Finding the Connection
A Proposal for a Greenway through the Northeast Area of Winnipeg

by

Tara Coley

A Practicum submitted to the Faculty of Graduate Studies of

The University of Manitoba

in partial fulfilment of the requirements of the degree of

MASTER OF LANDSCAPE ARCHITECTURE

Department of Landscape Architecture

University of Manitoba

Winnipeg

THE UNIVERSITY OF MANITOBA

FACULTY OF GRADUATE STUDIES

*****

COPYRIGHT PERMISSION

Finding the Connection

A Proposal for a Greenway through the Northeast Area of Winnipeg

by

Tara Coley

A Thesis/Practicum submitted to the Faculty of Graduate Studies

of The University of Manitoba

in partial fulfillment of the requirement of the degree

of

Master of Landscape Architecture

Acknowledgements

I would like to thank my committee, which consists of Professor Ted McLachlan, Chair, Professor Alan Tate, Internal Examiner, and Mel Falk, External Examiner for their unwavering support and guidance throughout my exploration of Greenway Design.

I would also like to thank my parents, Dennis and Carol Coley, for their unconditional love and understanding. I was once asked what I was most proud of in my life and I said not what, but whom, my Mom and Dad.

To my sister, Sheri Coley, thank you for sharing late nights studying and a large pot of coffee.

To my dear friends, Tanya Laewetz, Jennifer Brehm, and Julia Rosen, thank you for believing I have the strength to achieve anything.

I have saved the last thank you for the person who has shared my life for the past ten years, Brent Nyznyk. You have seen me through everything and I want you to know that you cheer the loudest.

Abstract

This practicum encompasses the exploration and design of a network of continuous greenway connections that will flow through the northeast City of Winnipeg, Manitoba, Canada. The greenway will be sensitive to all users such as pedestrians, cyclists, motorists, and wildlife and serve as a template to continue the circuit of connections throughout the entire city.

The proposed design will be developed as two layers that will function together and separately. The first layer is the design of City Greenways. These City Greenways will be developed using existing and proposed Greenways. The second layer is the design of Community Greenways. These Community Greenways will connect to other existing and proposed Community and City Greenways.

The practicum will show how existing fragmented Greenways can be connected to provide opportunities for all users to further engage spaces throughout the city that are under utilized today.

Table of Contents

List of Figures

Introduction

The Beginning

1. Introduction: The Beginning

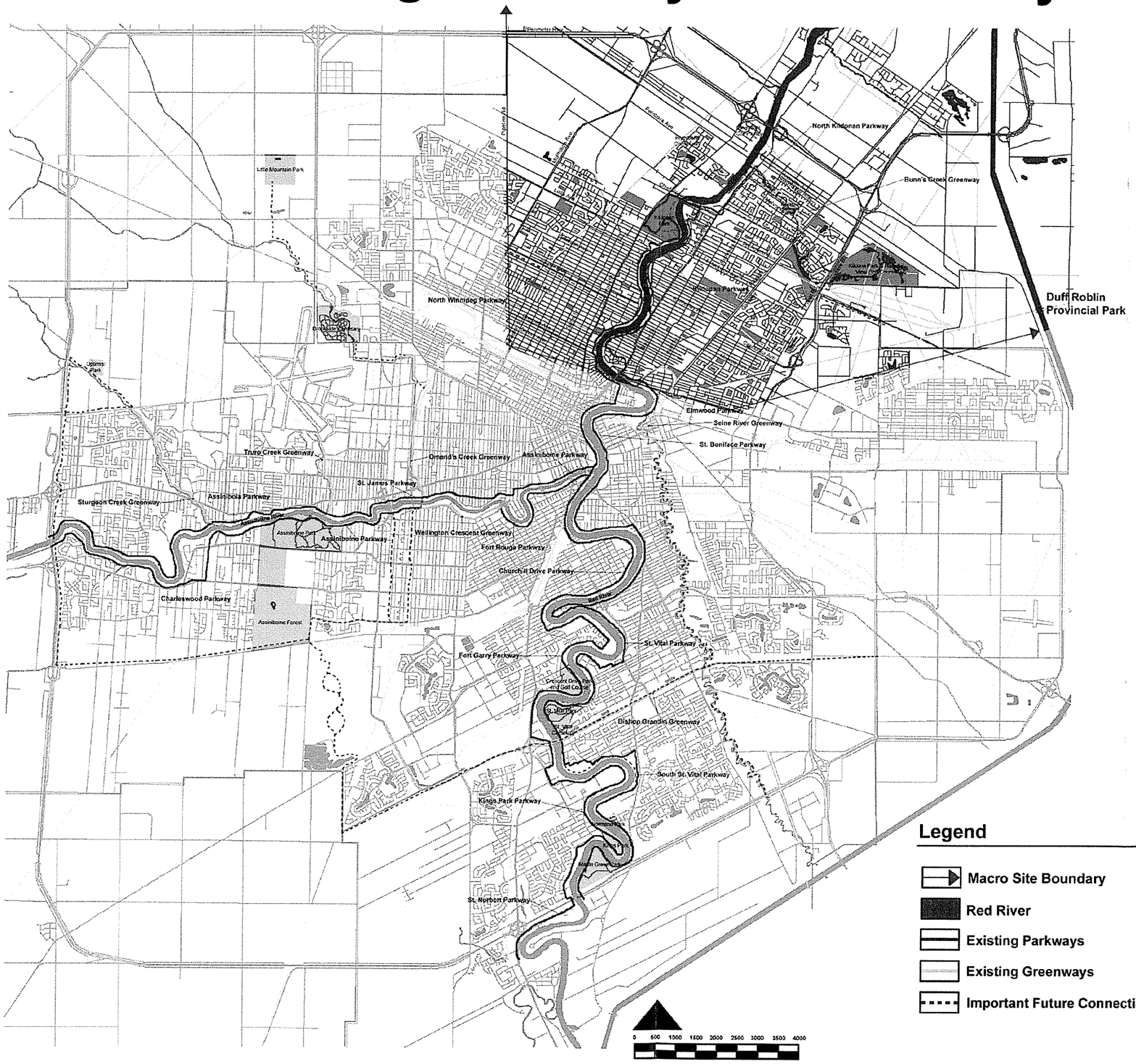
Tom Turner accurately described the problem of Greenways today when he said that "too many 'greenways' are bland strips of parkland, which one can walk along, but which, because they do not lead from an origin to a destination, are not 'ways' in the historic sense of routes" (269).

This practicum is an exploration into the need for a greenway through the northeast area of the City of Winnipeg. The need for a greenway through this area was initially an idea that originated from my own experiences as a pedestrian and motorist in Winnipeg. I have often felt very frustrated as a pedestrian because I can not access many public open spaces without the use of a motor vehicle or public transportation. Winnipeg has seventeen existing parkways and seven greenways that can not be accessed continuously without the use of vehicular transportation. The seventeen parkways are located along the Red and Assiniboine Rivers. The North Kildonan Parkway, North Winnipeg Parkway, Kildonan Parkway, Elmwood Parkway, St. Boniface Parkway, Churchill Drive Parkway, St. Vital Parkway, South St. Vital Parkway, King's Park Parkway, and St. Norbert Parkway are located along the Red River. The Fort Rouge Parkway, Assiniboine Parkway, Assiniboia Parkway, St. James Parkway, and Charleswood Parkway are located along the Assiniboine River. The seven greenways are located along the Red, Assiniboine, and the Seine Rivers. Bunn's Creek Greenway is located along the Red River. Sturgeon Creek Greenway,

Truro Creek Greenway, Wellington Crescent Greenway, and Omand's Creek Greenway are located along the Assiniboine River. The Bishop Grandin Greenway and Seine River Greenway are located along the Seine River (see Figure 1). I see these existing parkways and greenways as opportunities to explore the city as a pedestrian, motorist, or cyclist. Unfortunately, these existing parkways and greenways are several links on a chain that is broken. I see the need for strong connections between these existing parkways and greenways and I am proposing a greenway through the entire city. In order to find the connection between these parkways and greenways I have selected one area of Winnipeg as my area of study (see Figure 2). I have chosen the northeast area of Winnipeg because the municipality has placed a lot of focus on greenway design in the southern areas of the city. I believe the same opportunities found in the southern areas of the city exist in the area I am proposing to study.

Open spaces in the northeast area are more accessible by motor vehicle than any other mode of transportation. Why is the motor vehicle the most commonly chosen mode of transportation within the northeast area of Winnipeg? This area contains one of the seven greenways located within this city, three of the sixteen parkways, has several open spaces, and has a significant proportion of the Trans Canada Trail running through it. However, these spaces are not connected to each other (see Figure 1). This fragmentation or segregation limits the choices that residents in this area have regarding mobility. Unlike the greenways, parkways, and open spaces, the roadways within this area are connected. These

Existing Greenways and Parkways



Legend

- Macro Site Boundary
- Red River
- Existing Parkways
- Existing Greenways
- Important Future Connections

