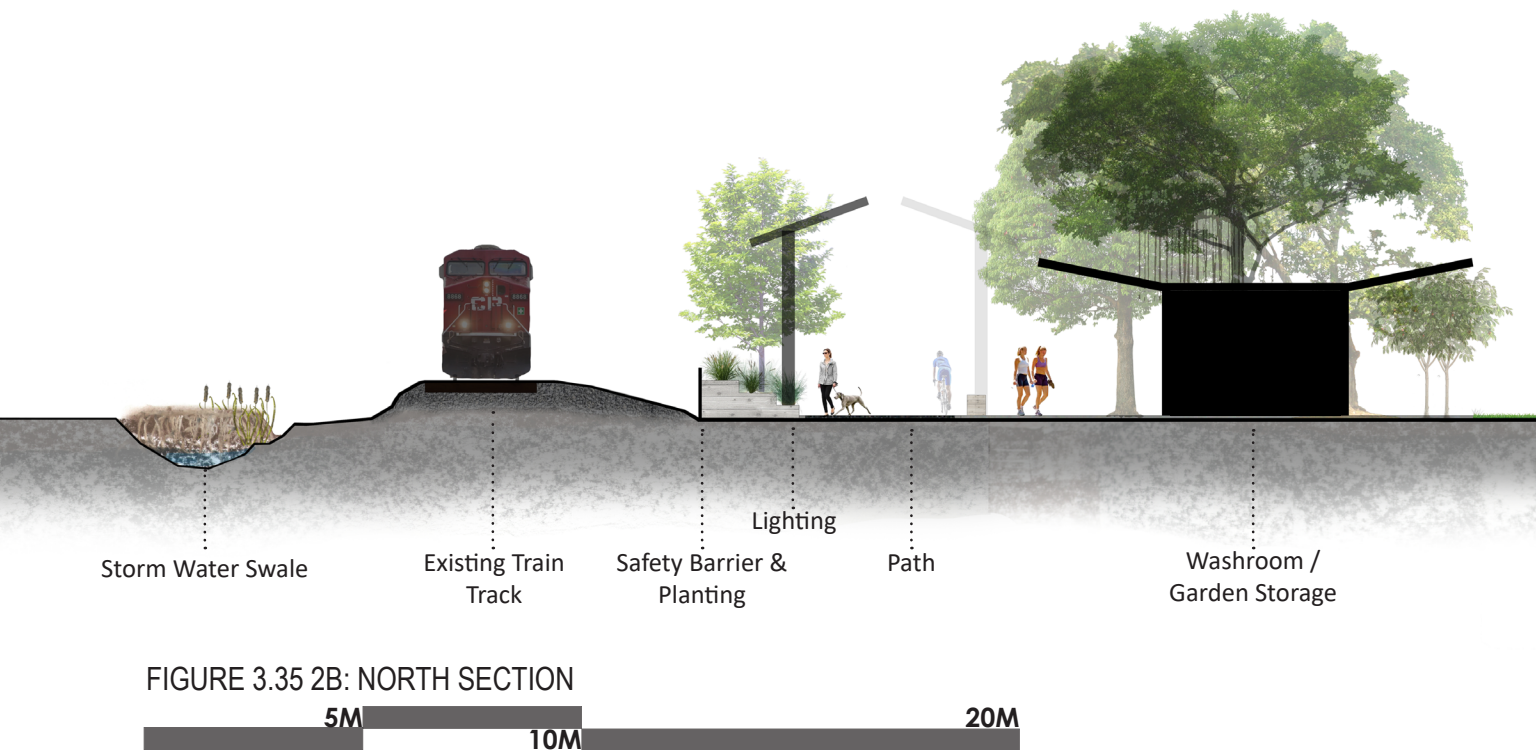
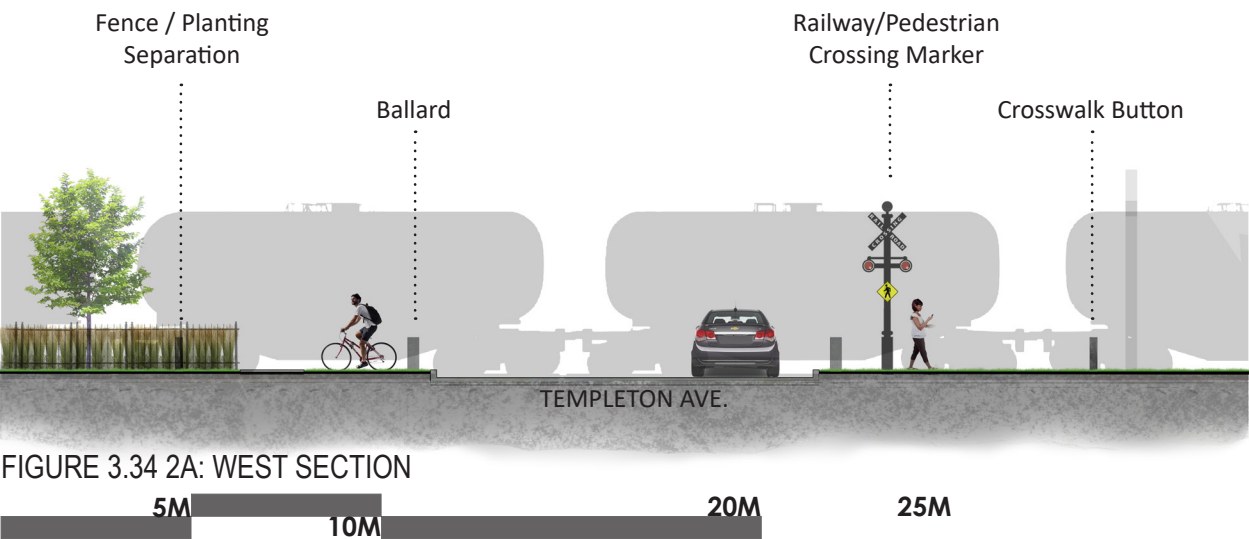
The area that is developed in further detail is situated between the West Kildonan and Garden City neighbourhoods and is classified as a city park but lacks any features or programming. It is accessible by a path that dissects the site and connects residential areas. Some residents of the area currently use the vacant space for private vegetable gardens while others walk along the tracks for leisure. The proposed park is situated in an area with few side walks and a street layout that caters to vehicular traffic. The park would connect an existing series of pocket parks in the neighbourhood that is currently fragmented once pedestrians reach McGregor Street.