Figure 1

Existing Greenways and Parkways Map

Macro and Micro Site Area

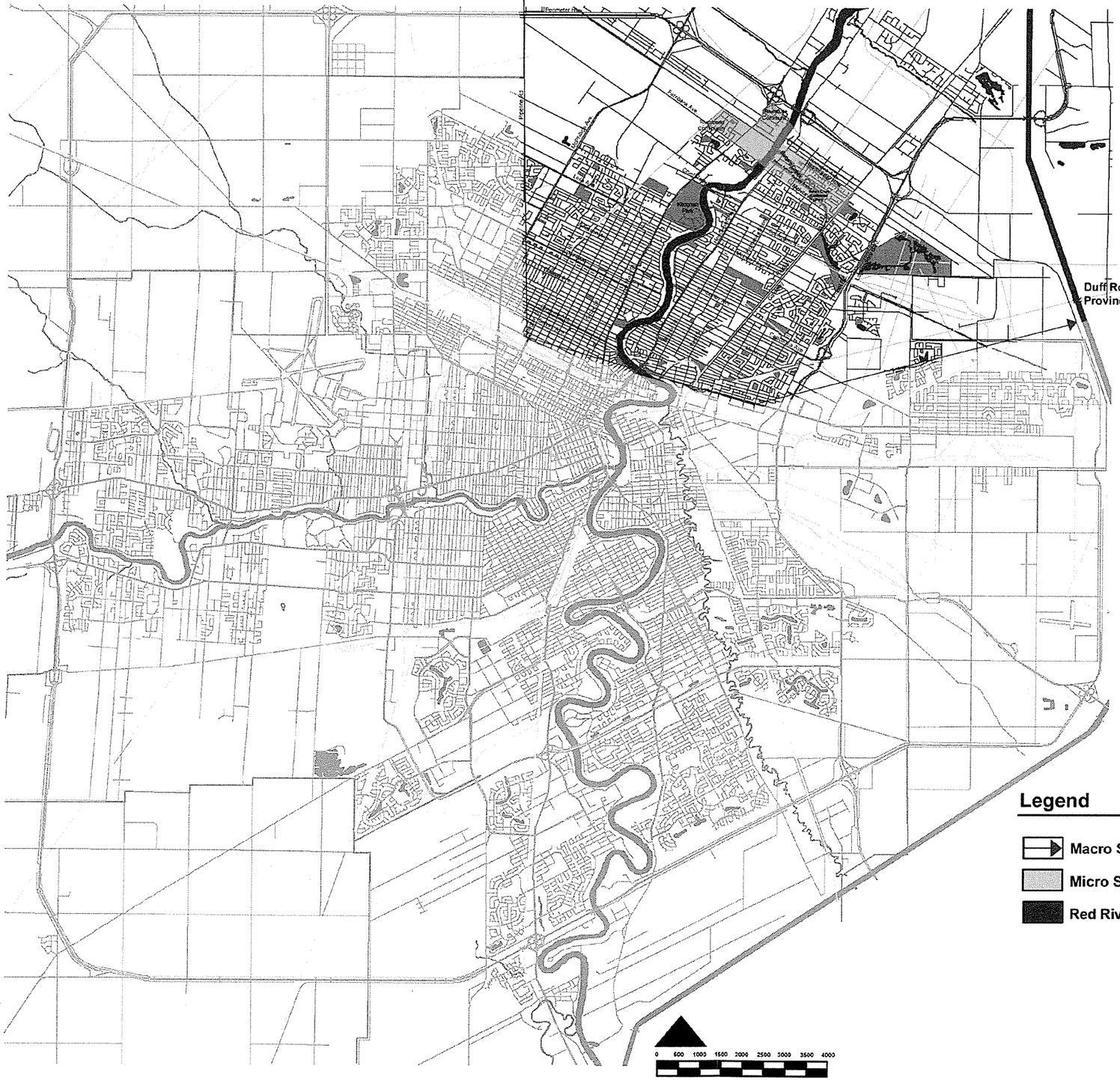


Figure 2

Macro and Micro Site Area Map

connected roadways provide residents with incentive to use their vehicles because it is more convenient and less time consuming to drive. Through the design of a greenway I have created connections between existing greenways, parkways, and open spaces within this area. These connections will allow residents to choose the mode of transportation that best suits their needs.

Thomas Votsmeier's Environmental Quality Target Concept is the tool I have chosen to test the design of a specific site along this greenway (Breuste et al. 63). This methodology encompasses five target levels that have guided me through the design process.

1.1. Goal

The goal of this practicum is to design a greenway through the northeast area of the City of Winnipeg. This greenway will connect to existing parkways, open spaces, and greenways in the northeast area.

1.2. Objectives

1. To connect existing parkways, open spaces, and greenways at a macro scale through analysis and design.

2. To use the Environmental Quality Target Concept as guidance through the

design of a site specific section of the greenway.

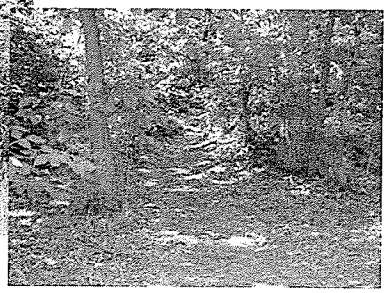
3. To ensure the greenway is sensitive to all users; pedestrians, motorists, cyclists, and wildlife.

4. To design the greenway so that it reinforces Winnipeg's unique environmental and aesthetic characteristics.

5. To demonstrate how this greenway can be continued throughout Winnipeg.

Methodology and Inventory

Looking for Connections



2. Methodology and Inventory: Looking for Connections

Connecting pedestrian spaces is a hierarchal process. Physical connections must be made in order to set the stage for the creation of mental connections. Finding the physical connections between existing pedestrian spaces within the City of Winnipeg is the focus of this practicum; however, an anticipated outcome of this walkway or greenway design is to set the stage for pedestrians to discover their mental connections with the City of Winnipeg.

Planning an interconnected walkway or greenway design for Winnipeg requires the examination of environmental quality targets, such as urban climate change, air quality, and water quality, and the impacts of ecological fragmentation on plant, water, and animal resources. The concept of sustainable development means progress in human well-being that can be extended or prolonged over many generations rather than just a few (Cunningham and Saigo 15). In practice, it results in development that maintains or enhances economic opportunity and community well-being while protecting and restoring the natural environment upon which people and economies depend (Winnipeg Civic Environmental Committee 56). The interactions humans have with their environment (consisting of biophysical, socio-economic, and cultural components) will play a role in the planning and design of this greenway.

To help plan this major landscape, a Greenway for the City of Winnipeg, I have

consulted the Environmental Quality Target Concept (see Figure 3). This concept encompasses five target levels. The first target level is to define overall objectives, philosophy, and vision (Breuste et al. 63). The vision for a sustainable Winnipeg is for it to embrace its identity as a prairie city through the integration of environmental policy while employing economic objectives to become one of the world's healthiest urban centres (Winnipeg Civic Environmental Committee 8).

Figure 3. The Environmental Quality Target Concept
Source: Adapted from Thomas Votsmeier's Environmental Quality Targets in the City of Wiesbaden; Breuste, J., H. Feldmann, and O. Uhlmann, ed, *Urban Ecology* (Berlin: Springer, 1998) 63.

The second target level is to detail Winnipeg's vision and philosophy by separating its 'environment' into various segments (different environmental media and potentials) (Breuste et al. 63). The three major environmental segments that

will be discussed in further detail throughout this chapter are Winnipeg's urban climate change, urban forest management, and water quality. These three environmental segments have been carefully chosen because they have a direct relationship to the planning and design of a pedestrian walkway or greenway for the City of Winnipeg.

The third target level is to define Winnipeg's quality targets and standards for the various environmental segments. The fourth target level is to establish avoidance and minimisation targets for causal chains that could lead to pollution and strain. The final target level is to propose design strategies, plans, and/or projects aimed at reaching Winnipeg's target levels (Breuste et al. 63). The following discussion will address the third and fourth target levels for all three environmental segments. The final target level will be discussed in the design phase of this document.

2.1. Environmental Segment One: Urban Climate Change

The first environmental segment is urban climate change. Urban climate change is the result of the accumulation of pollutants and greenhouse gases (GHGs) in the atmosphere. The source of pollutants and greenhouse gases such as carbon monoxide, carbon dioxide, and nitrous oxides are gasoline-powered vehicles, industries using gas and oil, and buildings being heated using gas and oil. The effect of carbon dioxide is the promotion of heat retention and atmospheric

warming. The effect of carbon monoxide is toxicity to humans at high concentrations. The effects of nitrous oxides are damage to vegetation and the development of photochemical smog (Marsh 312).

Greenhouse gas emissions are increasing in Manitoba. The 2001 report findings of the Manitoba Climate Change Task Force conclude that greenhouse gas emissions totaled approximately 20,900 kilo tonnes of carbon dioxide equivalent in 1999, and that this total represents an increase of 2.5% in comparison to emission rates in 1990 (quoted in Winnipeg Civic Environmental Committee, *Environmental Issues* 3). Winnipeggers produce 8 tonnes of GHGs per capita per year. The city as a whole generates 5.2 million tonnes annually (Winnipeg Civic Environmental Committee 15). The Manitoba Climate Change Task Force predicts that the average annual temperature will increase 4-6 °C by the end of the century with an average temperature increase of 5-8 °C during winters. Emissions of greenhouse gases into the atmosphere from transportation activities is directly related to the amount of fossil fuels consumed (Winnipeg Civic Environmental Committee *Environmental Issues* 8).

In 2001 the total number of light duty vehicle registrations in Manitoba was 592,211, which has increased to 616,014 in 2004 (Winnipeg Civic Environmental Committee, *Environmental Issues* 8; Statistics Canada). Winnipeg transit ridership has decreased by 36% between 1982 and 2001 (quoted in Winnipeg Civic Environmental Committee, *Environmental Issues* 8). The number of motor

vehicles on the road is a reflection of their importance in the lives of Winnipeggers, as well as a reflection of the design of the city (Winnipeg Civic Environmental Committee *Environmental Issues* 8).

The first step in establishing avoidance and minimization targets for urban climate change is to implement a program that will measure and monitor any changes in Winnipeg's urban climate. In 1998, the City of Winnipeg became a member of the Partners for Climate Protection Program (PCP). The PCP allows municipalities such as Winnipeg to model their emissions so that emissions can be measured and monitored over time to report on trends in emissions (Winnipeg Civic Environmental Committee 14).

The second step in establishing avoidance and minimization targets for urban climate change is to plan and design a continuous greenway for the City of Winnipeg. This greenway will propose the use of vegetation that will increase the absorption of carbon dioxide from greenhouse gas emissions (a process referred to as carbon sequestering), reducing the total amount of carbon dioxide in the atmosphere. Cutting emissions will also reduce the total amount of carbon dioxide in the atmosphere. For those that are willing to walk, cycle, skateboard, or rollerblade, a continuous greenway with pedestrian pathways, cycleways, trails, bridges, and crossings would provide an alternative to driving. Every liter of gas that a car burns produces 1.87 kilograms of carbon dioxide. For those that are not willing to walk, increasing automobile mileage from 10.63 kilometers/liter

to 21.26 kilometers/liter would save about $3000 and reduce carbon dioxide production by 20 metric tons over the life of the vehicle (Cunningham and Saigo 378).

The third step in establishing avoidance and minimization targets for urban climate change is to educate residents of Winnipeg on climate change and policies directed toward reducing greenhouse gas emissions (Winnipeg Civic Environmental Committee 15). One way to educate Winnipeggers on climate change and policies at the community level would be to provide communities with the tools (such as funding and construction resources) to develop community greenways, gardens, open spaces, and parks that will connect to a continuous city greenway.

EcoAction Community Funding Program is a community funding program created in 1995 by Environment Canada that has provided financial support to community groups for projects that have measurable, positive impacts on the environment. EcoAction supports projects that address climate change, clean water, nature, and clean air (Environment Canada). However, EcoAction is now placing special emphasis on climate change projects in order to align with the Government of Canada's One Tonne Challenge. Funding support is requested for projects that have an action focus, a community capacity building focus, or a combination of both objectives. Non-profit groups eligible to apply to this program include community groups, environmental groups, aboriginal groups and First

Nations councils, service clubs, associations, and youth and seniors' organizations. The application process requires each applicant to obtain matching funds or in kind support from other sponsors (other than the federal government) equaling 50% of the total value of their project. Once this funding from other sponsors has been obtained, an Action Plan outlining the proposed project must be submitted to EcoAction for approval. If approval is granted, the applicant is then responsible for implementing and evaluating their community project (Environment Canada).