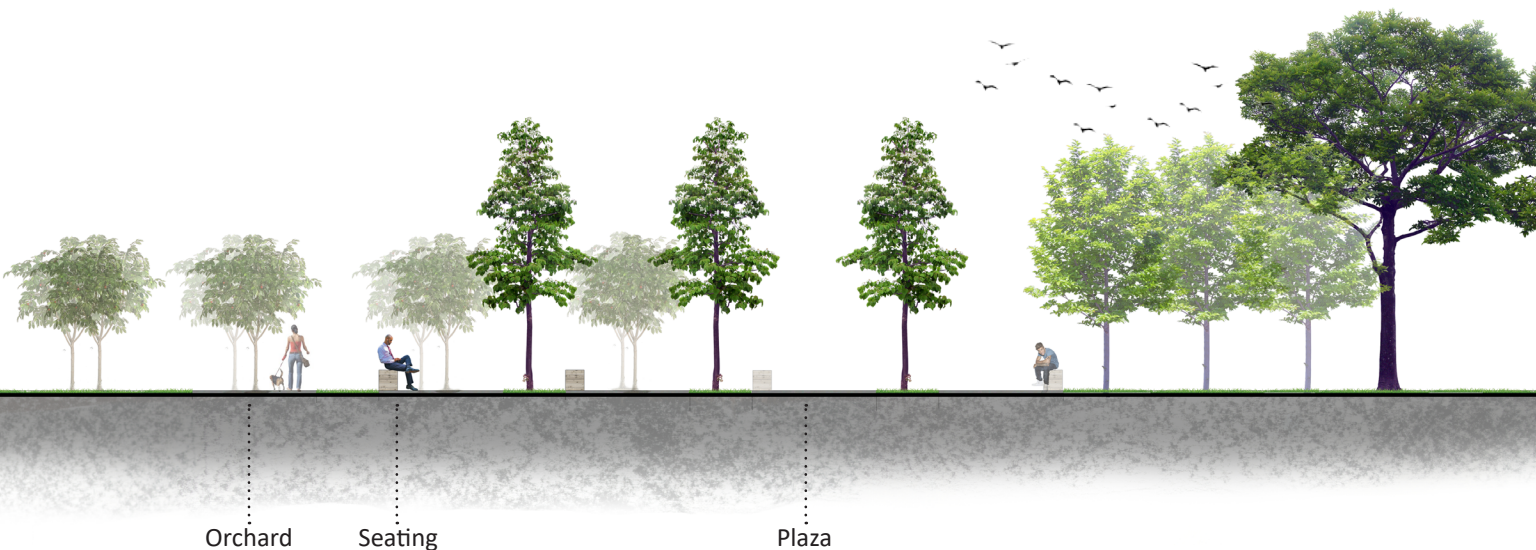
FIGURE 3.33 PROPOSED RAILWAY GREENWAY SITE PLAN

RAILWAY GREENWAY



Providing pedestrians the right-of-way is accomplished by using existing railway crossing markers as pedestrian crossings as well (figure 3.34). Pedestrians can trigger the lights using buttons as they approach the road crossing allowing for minimal disruptions during their physical activity. Drivers are already adjusted and trained to be alert at train crossings so this strategy makes most sense. Ballards are placed along the trail at road crossings to prevent vehicles from entering while allowing smaller vehicles such as snow removal plows to access for maintenance while enhancing safety for pedestrians. Light fixtures and benches are placed along the entire length of the park for safety and comfort. Additionally, a single row of pavers is set into the path every 100 metres as a visual indicator for people to track their total distance or provide motivation during their physical activity.

This particular crossing (figure 3.34) leads from the Bergen Cut-Off trail and into the proposed park, one of the many entrances into the space. The Park includes features such as a large community garden and orchard which is supported by a storage facility that doubles as a washroom for visitors. The roof of the structure is shaped to capture rainwater inside of the shed which can be used by the garden members. Raised planters offer more accessible gardening for older visitors or those with mobility issues. The dog park features packed gravel paths, tree groves and a hill. The central plaza offers a space for people to meet, relax or even host community events. Visitors inside of the park are discouraged from encroaching onto the train tracks by installing a fence and mix of raised planters and native grasses. The raised tracks offer a view of passing trains from within the park, creating an ephemeral dynamic.



INKSTER BOULEVARD



Inkster Boulevard is a East-West running two-way road with a wide lawn boulevard that is highly underutilized by the public. It intersects the Railway Greenway proposal. Money is spent by the city on maintaining this lawn used by nothing more than advertising for garage sales. It runs through a predominantly residential area bordering West Kildonan and the North End and has amenities such as schools, small grocery stores and businesses. The proposal stretches from McPhillips Street to Scotia Street which has existing cycling programming. While the proposal runs this entire length, one segment is designed in detail.

- Enhance Tree Canopy
- Re-Structure Traffic Flows
- Minimize Pedestrian Interruptions
- Connect to Existing and Proposed Park Space



Figure 3.36: INTERVENTION 3 SITE

Figure 3.37
Existing Condition:
Railway greenway as
it intersects Inkster
Boulevard.



Figure 3.38
Existing Condition:
Highly underutilized
space requiring regular
maintenance and cutting.



Figure 3.39
Existing Condition:
Detached residential
homes primarily lined
along the boulevard.







Figure 3.40
Existing Condition:
Elm canopy along the
wide boulevard.



Figure 3.41
Existing Condition:
One of the many intersections along the boulevard.



Figure 3.42
Existing Condition:
Lawn that requires maintenance and cutting lies unused.



Figure 3.43
Existing Condition:
Inkster Elementary School lies along the heart of proposed stretch of Inkster Boulevard and is a reduced speed zone.

Figure 3.44
Existing Condition:
Heavily dominated by
vehicular traffic and on
street parking.



Figure 3.45
Existing Condition:
Inkster Boulevard ends
at Scotia Street which
is part of the North
Winnipeg Parkway
and connects back to
Kildonan Park.



Figure 3.46
Existing Condition:
Existing cycling
infrastructure along
Scotia Street where
Inkster Boulevard ends.

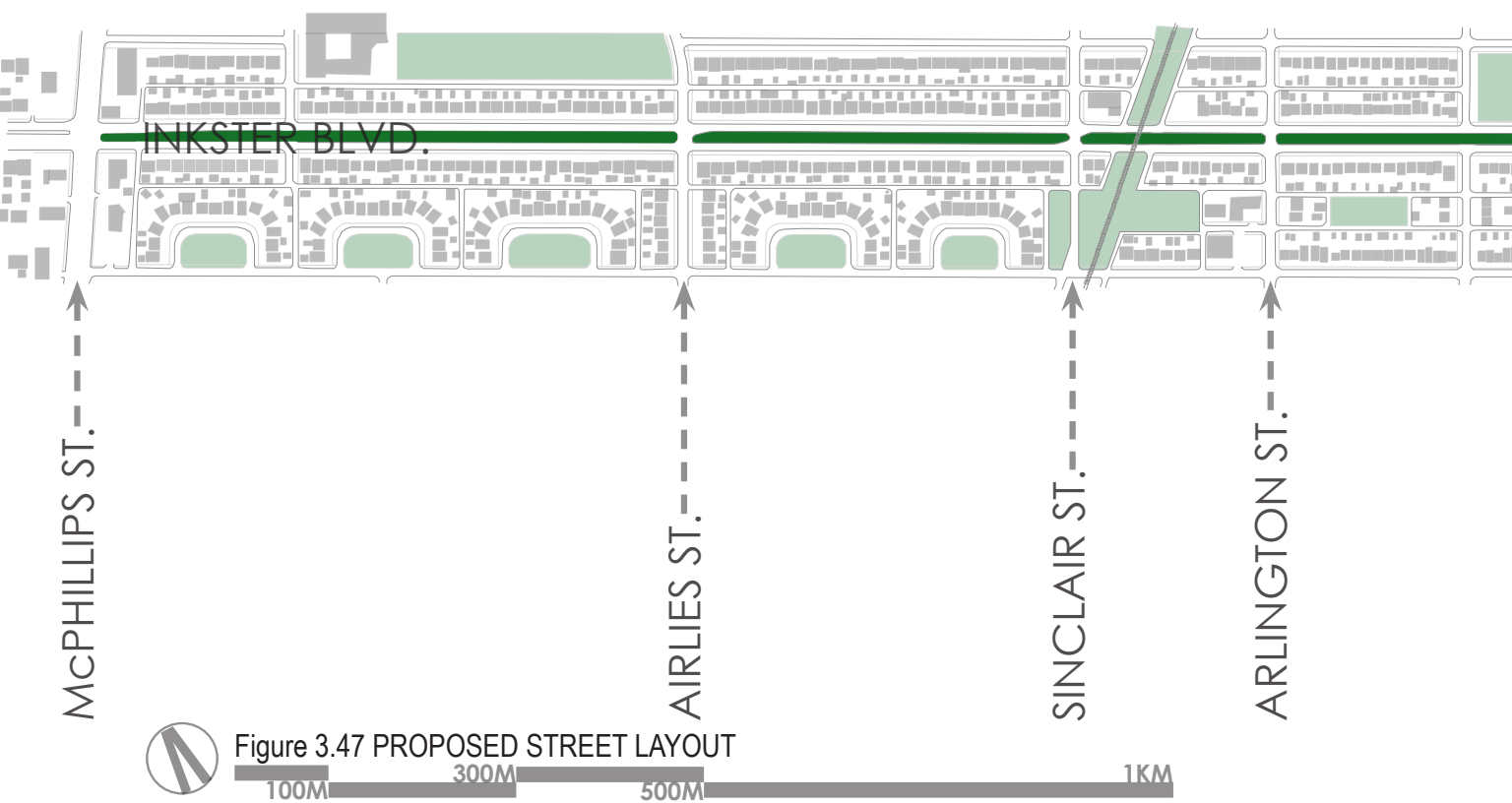


INKSTER BOULEVARD

Proposed Layout

The existing stretch of Inkster Boulevard from McPhillips Street to Main Street is three kilometres in length and measures 12 metres wide. This accounts for nearly nine acres of under utilized green space. Currently, this stretch of the boulevard is broken up and dissected by every through street along the way, 13 in total (figure 3.48). This break up currently allows for the longest stretch of uninterrupted green space to be only 200 metres in length. This makes the boulevard auto dominated and not very pedestrian friendly.

By restructuring the street layout and only allowing the larger through streets with traffic lights to cross Inkster Boulevard, reduces the interruptions to only five along the entire stretch. Smaller streets that meet Inkster would force drivers to make a turn onto the street rather than crossing it. This would allow for longer segments of uninterrupted physical activity (up to 600 metres) and would increase pedestrian safety. The section between Arlington Street and McGregor Street is developed in more detail as a design intervention.



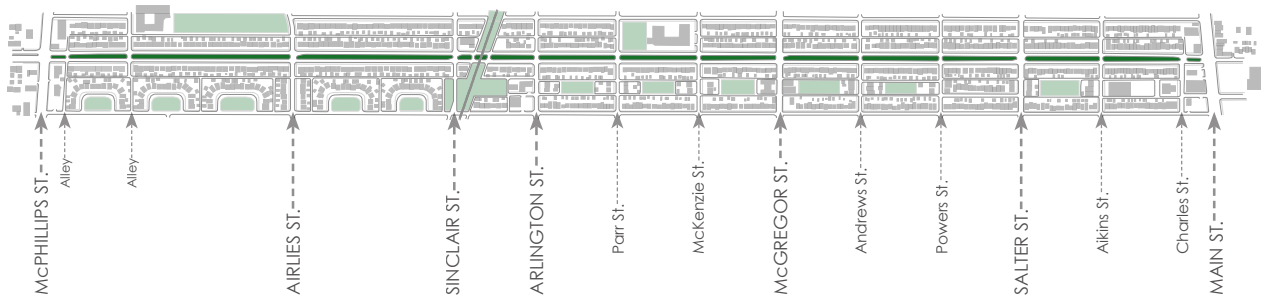
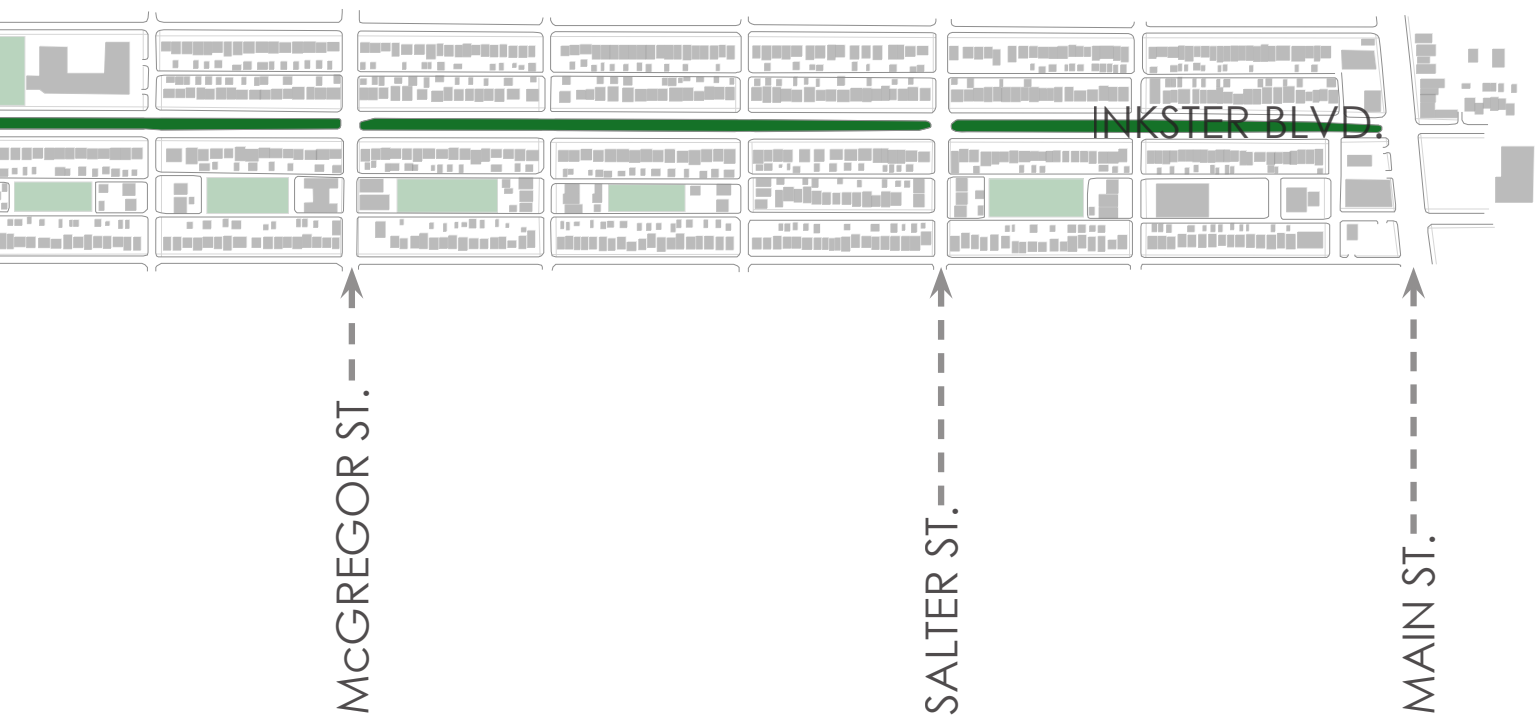