A national initiative that has been receiving media attention is the One Tonne Challenge. The One Tonne Challenge is a challenge set forth by the Federal Government of Canada for all Canadian residents to participate in reducing greenhouse gas emissions by one tonne annually per individual. The federal government states by "taking action now allows us to lessen the impact of greenhouse gas emissions that threaten our air quality, ecosystems, quality of life" (Government of Canada). In doing so, the federal government has compiled a 26 page Guide to the One Tonne Challenge that outlines the ways individuals can reduce greenhouse gas emissions by one tonne (see Appendix A). This guide is separated into two sections, the first titled "On the Road" and the second titled "At Home". The first section stresses the importance of driving less, maintaining your vehicle, and choosing the right vehicle. The second section goes on to stress the importance of optimizing your home in an energy efficient manner through the use of energy efficient tools such as energy efficient major

appliances, lighting, and home office equipment. Accompanying the use of energy efficient tools is energy efficient practices such as keeping blinds, curtains, and windows closed, rinsing clothes in cold water and washing clothes in warm water, using as little paper as possible, capturing rainwater, planting trees, and taking quick showers (Government of Canada).

Manitoba Hydro has also recognized the need to take action on urban climate change and has developed the Voluntary Challenge and Registry Program (VCR). This program describes Manitoba Hydro's Principles of Sustainable Development that apply to the management of their greenhouse gas emissions. The first principle is Conservation where corporate facilities are planned, designed, built, operated, maintained, and decommissioned in a manner that protects essential ecological processes and biological diversity. They are also proposing the use of renewable resources whenever possible and to extend the life of nonrenewable resources (Manitoba Hydro 13).

The second principle is efficient use of resources where Manitoba Hydro encourages the development and application of programs and pricing mechanisms that will result in the efficient and economic use of electricity by their customers. As well, Manitoba Hydro will encourage the efficient and economic use of energy and materials throughout their operations (Manitoba Hydro 13).

The third principle is global responsibility where they recognize there are no

political and jurisdictional boundaries to our environment, and that there is ecological interdependence among provinces and nations. As a direct action to the third principle, Manitoba Hydro will consider environmental affects outside the province when planning and deciding on new developments and major modifications to facilities and to methods of operation (Manitoba Hydro 13).

Manitoba Hydro has made a commitment to reduce their net greenhouse gas emissions in excess of 6% below 1990 levels between the year 1991 and 2012. Their commitment will be followed through by several measures to achieve this target. The first being the promotion of electrotechnologies where fossil fuels will be displaced with new, efficient technologies, thereby reducing greenhouse gas emissions (Manitoba Hydro 37). The second measure being the development and implementation of their own Environmental Management System (EMS) that will be consistent with ISO 14001 Standard for Environmental Management Systems (Manitoba Hydro 41). Manitoba Hydro will also participate in National Climate Change Processes such as the One Tonne Challenge, so they can meet their targets (Manitoba Hydro 41). As well, Manitoba Hydro will also participate and fund provincial energy efficiency improvement programs such The Manitoba Power Smart Eco-Efficiency Solutions Program and The Home Comfort and Energy Savings Program (Manitoba Hydro 42).

Manitoba Hydro has also encouraged environmental protection through community involvement. In 1995, they launched the ten year $3.5 million Forest

Enhancement Program which funds tree planting, forest education, and innovative research projects. They developed this program to recognize the loss of forest cover that results from the construction of their gas and electric infrastructure (Manitoba Hydro 52). In addition, Manitoba Hydro has also joined teams with the Fort Whyte Centre to provide funding and support for a Climate Change Field Station and Energy Education Programs such as an interactive "Energy Jeopardy" game and a mini model of a hydro electric generating station (Manitoba Hydro 52). Manitoba Hydro has also teamed up with the Manitoba Lung Association, Environment Canada, and the City of Winnipeg to sponsor the "Emissions Impossible" program where clinics are set-up around the city to provide free vehicle emissions testing (Manitoba Hydro 53).

2.2. Environmental Segment Two: Urban Forest Management

The urban forest acts as a sponge that absorbs carbon dioxide and slows global warming (Walker 16). George M. Woodwell and Kilaparti Ramakrishna state "if the warming trend is to be slowed down, there needs to be more trees and fewer exhaust pipes (Walker 16)." In addition to increased absorption of greenhouse gas emissions such as carbon dioxide, urban forests also have intrinsic value as protectors of waterways (absorption of storm run-off), recreation areas and homes to diverse plants, animals, and people, and a reduction of the urban heat island effect (trees conserve energy by shading buildings and paved surfaces) (Walker 16; quoted in Winnipeg Civic Environmental Committee, *Environmental*

Issues 10). Planted trees and natural forested areas contribute significantly to the attractiveness of Winnipeg and to the quality of residents' lives (Winnipeg Civic Environmental Committee 32).

Winnipeg's urban forest can be defined as all trees growing within the city limits (Winnipeg Civic Environmental Committee 32). Currently the benefits of trees in Winnipeg are not maximized because of vacant planting sites (Winnipeg Civic Environmental Committee 32). Identification of these vacant planting sites will help them to be used for tree planting and connect these proposed plantings to the existing urban forest. In addition to planting new trees, diversifying Winnipeg's urban forest will increase quantity and quality of wildlife habitat and minimize the threat that tree viruses such as the Dutch Elm Disease have on our urban forest (Winnipeg Civic Environmental Committee 32).

The first step in establishing avoidance and minimization targets for urban forest management is to identify a plan and the resources required to manage Winnipeg's urban forest for present and future generations (Winnipeg Civic Environmental Committee 32). This plan should include the following strategies; increasing the stock of trees through tree planting programs; diversifying the variety of new trees; and encouraging tree planting by the City of Winnipeg, local communities, and residents (Winnipeg Civic Environmental Committee 33).
The second step in establishing avoidance and minimization targets for urban forest management is to educate the public on the benefits and value of the

urban forest and to encourage residents to become involved in the planning, design, and development of greenways within their own communities (Winnipeg Civic Environmental Committee 33). Tree planting is one activity communities could organize in order to help expand and diversify Winnipeg's urban forest.

2.3. Environmental Segment Three: Water Quality

Winnipeg's waterways have a significant impact on the health of its residents, economy, the ecological health of the city, and the quality of the urban environment (Winnipeg Civic Environmental Committee 46).

Runoff is the movement of water, usually from precipitation, across the earth's surface, towards stream channels, lakes, and other surface depressions (Winnipeg Civic Environmental Committee 46). Shoreline vegetation along Winnipeg waterways such as the Red River and Bunn's Creek trap and absorb polluted run-off (containing pollutants such as nitrogen and phosphorus) making these shorelines effective natural filters and buffer zones. These shorelines are also breeding grounds, nurseries, food sources, shelter, and hiding places for small mammals, birds, and insects (Winnipeg Civic Environmental Committee 46). Winnipeg has several major rivers and creeks such the Red River and Bunn's Creek, all of which have been modified, making high quality riparian habitat rare (Winnipeg Civic Environmental Committee 46).

The first step in establishing avoidance and minimization targets for water quality should be to control the initial pollution sources. This can be difficult because of the type of pollution source that is affecting Winnipeg's waterways. Nonpoint source pollution represents spatially dispersed, usually nonspecific, sources that are released in various ways and at many points in the environment (Marsh 203). Effective natural filtration and a forested connection between waterways are two methods to help reduce the effects of nonpoint source pollution. Making a forested connection between the Red River and Bunn's Creek will change the spatial distribution of vegetative communities, which will provide for a better skeletal ecosystem (Platt et al. 197, 199, 200).

The second step in establishing avoidance and minimization targets for water quality should be to educate Winnipeg residents on how they can prevent the contamination of surface water run-off (Winnipeg Civic Environmental Committee 47). One way to prevent non-point source pollution (having no defined point of entry into receiving bodies of water (Winnipeg Civic Environmental Committee 47)) is to encourage private property owners along waterways to use lawn and plant fertilizers that do not contain nitrogen and phosphorus. Another way to prevent non-point source pollution is to design residential landscapes that filter the nutrients before they enter waterways such as the Red River.

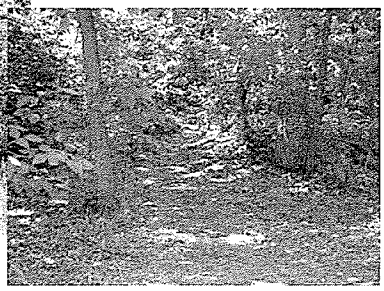
The third step in establishing avoidance and minimization targets for water quality should be to encourage committed local residents and community groups

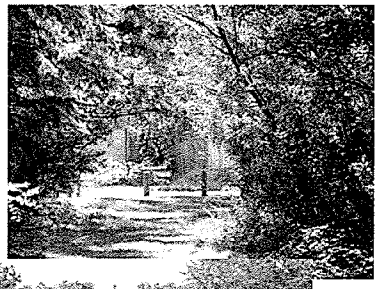
to continue working on the restoration of riparian areas (Winnipeg Civic Environmental Committee 47).

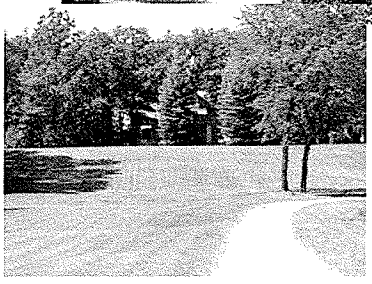
The fourth step in establishing avoidance and minimization targets for water quality should be to educate the public through access by situating pedestrian pathways, trails, and cycleways adjacent to riparian areas and to integrate these riparian areas into the city's network of pathways, trails, cycleways, and greenways (Winnipeg Civic Environmental Committee 47).

> "What artist, so noble, has often been my thought, as he, who with far-reaching conception of beauty and designing power, sketches the outline, writes the colours, and directs the shadows of a picture so great that Nature shall be employed upon it for generations, before the work he has arranged for her shall realize his intentions."
>
> ----Frederick Law Olmsted (1852), *Walks and Talks of an American Farmer in England*

Precedents
Contextualizing Examples







3. Precedents: Contextualizing Examples

To provide background to this study I examined a number of existing precedents in North America and Europe. I will examine the history/background, objectives, opportunities, constraints, design, and aspects of implementation of each precedent to determine how individual goals and objectives were met. I will compare and contrast each precedent to Winnipeg to demonstrate lessons I have learned. I will then apply these lessons in proposing a greenway design for Winnipeg. The five precedents that will be examined are the Emerald Necklace in Boston and Brooklyn, Massachusetts, the National Capital Greenbelt (Commission) in Ottawa, Ontario, the Meewasin Valley Project (Authority) in Saskatchewan, the Green Development Plans designed for London, England, and the Greenways Plan for Vancouver, British Columbia.