Figure 3.48 EXISTING STREET LAYOUT





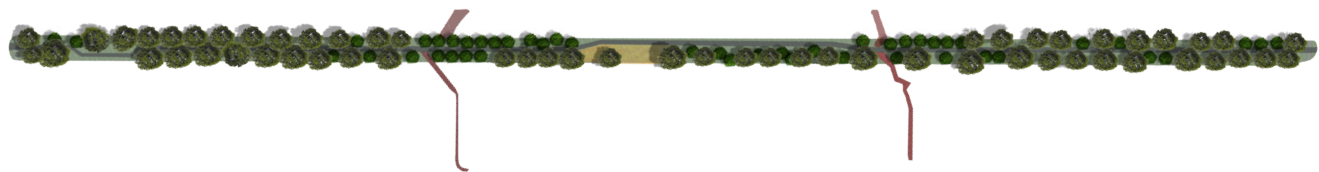


A VIBRANT BOULEVARD

A 600 metre segment of Inkster Boulevard in more detail with Inkster Elementary School centered in the residential area featuring a linear street layout. The boulevard would provide opportunities for physical activity and transportation for residents as well as students. Reducing the number of intersections along the new path increases pedestrian safety, accessibility and enjoyment.



INKSTER BOULEVARD



The boulevard would be treated with an asphalt path three metres in width to allow for two-way bicycle and pedestrian access. Areas where elm trees have been removed due to Dutch Elm Disease (DED) become re-planted with Hackberry trees in order to re-establish the boulevard’s characteristic canopy. The under canopy would be treated with a mixture of lawn and prairie grasses to provide a visual barrier from vehicles. The linear park would run the entire stretch of Inkster Boulevard between McPhillips Street and Scotia Street where it connects to the proposed railway greenway and existing parkway along the Red River which leads to Kildonan Park.

Raised, red, cast in place flagstone paving (figure 3.51) at cross walks raises driver alertness and forces reduced speeds along the street while adding splashes of colour into the neighbourhood. The red paving also leads into side streets that have under utilized pocket parks and tot lots for people to enjoy. Commuters, residents and even school children can access this park space for physical activity and as a means to connect to other park systems and local amenities in the neighbourhood.

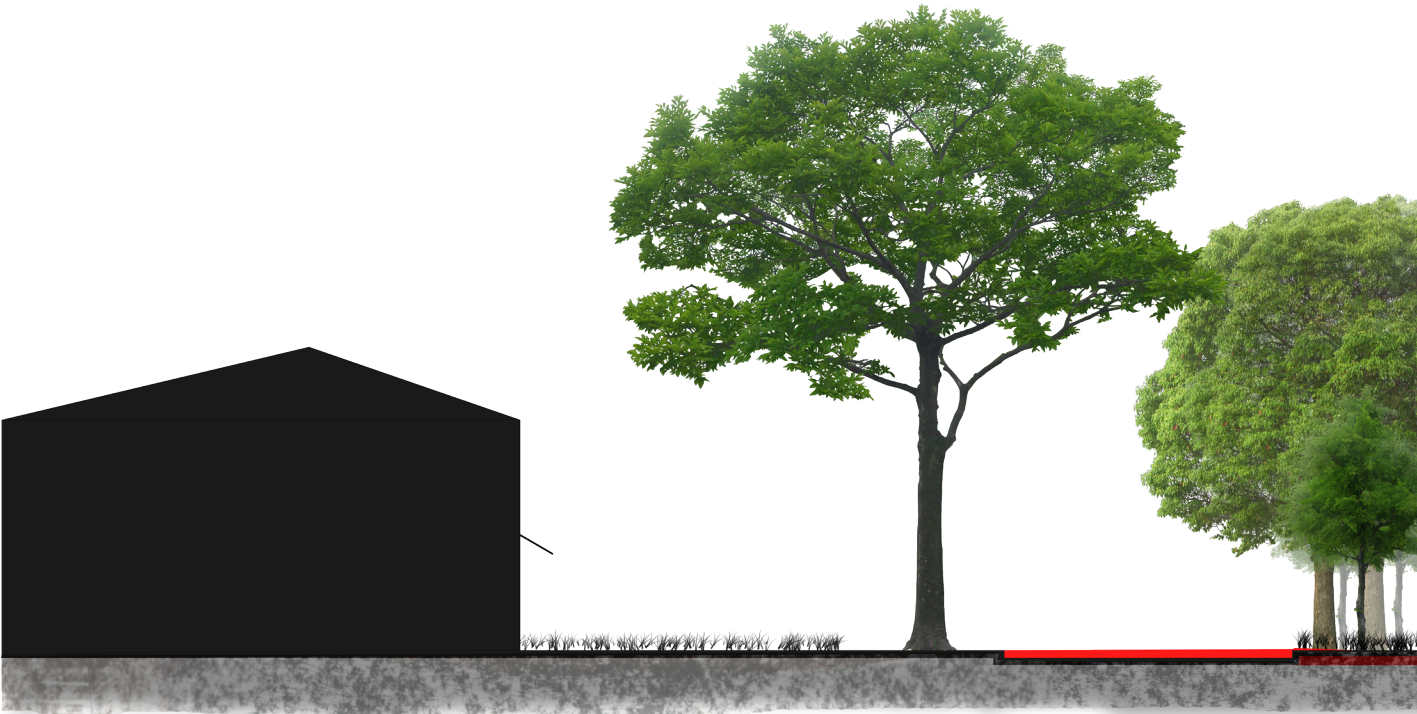


FIGURE 3.50 3A: WEST SECTION ELEVATION



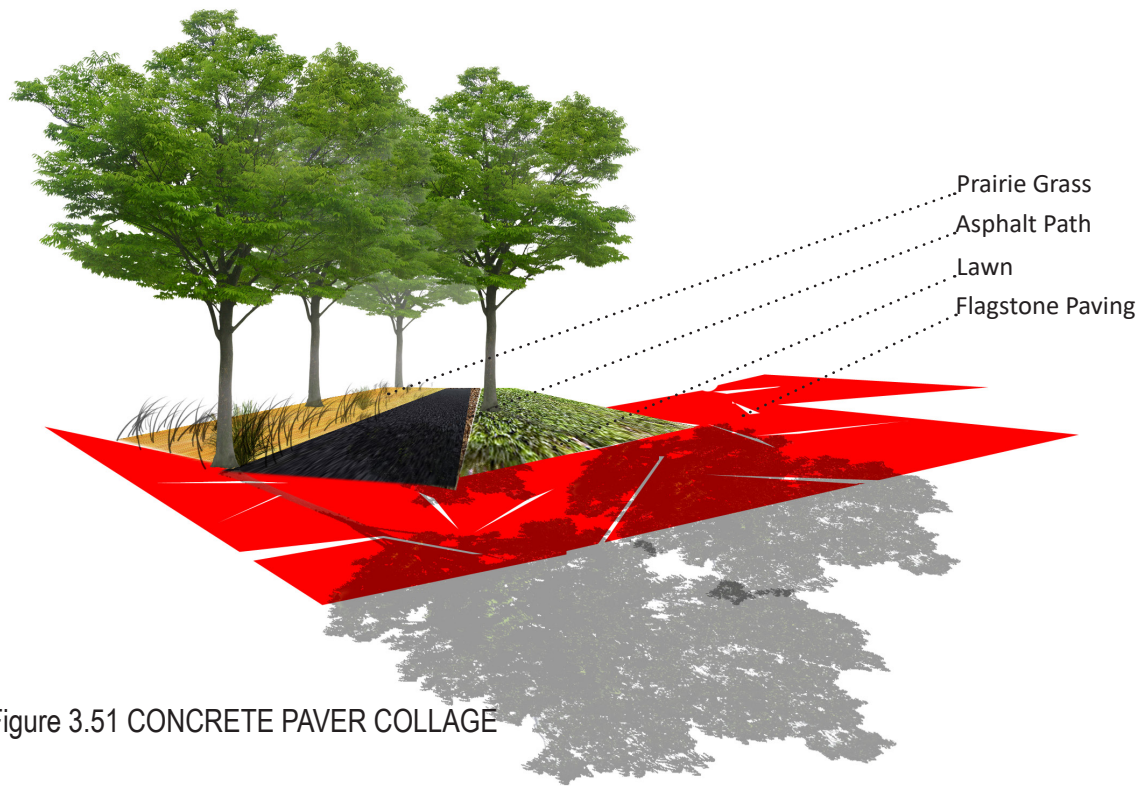
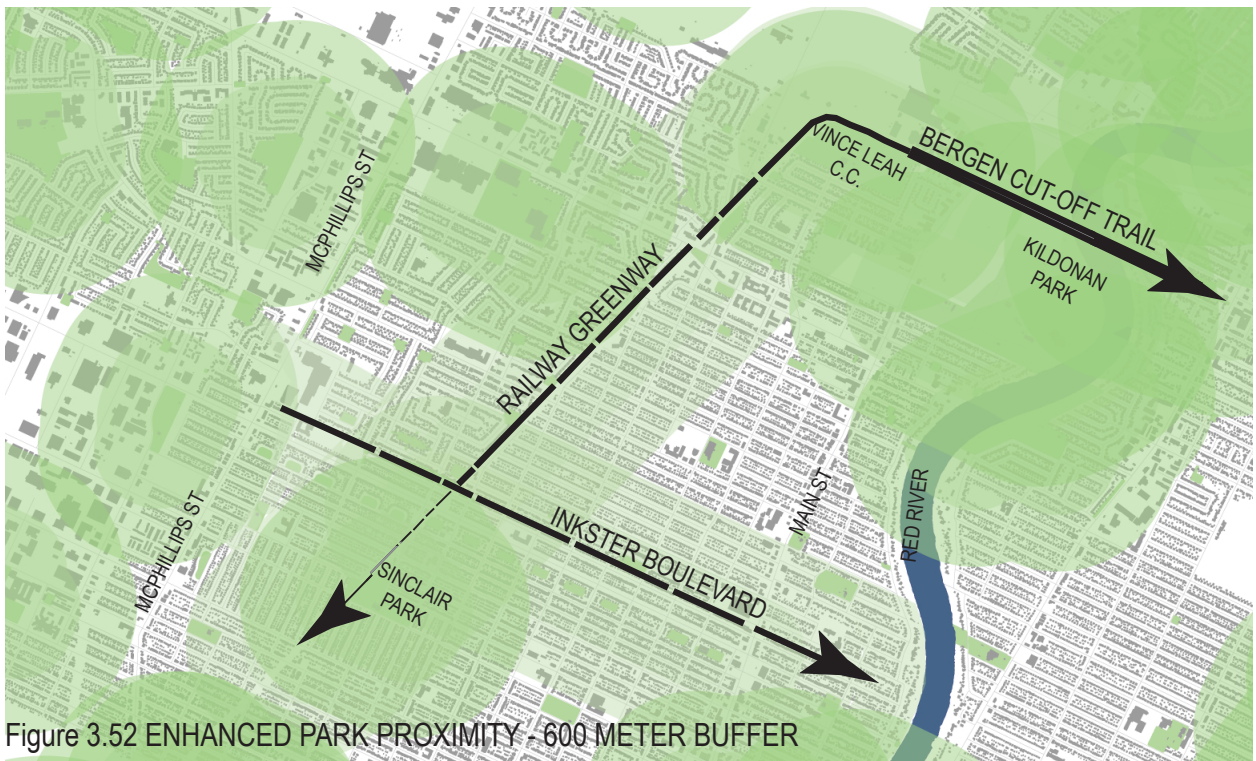


Figure 3.51 CONCRETE PAVER COLLAGE





CONCLUDING THOUGHTS AND FUTURE CONSIDERATIONS

Chronic disease is becoming an epidemic that places financial stresses on our healthcare system. By looking at the environment and how it plays a role on our overall health, we can begin to look at models of prevention rather than treatment. Older neighbourhoods do not have the advantage of vast space to develop like newer ones, so retrofitting existing under utilized or forgotten spaces becomes crucial, particularly in areas of endemic poor health.

These three interventions form a connection between existing parks and trail systems within the neighbourhood while becoming a linear park itself. A park that can be used year round for recreation or travel. It fills a tremendous void in terms of park space proximity for residents (figure 3.52 and 3.53) while adding nearly 30 acres of additional park space. Space that can be used year round for recreation or travel while providing health benefits.