These five precedents were chosen because they are all greenway designs that have been completely or partially implemented. They are appropriate precedents to learn from because the recreational activities and types of open spaces are similar to this proposal for a greenway through the City of Winnipeg. The focus for all five precedents was placed on the pedestrian and their ability to move from one landscape space to another. Similarly, one of the main objectives for this proposal is to design a progression of interconnected landscape spaces throughout the City of Winnipeg.

In addition to opportunities and similarities, these five precedents were also chosen because of their constraints and differences in comparison to this proposal for Winnipeg. The major difference between the National Capital Commission and the Meewasin Valley Project and this proposed Greenway through Winnipeg is the administrative status of sponsoring bodies. The National Capital Commission and the Meewasin Valley Project both have governing bodies that have set aside land and essentially "cleared a path" for the design and implementation of these Greenways. However, neither Winnipeg nor London has governing bodies which can acquire the desired parcels of land; therefore, London is an excellent study tool when designing this Greenway through Winnipeg.

3.1. Boston's Emerald Necklace

A most appropriate precedent to start this discussion with is an example of linear open spaces designed in stages between 1878 and 1890 by Frederick Law Olmsted (Smith and Hellmund 4-5). Olmsted's design for Boston's Emerald Necklace encompassed more detail than his previous designs and not only emphasized social and aesthetic issues, but also addressed problems of drainage and water quality. Olmsted's design encircled the city of Boston with a ring of green that included the Back Bay Fens and the Muddy River (which flows into the tidal portion of the Charles River) as well as a series of urban parks linked together with parkways (See Figure 4) (Smith and Hellmund 4-5).

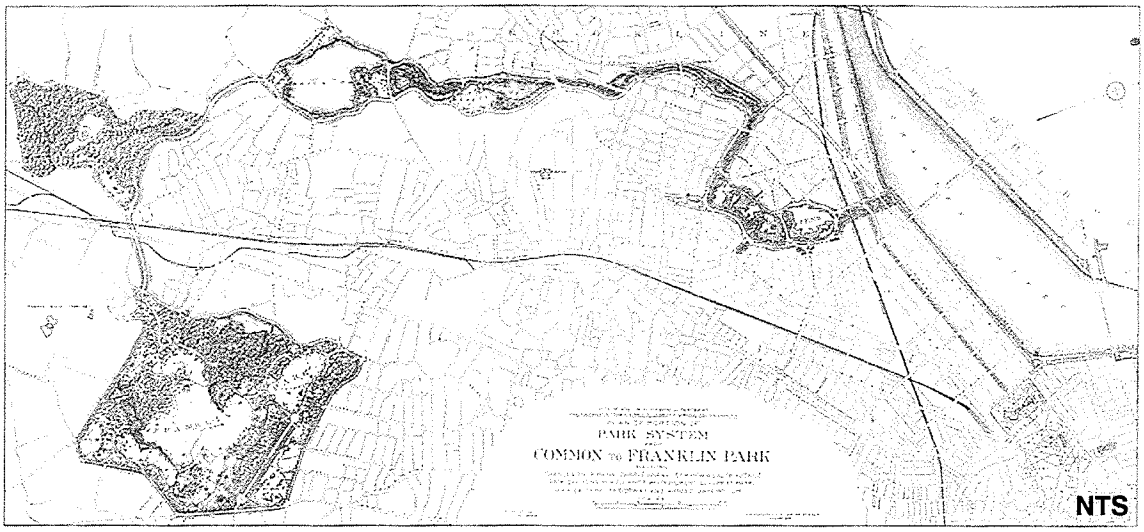


Figure 4. Boston's Emerald Necklace designed by Frederick Law Olmsted
Source: Smith, Daniel, S., and Paul, Cawood, Hellmund, *Ecology of Greenways* (Minneapolis: University Of Minnesota Press, 1993) 4.

Olmsted created an exemplar for Greenway design that has been used consistently since. His design of Boston's Emerald Necklace introduced the idea of using Greenways to accommodate multiple uses. Olmsted's design of the Muddy River and the Back Bay Fens involved modifications that enhanced flood storage, improved waste disposal, and linked these areas to the rest of the Emerald Necklace for recreation and transportation (see Figure 5) (Smith and Hellmund 5-6).

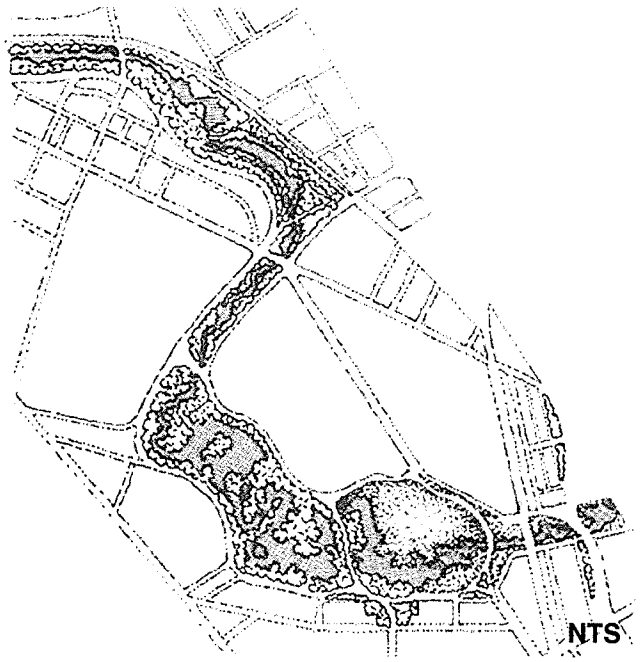


Figure 5. Frederick Law Olmsted's design of the Muddy River and Back Bay Fen
Source: Smith, Daniel, S., and Paul, Cawood, Hellmund, *Ecology of Greenways* (Minneapolis: University Of Minnesota Press, 1975) 5.

3.2. The National Capital Greenbelt

The main purpose behind the design of the National Capital Greenbelt is to maintain a mosaic of distinctive rural landscapes and activities near the urban area that contributes to the health and identity of the National Capital Region (see Figure 6). This greenbelt, in turn, provides Canadians with a sense of pride for their country and its capital (The National Capital Commission 17). The five key objectives of the National Capital Greenbelt are:

1. To provide a distinctive and symbolic rural setting for the capital (Distinctive Capital Setting);
2. To serve as a key setting in the Capital for public activities that require a

rural or natural environment (Accessible Public Activities);

3. To preserve natural ecosystems that support the larger natural environment in the National Capital Region (Continuous Natural Environment);
4. To sustain productive farms and forests that support a vibrant rural community near the Capital (Vibrant Rural Community); and
5. To provide settings for built facilities that support the Capital's political, cultural, symbolic, or administrative function (The National Capital Commission 17-18).

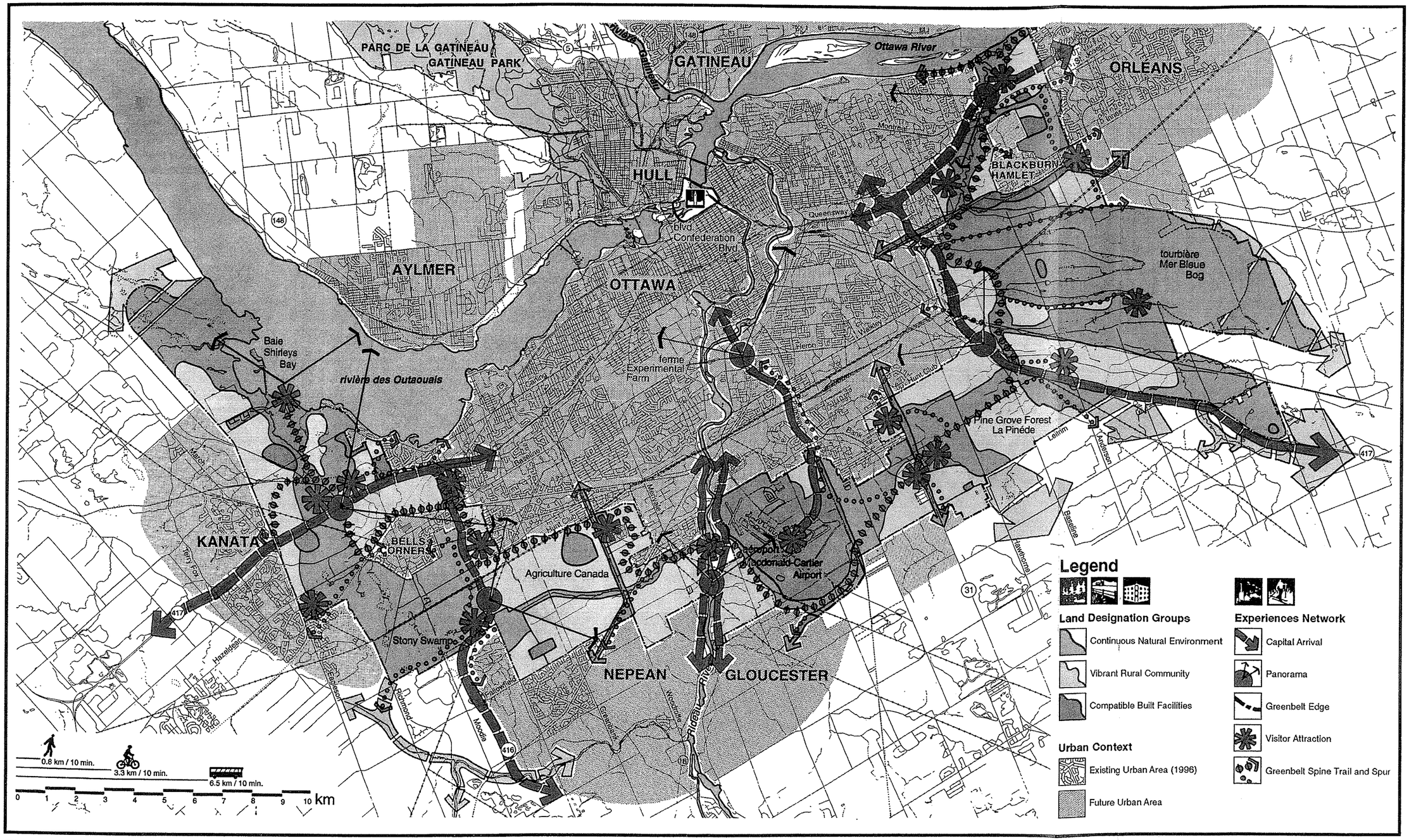


Figure 6. The National Capital Greenbelt
Source: The National Capital Commission, *The National Capital Commission: Greenbelt Master Plan* (1996) 17.