While this project focused on the built environment specifically, it is important to note that many other social and demographic determinants affect the overall health of a neighbourhood.



REFERENCES

- Atlanta Beltline, 2013. *2030 Strategic Implementation Plan Final Report*. Atlanta: Atlanta Beltline
- Bancroft, C., Joshi, S., Rundle, A., Hutson, M., Chong, C., Weiss, C.C., Genkinger, J., Neckerman, K. and Lovasi, G., 2015. Association of proximity and density of parks and objectively measured physical activity in the United States: A systematic review. *Social Science & Medicine*, 138, pp.22-30.
- Barton, H. and Grant, M., 2006. A health map for the local human habitat. *The Journal for the Royal Society for the Promotion of Health*. 126(6), pp.252-253.
- Bedimo-Rung, A.L., Mowen, A.J. and Cohen, D.A., 2005. The Significance of Parks to Physical Activity and Public Health. *American Journal of Preventative Medicine*, 28, pp.159-168.
- Boustan, L, 2017. *The Culprits Behind White Flight*. [online] Available at: <<https://www.nytimes.com/2017/05/15/opinion/white-flight.html>> [Accessed 12 January 2018].
- Brooklyn Bridge Park, n.d. *The Design*. [online] Available at: <<https://www.brooklynbridgepark.org/pages/parkdesign>> [Accessed 22 November 2017].
- CBC The National, 2015. *How Cities Make Us Sick*. [online] Available at: <https://www.youtube.com/watch?time_continue=185&v=jQfC6mKTErg> [Accessed 12 December 2017].
- Centers for Disease Control and Prevention, 2017. *Chronic Diseases: The Leading Causes of Death and Disability in the United States*. [online] Available at: <<https://www.cdc.gov/chronicdisease/overview/index.htm#ref17>> [Accessed 10 October 2017].
- CityParksAlliance, 2017. *City Parks: America's New Infrastructure – Health & Social Benefits*. [online] Available at: <https://www.youtube.com/watch?time_continue=385&v=Lm4UD1eOTSI> [Accessed 16 November 2017].
- Cohen, D.A., McKenzie, T.L., Sehgal, A., Williamson, S., Golinelli, D. and Lurie, N., 2007. Contribution of Public Parks to Physical Activity. *American Journal of Public Health*, 97(3), pp.509-514.
- Cohen, D.A., Marsh, T., Williamson, S., Derose, K.P., Martinez, H., Setodji, C. and McKenzie, T.L., 2010. Parks and physical activity: Why are some parks used more than others?. *Preventative Medicine*, 50, pp.s9-s12.
- Cohen, D.A., Han, B., Nagel, C.J, Harnik, P., McKenzie, T.L., Evenson, K.R., Marsh, T., Williamson, S., Vaughan, C. and Katta, S., 2016. The First National Study of Neighborhood Parks: Implications for Physical Activity. *American Journal of Preventative Medicine*, pp.1-8.
- Dannenberg, A.L., Frumkin, H. and Jackson, R.J., 2011. *Making Healthy Places: Designing and Building for Health, Well-being, and Sustainability*. Washington: Island Press.
- Dellorto, D., 2012. Global report: Obesity bigger health crisis than hunger. *CNN*, [online] (Last updated 5.41 AM on 14th December). Available at: <<http://www.cnn.com/2012/12/13/health/global-burden-report/index.html>> [Accessed 21 December 2017].
- Distasio, J. and Kauffman, A. eds., 2015. *the divided prairie city Income Inequality Among Winnipeg's Neighbourhoods, 1970-2010*. Winnipeg: Institute of Urban Studies, University of Winnipeg.
- Elmslie, K., n.d. *Against the Growing Burden of Disease*. Canada: Public Health Agency of Canada.
- Faiks, S., Kest, J., Szot, A. and Vendura, M., 2001. *Revisiting Riverside: A Frederick Law Olmsted Community*. Masters. University of Michigan. Available at: <http://seas.umich.edu/ecomgt/pubs/riverside.htm> [Accessed 8 November 2017].

Frank, L.D., Engelke, P.O. and Schmid T.L., 2003. *Health and Community Design: The Impact Of The Built Environment On Physical Activity*. Washington: Island Press.

Giles-Corti, B., Moudon, A.V., Reis, R., Turrell, G., Dannenberg, A.L., Badland, H., Foster, H., Lowe, M., Sallis, J.F., Stevenson, M. and Owen, N., 2016. City planning and population health: a global agenda. *The Lancet*, 388, pp.2912-2924.

Kaczynski, T.A., Potwarka, L.R. and Saelens, B.E., 2008. Association of Park Size, Distance, and Features With Physical Activity in Neighbourhood Parks. *American Journal of Public Health*, 98(8) pp.1451-1456.

Kaplan, R. and Kaplan S., 1989. *The Experience of Nature: A Psychological Perspective*. Melbourne: Cambridge University Press.

Kirby, V. and Russel. S., 2015. *Cities, green infrastructure and health*. London: Landscape Institute.

Klyde Warren Park, 2015. *Heart of the City*. [online] Available at: <<https://www.klydewarrenpark.org/About-the-Park/index.html>> [Accessed 19 October 2017].

Landscape Institute. 2013. *Public Health and Landscape: Creating healthy places*. London: Landscape Institute.

Loudon, J.C., 1969. *The Landscape Gardening and Landscape Architecture of the Late Humphrey Repton*. London: Gregg International Publishers Limited.

Marcus, C.C. and Sachs, N.A., 2014. *Therapeutic Landscapes: An Evidence-Based Approach to Designing Healing Gardens and Restorative Outdoor Spaces*. Hoboken: John Wiley & Sons.

Montgomery, C., 2014. *Happy City Transforming Our Lives Through Urban Design*. Toronto: Anchor Canada.

Olmsted, F.L., 1870. *Public Parks and the Enlargement of Towns*. Boston: American Social Science Association.

Repton, H., 1969. *An Enquiry Into The Changes in Landscape Gardening*. London: Gregg International Publishers Limited.

Sallis, J.F., Cerin, E., Conway, T.L., Adams, M.A., Frank, L.D., Pratt, M., Salvo, D., Schipperijn, J., Smith, G., Cain, K.L., Davey, R., Kerr, J., Lai, P., Mitas, J., Reis, R., Sarmiento, O.L., Schofield, G., Troelsen, J., Van Dyck, D., De Bourdeauhuji, I.D. and Owen, N., 2016. Physical activity in relation to urban environments in 14 cities worldwide: a cross-sectional study. *The Lancet*, 387, pp.2207-2217.

Sarkar, C., Webster, C., Pryor, M., Tang, D., Melbourne, S., Zhang, X. and Jianzheng, L., 2015. Exploring associations between urban green, street design and walking: Results from the Greater London boroughs. *Landscape and Urban Planning*, 143, pp.112-125.