These objectives are the tools that the National Capital Commission has used to create several opportunities along the National Capital Greenbelt. The National Capital Greenbelt serves to provide the Capital Region with distinction by creating seven gateways into Ottawa. Landscapes that symbolize the natural and rural heritage of Canada and the Capital are conserved and enhanced. Highly visible areas are managed to ensure visual quality, key views are maintained and the rural character of scenic roads is enhanced. The seven arrival routes are along highways 416, 417, 17, and 16, the Airport Parkway, the Rideau Canal, and along passenger rail lines (The National Capital Commission 22). The arrival routes are meant to trigger the sense of pride Canadians feel for their capital and their country because newly developed areas are sited to respect the rural character of the Greenbelt and the gateway approaches to the City of Ottawa in such a fashion that the natural backdrop of the Capital is of the Gatineau Hills (see Figure 7) (The National Capital Commission 22-23).

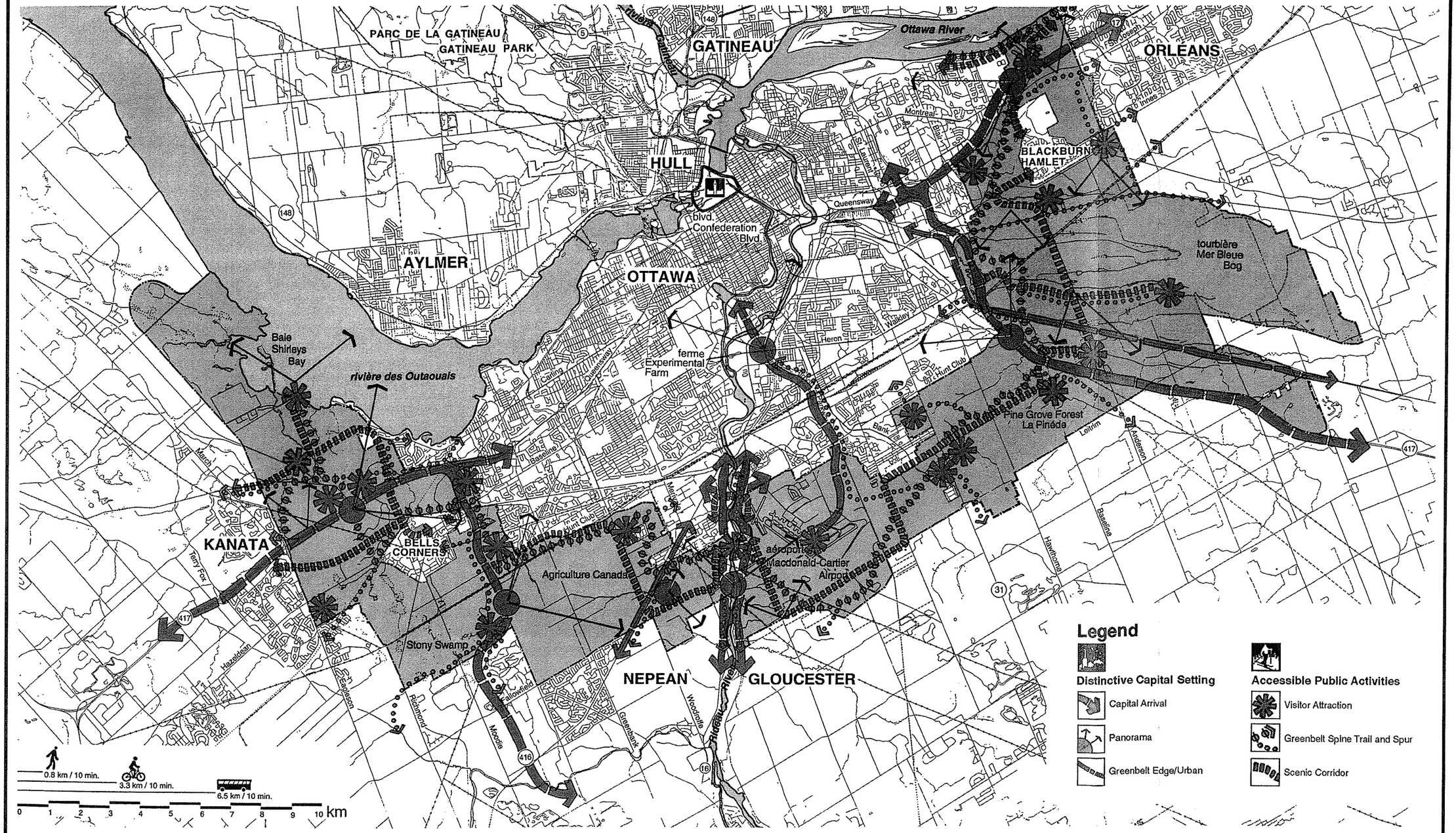


Figure 7. Arrival routes into the National Capital Greenbelt
Source: The National Capital Commission, *The National Capital Commission: Greenbelt Master Plan* (1996) 22.

The National Capital Greenbelt has several visitor attractions located throughout the Greenbelt, with publicly accessible routes linked to surrounding urban areas. A series of recreational pathways and destinations serves as a strong connection throughout the Greenbelt itself and to urban communities located at the edges of the Greenbelt (see Figure 8) (The National Capital Commission 24-25).

The designation of land within the Greenbelt is divided into three categories: the Continuous Natural Environment, the Vibrant Rural Community, and Compatible Built Facilities (The National Capital Commission 26-31). The continuous natural environment comprises "core natural areas", "natural buffers", and "natural area linkages". "Core natural areas" have the least amount of modified landscapes and the primary human uses in these areas are nature interpretation and ecological research. Human activities that are acceptable in "core natural areas" are nature study, walking, and cross-country skiing (on low-impact trails or boardwalks). All existing intensive uses of "core natural areas" such as agricultural use and productive forestry use have been phased out and new urban infrastructure is prohibited - although maintenance of existing urban infrastructure is permitted (The National Capital Commission 26-27).

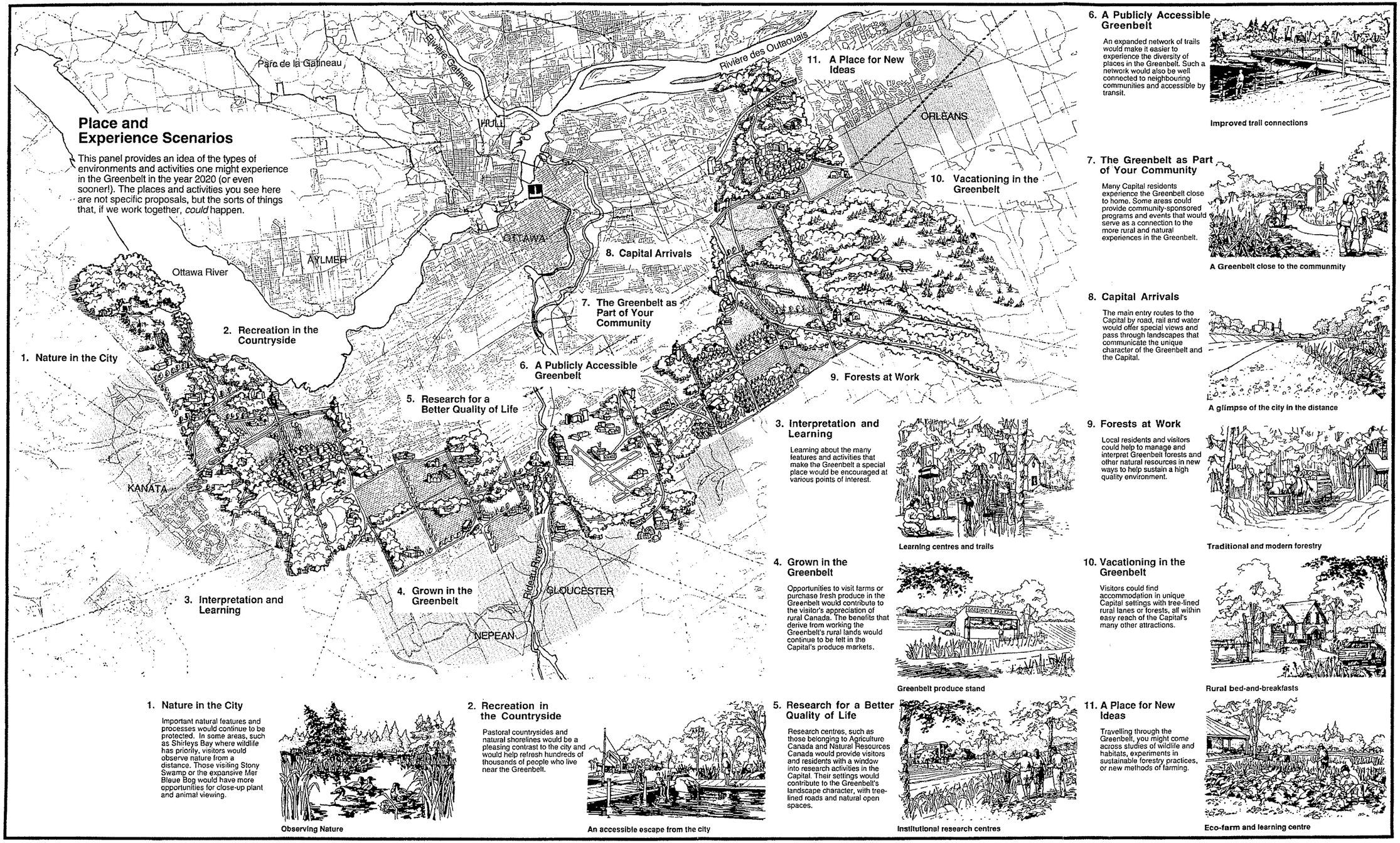


Figure 8. Places and experiences throughout the National Capital Greenbelt
Source: The National Capital Commission, *The National Capital Commission: Greenbelt Master Plan* (1996) 24.

"Natural area buffers" envelop "core natural areas" in order to prevent adverse effects from adjacent activities. Non-intensive or linear recreational activities such as bicycling, horseback riding, walking, cross-country skiing, and camping are permissible in "natural area buffers". Agricultural practices such as pasturing, mixed cropping, crop rotation, zero or low tillage, vegetated buffers, and minimal use of chemicals are compatible in "natural area buffers" (The National Capital Commission 26-27).