Stark, J.H., Neckerman, K., Lovasi, G.S., Quinn, J., Weiss, C.C., Bader, M.D.M., Konty, K., Harris, T.G. and Rundle, A., 2014. The impact of neighborhood park access and quality on body mass index among adults in New York City. *Preventative Medicine*, 64, pp.63-68.

Sturm, R. and Cohen, D., 2014. Proximity to Urban Parks and Mental Health. *Journal Ment Health Policy Econ*, 17(1), pp.1-12.

Tate, A., 2015. *Great City Parks*. 2nd Edition. New York: Routledge.

Thompson, C.W., 2010. Linking landscape and health: The recurring theme. *Landscape and Urban Planning*, 99, pp.187-195.

Wang, G., Macera, C.A., Scudder-Soucie, B., Schmid, T., Pratt, M. and Buchner, D., 2006. A Cost-Benefit Analysis of Physical Activity Using Bike/Pedestrian Trails. *Health Promotion Practice*, 6(2), pp.174-179.

World Health Organization Regional Office for Europe. 2016. *Urban green space and health: A review of evidence*. Copenhagen: World Health Organization Regional Office for Europe.

FIGURES

Cover Image

Sajdak, D., 2014. *Cut-Off*.
[photograph] (Winnipeg, Manitoba).

Figure 1.1

Adapted by author from:

Barton, H. and Grant, M., 2006. A health map for the local human habitat. *The Journal for the Royal Society for the Promotion of Health*. 1.266(6), pp 252-253.

Figure 1.2

Image created by author with information from:

Dannenberg, A.L., Frumkin, H. and Jackson, R.J., 2011. *Making Healthy Places: Designing and Building for Health, Well-being, and Sustainability*. Washington: Island Press.

Figure 1.3

Image created by author with information from:

Centers for Disease Control and Prevention, 2017. *Chronic Diseases: The Leading Causes of Death and Disability in the United States*. [online] Available at: <<https://www.cdc.gov/chronicdisease/overview/index.htm#ref17>> [Accessed 10 October 2017].

Elmslie, K., n.d. *Against the Growing Burden of Disease*. Canada: Public Health Agency of Canada.

Figure 1.4

Tate, A., 2015. *Great City Parks*. [print] 2nd Edition. New York: Routledge.

Figure 1.5

Eric The Fish, April 19, 2004. *Birkenhead Park 18.jpg*. [image online] Wikimedia Commons, Creative Commons Attribution 2.0 Generic license. Available at <https://commons.wikimedia.org/wiki/File:Birkenhead_Park_18.jpg> [Accessed 2 November 2018].

Figure 1.6

Kevin 1086, September 1, 2013. *KWP East Side.jpg*. [image online] Wikimedia Commons, Creative Commons Attribution-Share Alike 3.0 Unported license. Available at <https://commons.wikimedia.org/wiki/File:KWP_East_Side.jpg> [Accessed 22 November 2018].

Figure 1.7

Google Earth 9.2.73.2. 2018. *Klyde Warren Park* 32°47'29"N, 96°48'03"W, elevation 502M, 3D layer. Available at: <<https://earth.google.com/web/@32.78918031,-96.8018508,141.17433494a,45.2.30158047d,35y,105.46344019h,45.39689551t,0r>> [Accessed 22 November 2018].

Figure 1.8 - 1.10

Atlanta Beltline, 2013. *2030 Strategic Implementation Plan Final Report*. [print] Atlanta: Atlanta Beltline.

Figure 1.11 - 1.13

Van Valkenburgh, M., 2018. *Brooklyn Bridge Park*. [image online] Available at: <<http://www.mvvainc.com/project.php?id=3&c=parks>> [Accessed 22 November 2018]

Figure 2.1

Image created by author with information from:

Weir, T. R., 1978. *Winnipeg evolution of the built-up area 1872-1974*. [map] Toronto: University of Toronto Press. Available at: <<https://www.flickr.com/photos/manitobamaps/2243409890/in/album-72157603367131087/>> [Accessed 13 March 2018].

Figure 2.2 - 2.9

Image created by author with information from:

Fransoo R, Martens P, The Need To Know Team, Prior H, Burchill C, Koseva I, Bailly A, Allegro E. *The 2013 RHA Indicators Atlas*. Winnipeg, MB. Manitoba Centre for Health Policy, October 2013.

Figure 2.10

Map created using GIS software edited by author:

Winnipeg Park Space [map]. Scale 1:10,000. Data Layers: University of Manitoba: STREET, PARK_AND_

OPEN_SPACE, RIVERFILL, BRIDGES [computer files]. Winnipeg, MB: Generated by Darko Sajdak, February 22, 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.2. Redlands, CA, 2013.

Figure 2.11

Map created using GIS software edited by author:

Winnipeg Park Space Over 6 Acres [map]. Scale 1:10,000. Data Layers: University of Manitoba: STREET, PARK_AND_OPEN_SPACE, RIVERFILL, BRIDGES, park_over_3ha [computer files]. Winnipeg, MB: Generated by Darko Sajdak, February 22, 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.2. Redlands, CA, 2013.

Figure 2.12

Map created using GIS software edited by author:

600m Buffer [map]. Scale 1:10,000. Data Layers: University of Manitoba: STREET, PARK_AND_OPEN_SPACE, RIVERFILL, BRIDGES, park_over_3ha, 600m_buffer [computer files]. Winnipeg, MB: Generated by Darko Sajdak, February 22, 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.2. Redlands, CA, 2013.

Figure 2.13

Adapted by author from:

City of Winnipeg, 2018. *Map: active transportation routes*. [image online] Available at: <<http://winnipeg.ca/publicworks/pedestriansCycling/maps/default.stm>> [Accessed 02 April 2018].

Figure 2.14

Image created by author with information from:

City of Winnipeg, 2011. 2011 census. [online] Available at: <<http://winnipeg.ca/census/2011/>> [Accessed 02 April 2018].

Figure 2.15

Google Earth 9.2.73.2. 2017. *RTE 62* 49°49'59"N, 97°6'32"W, elevation 233M, Street View. Available at: <<https://earth.google.com/web/@49.83307349,-97.10900292,235.47476365a,0d,59.9997807y,45.52520099h,81.09196107t,0r/data=ChEaDwoJL20vMDJ6anQxGAEGASlaChZVYjA2dEl0Zmt2N1kyLWtMTBJZ2h3EAI>> [Accessed 22 November 2018].

Figure 2.16

Google Earth 9.2.73.2. 2017. *30 RTE 70* 49°52'48"N, 97°9'34"W, elevation 237M, Street View. Available at: <<https://earth.google.com/web/@49.88019151,-97.15969942,236.82477961a,0d,40.69018818y,31.56544426h,100.07386236t,0r/data=ChEaDwoJL20vMDJ6anQxGAEGASlaChZVMkVhN3QyRWWh1R1hQZk9kTWUxZ09nEAI>> [Accessed 22 November 2018].