"Natural area linkages" are strategically located corridors that facilitate wildlife movement and provide opportunities for continuity of vegetation throughout the Greenbelt (The National Capital Commission 26-27). The same non-intensive or linear recreational activities allowed in "natural area buffers" are also deemed acceptable in "natural area linkages".

The rural community can be subdivided into two categories: "cultivated landscapes" and "rural landscapes". "Cultivated landscapes" are defined as landscapes that use the Greenbelt, but do not impair the long-term productivity of the soil, such as market-oriented farming and forestry (The National Capital Commission 28-29). "Rural landscapes" are defined as landscapes created for extensive recreational activities such as golf courses, sportsfields, toboggan hills, equestrian facilities, and hobby farming (The National Capital Commission 28-29).

The final land designation is "compatible built facilities". This comprises buildable sites and infrastructure corridors. Buildable sites include lands that were developed prior to the Greenbelt Master Plan and proposed development in the plan (The National Capital Commission 30-31). Infrastructure corridors include major transportation routes and services, which cross the Greenbelt. Infrastructure corridors also accommodate wildlife movement when crossing "natural area linkages" (The National Capital Commission 30-31).

Although the above list of opportunities is extensive, the National Capital Commission does have some constraints. The major constraint is the legislation controlling the National Capital Greenbelt. A governing body such as the National Capital Commission has some benefits (eg. acquisition of desirable land), but the cost is more political "red tape" to cut through and slower results. Governing bodies have an approval process that requires time and delays are inevitable and opportunities can be missed. For example, if an additional parcel of land is needed to complete a pathway or trailway it is almost always going to be easier to reach an agreement with the private owner than forcing the private owner to sell.

The lessons learned from this precedent are:

1. Arrival routes to the Capital are important and should be preserved. They provide visual points of interest for the user.
2. Recreational pathways can provide strong connections from the core area

of a city to its outer edges. These connections should be considered opportunities to develop continuous pedestrian pathways through a city.

3. Strategic designation of areas used for recreational activities and other activities such as agriculture. Non-intensive recreational activities such as cycling, walking, and jogging can be located in natural areas with buffers surrounding these areas to segregate intensive practices and activities such as agriculture and major roadways.
4. Natural area linkages provide connections between densely vegetated areas and promote the migration of animals. They also reduce the amount of road kill.

3.3. The Meewasin Valley Project (The Meewasin Valley Authority)

The next precedent I will examine is the Meewasin Valley Project located in Saskatchewan. Glaciers and the retreat of the Wisconsin Glacier, which formed Lake Saskatoon, created the Saskatchewan River Valley. Today, the River Valley is a diverse and interconnected water-created pattern of meander plains, creeks, islands, river banks, river terraces, coulees, aquifers, and sloughs (The Meewasin Valley Authority 18). This river valley is distinct from the surrounding prairie region because it is a moist river bottom community within the mixed grass region of the prairies (see Figure 9) (The Meewasin Valley Authority 18).

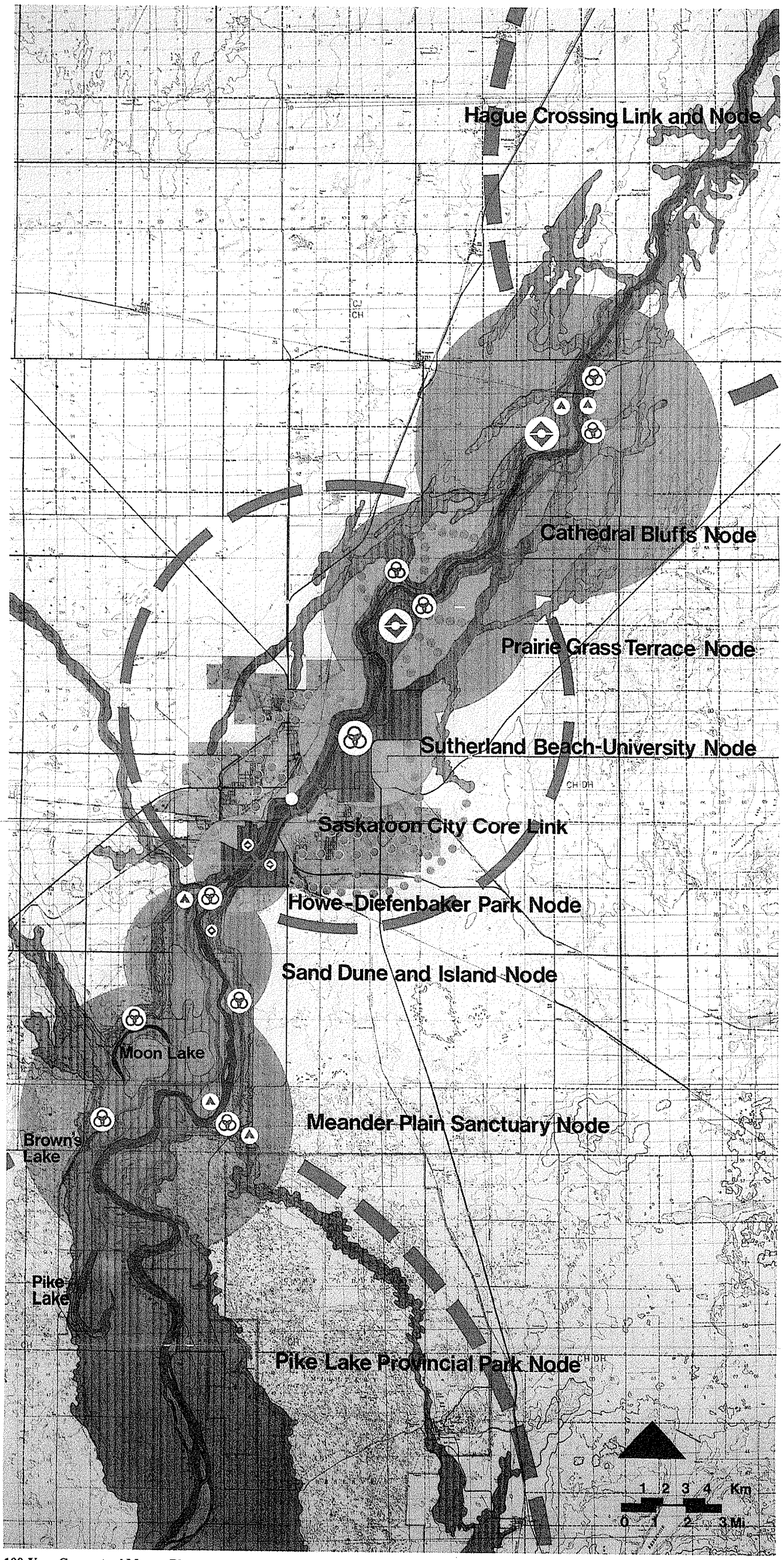


Figure 9. The Meewasin Valley Project 100 Year Conceptual Plan
Source: Moriyama, Raymond, *The Meewasin Valley Project: 100 Year Conceptual Master Plan of the South Saskatchewan River Environment* (Toronto: Raymond Moriyama Architects and Planners, 1978) 48.

The main objective of the Meewasin Valley Project was to create a linear chain of landscapes connecting various land uses along the river valley. These land uses include:

1. Recreational use of bicycle and hiking trails that follow the river's edge but avoid sensitive banks and ecologically vulnerable areas.
2. The Rivervalley Parkway consists of two routes the 'high road' and the 'riveredge drive' that permit vehicular use. The 'high road' follows the top ridge of the ancient west bank, giving motorists an opportunity to view the river valley to the east from high vantage points. The 'riveredge drive' provides motorists with direct views of the river. The Parkway was designed to respect natural contours and consists of two lanes that run without interruption along the riverside through the city and rural areas. Highway traffic is discouraged by enforcing maximum speeds of 50 kilometres per hour or less, so a leisurely pace is achieved through the Parkway (The Meewasin Valley Authority 49).
3. The University of Saskatchewan's less-productive agricultural land became a designated site for the research and development of experimental communities suited to the prairie environment. These communities provide opportunities for experiments in energy conservation, waste recycling, and continuing studies of new social needs and patterns suited to the prairie landscape and form (The Meewasin Valley Authority 49).

4. The 100 Year Conceptual Master Plan (see Figure 9) also made provisions for archeological exploration, so more documentation and factual knowledge could be obtained about this regions human history. Several archeological sites can be found in the Meander Plain Sanctuary Node, Sand Dune and Island Node, and Prairie Grass Terrace Node.
5. Agricultural use in surrounding rural areas (see Figure 9).

The social history of the Meewasin Valley is an important part of the Meewasin Valley Project because the history of human life on the plains represents the dreams and realities passed down from the pioneers and forefathers. To paraphrase John Rusk:

When we think and plan
Let us think responsively and responsibly
Let us plan with foresight
Not for present use nor present delight alone
But Let them be such thoughts and ideas
As our children will thank us for (Meewasin Valley Authority 45).

The social history of the Meewasin Valley includes a lineage of events:

1. 6000 B.C., when the late prehistoric nomads migrated into the northern plains;

2. the year 1754, when Anthony Henday became the first recorded European to travel through the valley, using the Indian Trails; and
3. the year 1882, when John Lake adopted the name "Saskatoon" for the new settlement site (The Meewasin Valley Authority 20-21).

The word "Saskatoon" comes from the Cree word "Mir-sask-quah-too-min", which means "a carpet of Flowers" (The Meewasin Valley Authority 23). Since the late 1880s, The City of Saskatoon has continued to expand both away from and along the South Saskatchewan River. This expansion provided both opportunities and constraints for a large-scale trail along the River Valley.

The Meander Plain, Beaver Creek, Saskatoon (the River and the City), Sutherland Beach (University of Saskatchewan), Peturrson's Ravine, and Clark's Crossing are environments unique to the Meewasin River Valley. The Meander Plain is one of the few remaining places on the prairies where the wet environment supports a highly diverse ecosystem of wildlife and plants where the largest trees can be seen for hundreds of miles and wildlife is abundant. (The Meewasin Valley Authority 29-30).

Beaver Creek is maintained in a semi-wilderness state, providing habitat and the opportunity to observe rarer animals, such as the otter and lynx (The Meewasin Valley Authority 31).

The Meewasin Valley Authority believes Saskatoon adds value to the Meewasin Valley Project because of its central location, river ecosystem, developing core commercial areas, city-wide cultural, educational, and recreational facilities, and pedestrian links connecting streets, parks, and open spaces with the river (The Meewasin Valley Authority 33-35).