Figure 2.17

Google Earth 9.2.73.2. 2017. *1789 Pembina Hwy* 49°49'28"N, 97°9'10"W, elevation 235M, Street View. Available at: <<https://earth.google.com/web/@49.82456479,-97.15295555,235.38905059a,0d,59.9996473y,359.04194184h,103.17940377t,0r/data=ChEaDwoJL20vMDJ6anQxGAEGASlaChYzbjJoR2Zncmw5TjZmLUV5dHY3ZDZjEAI>> [Accessed 22 November 2018].

Figure 2.18

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Figure 2.19

Adapted by author from:

City of Winnipeg, 2018. *Map: active transportation routes*. [image online] Available at: <<http://winnipeg.ca/publicworks/pedestriansCycling/maps/default.stm>> [Accessed 02 April 2018].

Figure 3.1

Adapted by author from:

Map digitally provided through the University of Manitoba GIS Libraries, 2016. *City of Winnipeg*, no scale.

Figure 3.2

Adapted by author from:

Map digitally provided through the University of Manitoba GIS Libraries, 2016. *City of Winnipeg*, no scale.

Figure 3.3

Base map: edited by author

Google Earth 9.2.73.2. 2017. 49°56'29"N, 97°6'28"W, elevation 2000M, Street View. Available at: <<https://earth.google.com/web/@49.94399037,-97.10747906,231.02479462a,2313.10216561d,35y,0.24390123h,0t,0r/data=ChEaDwoJL20vMDJ6anQxGAEgAQ>> [Accessed 15 October 2018].

Figure 3.4

Sajdak, D., 2018. *Intervention 1 Site*. [digital]

Base map: edited by author

Google Earth 9.2.73.2. 2017. 49°56'29"N, 97°6'28"W, elevation 2000M, Street View. Available at: <<https://earth.google.com/web/@49.94399037,-97.10747906,231.02479462a,2313.10216561d,35y,0.24390123h,0t,0r/data=ChEaDwoJL20vMDJ6anQxGAEgAQ>> [Accessed 15 October 2018].

Figure 3.5 - 3.7

Sajdak, D., 2018. *Existing Condition*. [photograph] (Winnipeg, Manitoba).

Figure 3.8

Sajdak, D., 2014. *Cut-Off*. [photograph] (Winnipeg, Manitoba).

Figure 3.9 - 3.14

Sajdak, D., 2018. *Existing Condition*. [photograph] (Winnipeg, Manitoba).

Figure 3.15

Sajdak, D., 2018. *View 1 Proposed Perspective Along Bergen Cut-Off Trail*. [digital].

Figure 3.16

Sajdak, D., 2018. *Proposed Bergen Cut-Off Site Plan*. [digital]

Basemap: GIS software edited by author: *Winnipeg 2014* [map]. Original scale: 1:5,000. Data layers: ArcGIS Online: Basemap [computer files]. Winnipeg, MB: Generated by Darko Sajdak, 27 September 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.2. Redlands, CA, 2013.

Figure 3.17

Sajdak, D., 2018. *1B: North Section Elevation*. [digital]

Figure 3.18

Sajdak, D., 2018. *1B: North Section Elevation*. [digital]

Figure 3.19

Sajdak, D., 2018. *Bench Detail*. [digital].

Figure 3.20

Sajdak, D., 2018. *Axonometric*. [digital].

Figure 3.21

Sajdak, D., 2018. *1C: East Section Elevation*. [digital].

Figure 3.22

Sajdak, D., 2018. *Intervention 2 Site*. [digital].

Base map: edited by author

Google Earth 9.2.73.2. 2017. 49°56'29"N, 97°6'28"W, elevation 2000M, Street View. Available at: <<https://earth.google.com/web/@49.94399037,-97.10747906,231.02479462a,2313.10216561d,35y,0.24390123h,0t,0r/data=ChEaDwoJL20vMDJ6anQxGAEgAQ>> [Accessed 15 October 2018].

Figure 3.23 - 3.31

Sajdak, D., 2018. *Existing Condition*. [photograph] (Winnipeg, Manitoba).

Figure 3.32

Sajdak, D., 2018. *Proposed Railway Greenway Site Plan*. [digital].

Basemap: GIS software edited by author: *Winnipeg 2014* [map]. Original scale: 1:5,000. Data layers: ArcGIS Online: Basemap [computer files]. Winnipeg, MB: Generated by Darko Sajdak, 27 September 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.2. Redlands, CA, 2013.

Figure 3.33

Sajdak, D., 2018. *Proposed Railway Greenway Site Plan*. [digital]

Figure 3.34

Sajdak, D., 2018. *2A: West Section*. [digital]

Figure 3.35

Sajdak, D., 2018. *2B: North Section*. [digital]

Figure 3.36

Sajdak, D., 2018. *Intervention 3 Site*. [digital]

Base map: edited by author
Google Earth 9.2.73.2. 2017. 49°56'29"N, 97°6'28"W, elevation 2000M, Street View. Available at: <<https://earth.google.com/web/@49.94399037,-97.10747906,231.02479462a,2313.10216561d,35y,0.24390123h,0t,0r/data=ChEaDwoJL20vMDJ6anQxGA EgAQ>> [Accessed 15 October 2018].

Figure 3.37 - 3.46

Sajdak, D., 2018. *Existing Condition*. [photograph] (Winnipeg, Manitoba).

Figure 3.47

Sajdak, D., 2018. *Proposed Street Layout*. [digital].

Figure 3.48

Sajdak, D., 2018. *Existing Street Layout*. [digital].

Figure 3.49

Sajdak, D., 2018. *Proposed Inkster Boulevard Site Plan*. [digital].

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Figure 3.50

Sajdak, D., 2018. *3A: West Section Elevation*. [digital].

Figure 3.51

Sajdak, D., 2018. *Concrete Paver Collage*. [digital].

Figure 3.52

Map created using GIS software edited by author:

Existing Park Proximity - 600m Buffer [map]. Scale 1:10,000. Data Layers: University of Manitoba: STREET, PARK_AND_OPEN_SPACE, RIVERFILL, BRIDGES, park_over_3ha, BLDG_ROOF_OUTLINE_2006, 600m_buffer [computer files]. Winnipeg, MB: Generated by Darko Sajdak, February 22, 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.2. Redlands, CA, 2013.

Figure 3.53

Map created using GIS software edited by author:

Enhanced Park Proximity - 600m Buffer [map]. Scale 1:10,000. Data Layers: University of Manitoba: STREET, PARK_AND_OPEN_SPACE, RIVERFILL, BRIDGES, park_over_3ha, BLDG_ROOF_OUTLINE_2006, 600m_buffer, Proposed_Park [computer files]. Winnipeg, MB: Generated by Darko Sajdak, February 22, 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.2. Redlands, CA, 2013.

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