Sutherland Beach is the second river terrace downstream from the Saskatoon Terrace located in the City Core. Its gently sloping landform is the most accessible riverbank downstream (The Meewasin Valley Authority 35-36). The Sutherland Beach shoreline and terrace show the glacial deposition and dynamics of the South Saskatchewan River. Over time the river has eroded through till, carrying away fine particles and allowing the boulders to collect and form a stone-paved river bottom. Along the river bank a stratigraphic sequence can be found exposing three glacial ages and sediments of glacial Lake Saskatoon (Meewasin Valley Authority 36). The University of Saskatchewan has taken advantage of the opportunity to study the paleolontological remains preserved over time within the exposed geological layers. Through research the University hopes to learn more about the processes that have exposed these geological layers and the life that existed during these processes (Meewasin Valley Authority 36).

Peturrson's Ravine is a highly active area along the River Valley. It houses groundwater seepage from aquifers, which constantly replenishes and

rejuvenates the land and nourishes the life that relies on this landform (The Meewasin Valley Authority 36). Current scars and sloughs intersect and link to coulees along the River Valley to create balance between water collection and drainage. Coulees provide a distinct drainage pattern along the River Valley creating some of the richest habitat on the prairies. (The Meewasin Valley Authority 36).

Clark's Crossing was one of the original places of settlement along the river. This node can be found at the northernmost tip of the paired terraces where riverbanks are steep and high on one side of the river and low sloping terraces on the opposite side of the river. The contrasting high and low riverbanks provide this node with several opportunities for recreational activities such as camping, interpretive nature walks, canoeing, etc. (The Meewasin Valley Authority 39). The focus of this project is to create a network of continuous nodes along the River Valley; however, it is important to remember that the context beyond the immediate scope of this project (and all projects) should not be ignored.

Points of interest are the focus of every node within the Meewasin Valley Project. These points of interest determine what role each node will play in the Greenway as a whole. An important step when planning and designing a Greenway is to discover the focal points of the Greenway and home in on these focal points as the starting point for each individual segment of the Greenway. Two of the nine nodes that have comparable characteristics to the City of Winnipeg are the

Sutherland Beach University Node (see Figure 10) and the Saskatoon City Core Link (see Figure 11). The Sutherland Beach University Node is comparable to the University of Manitoba Fort Garry Campus because it also runs along a river and both university campuses create the illusion of a city within a city. The Saskatoon City Core Link is comparable to Downtown Winnipeg because both city cores are divided by a river. As illustrated in Figure 11, Saskatoon has provided linkages to the east and west banks of the South Saskatchewan River. Similarly, Winnipeg has also provided linkages to the east and west banks of the Red River by the recently constructed foot bridge and the Provencher Bridge. These two nodes can be treated as examples to follow during the design stage for the Winnipeg Greenway.

The constraints of the Meewasin Valley Project are the presence of a separate governing body and accessibility. Similar to the National Capital Greenbelt, the Meewasin Valley Project is also regulated by a separate governing body. On one hand, the organization of the Meewasin Valley Authority can be seen as an opportunity because the Meewasin Valley Project required a large amount of land in order to implement this project. However, private land owners may have been persuaded to sell their land in order to fulfill the land requirement for a project of this magnitude. Accessibility is another constraint because the project runs north and south along the South Saskatchewan River. The project is more accessible to users who live along the river valley. Although green space links connect surrounding areas to the project, these links are mainly confined within

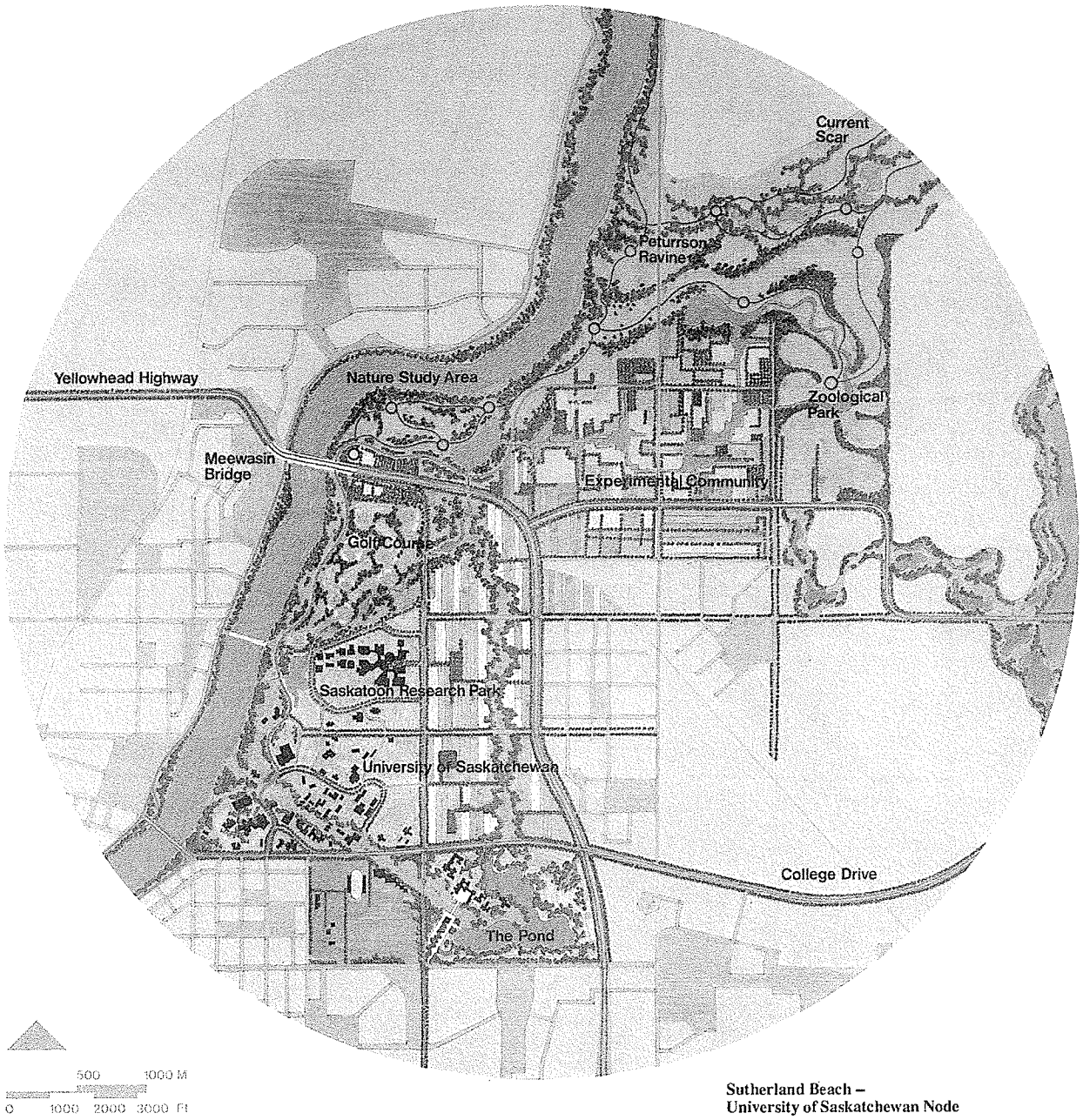


Figure 10. The Sutherland Beach Terrace Node
Source: Moriyama, Raymond, *The Meewasin Valley Project: 100 Year Conceptual Master Plan of the South Saskatchewan River Environment* (Toronto: Raymond Moriyama Architects and Planners, 1978) 64.

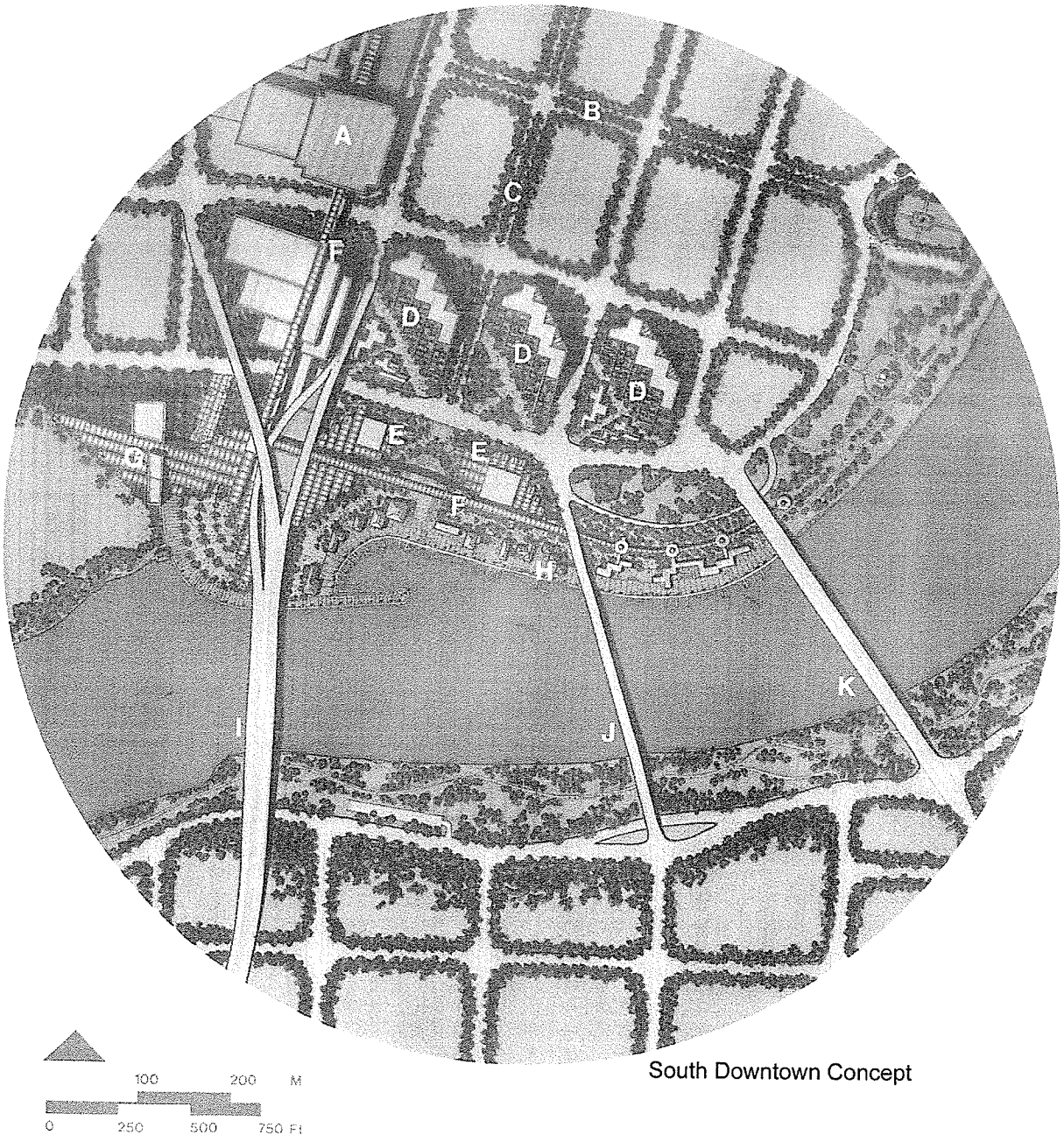


Figure 11. The Saskatoon City Core Link
Source: Moriyama, Raymond, *The Meewasin Valley Project: 100 Year Conceptual Master Plan of the South Saskatchewan River Environment* (Toronto: Raymond Moriyama Architects and Planners, 1978) 58.

the limits of Saskatoon.

The lessons learned from the Meewasin Valley Project are:

1. Using trails, pathways, and roads to connect through environments unique to the Meewasin Valley River such as the Meander Plain, Beaver Creek, Saskatoon (the River and the City), Sutherland Beach (University of Saskatchewan), Peturrson's Ravine, and Clark's Crossing.
2. Using points of interest within individual nodes as the main attraction, which in turn creates a continuous connection throughout the entire Meewasin Valley Project.
3. Using natural landscape features such as a river as the starting point for a greenway and branching out from this solid foundation.

The Meewasin Valley Project can be simply summarized, as "The intent is *enrichment* of life; The spine is the *river;* The base is the *natural system*; The broad concept is *health and fit*; The principle is *access* to and along the river; The theme is *linkage*; The operational model is one of *links and nodes*; and The key is *balance* (Meewasin Valley Authority)."

3.4. Green Development Plans for London, England

In 1929, Architect/Planner Raymond Unwin and a committee representing the London Boroughs prepared a plan that contained a memorandum on 'open

spaces.' The 1929 plan proposed a 'green girdle' of recreational open space in the form of a ring around London (see Figure 12) (Turner 270). Some of the land required to complete the 'green girdle' was purchased, but most of the land was not open to the public. As a result, the ring was not completed. Although the 1929 Green Development Plan for London was not fully implemented, it was the foundation for the 1943-1944 Green Development Plan for London.

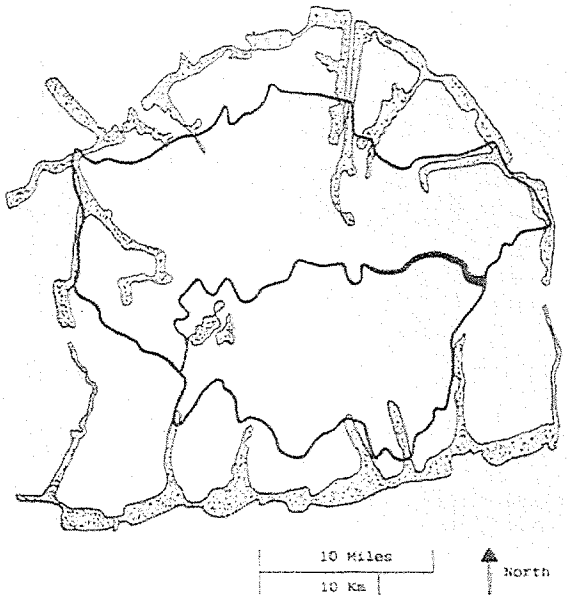


Figure 12. 1929 London Plan: A 'green girdle' of recreational open space
Source: Turner, Tom, "Greenways, blueways, skyways and other ways to a better London." *Landscape and Urban Planning* 33 (1995) 270.

The 1943-1944 Green Development Plan was mostly the visionary work of Patrick Abercrombie, a landscape architect, town planner and architect. Patrick Abercrombie's vision for the County of London was to build upon the 1929 Plan and create a network of greenways that linked inner city open spaces to the outskirts of Greater London (See Figure 13). His objective was to make it

possible for "the town dweller to get from doorstep to open country through an easy flow of open space from garden to park, from park to parkway, from parkway to green wedge, and from green wedge to Green Belt.

A great advantage of the linking parkway is that it extends the radius of influence of the larger open spaces and brings the latter into more intimate relationship with the surrounding areas (London County Council)."

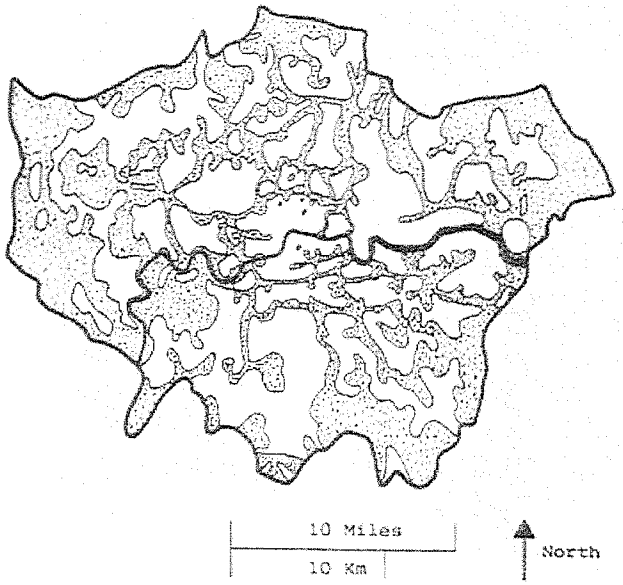


Figure 13. The 1943-1944 London Open Space Plan
Source: Turner, Tom, "Greenways, blueways, skyways and other ways to a better London." *Landscape and Urban Planning* 33 (1995) 271.

According to Tom Turner, the 1951 and 1976 Green Development Plans for London were for the most part insignificant and did not promote or enhance Abercrombie's 1943-1944 Plan (Turner 272). The Post-1976 Green Development Plan was a significant stepping stone for London. It marked the return of Abercrombie's vision. The concept of the Post-1976 Plan was to create a 'green chain' that would protect several open spaces and develop their recreation

potential (Turner 272).

In 1977, the London Boroughs of Bexley, Bromley, Greenwich, and Lewisham, in cooperation with the Greater London Council launched the Green Chain, which created an opportunity for pedestrian links between open spaces (See Figure 14) (Turner 272).

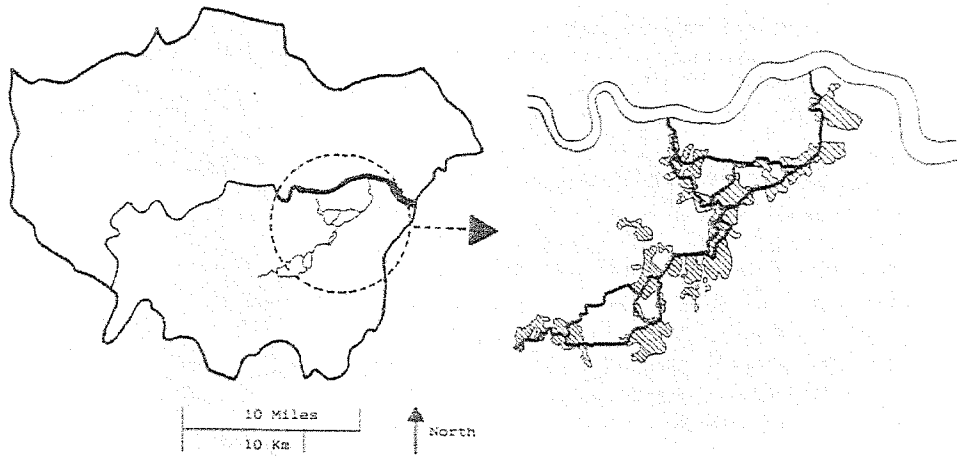


Figure 14. The South London Green Chain
Source: Turner, Tom, "Greenways, blueways, skyways and other ways to a better London." *Landscape and Urban Planning* 33 (1995) 272.

London's 1991 Green Strategy Report was significant because it built upon Abercrombie's 1943-1944 Plan and the Post-1976 Plan. A survey was conducted in 1991 and the findings revealed that London had 212 km of existing long-distance walkway, and proposals for a further 333 km. Initially, when Tom Turner began to work on London's 1991 Green Strategy Report he thought a recommendation for a network of long distance walks would be the basis for this proposed open space system (Turner 273). However, the approach made in London's 1991 Green Strategy Report was to overlap a series of functional

layers to create networks that were qualitative rather than quantitative. The three overlapping functional layers of greenspace are the pedestrian layer, the cycleway layer, and the ecological corridor layer (see Figure 15). These three layers become a hierarchy of how pedestrians use open space and interact with wildlife within the boundaries of Greater London.

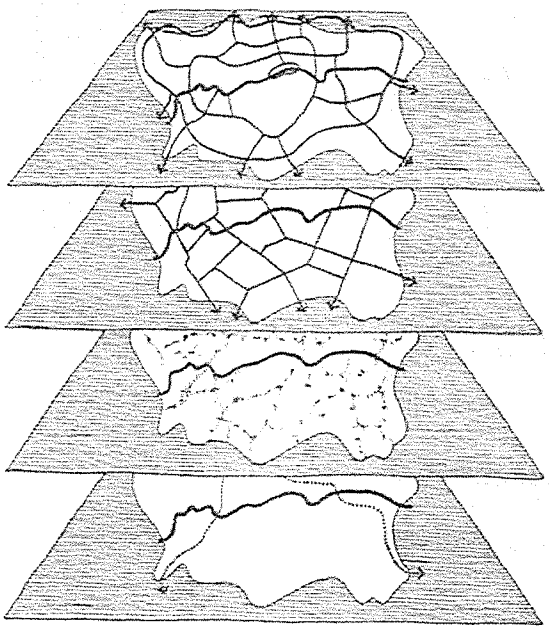


Figure 15. London's 1991 Green Strategy for a series of overlapping webs of open space
Source: Turner, Tom, "Greenways, blueways, skyways and other ways to a better London." *Landscape and Urban Planning* 33 (1995) 273.

A major constraint for London is the lack of diversity in public open spaces (Turner 275). This is also a constraint for Winnipeg. The City of Winnipeg does not have a linear or connected non-vehicular public realm. Once a non-vehicular public realm is created through the hierarchy of interconnected greenways, trailways, and pathways within Winnipeg, diversity will become a common attribute of the Greenway in its entirety.

The Green Development Plan for London was chosen as a precedent to be examined for this practicum because it is similar to the green development that has occurred in the City of Winnipeg. There are three similarities between the green development of London and green development in Winnipeg. The first is the absence of a separate government funded planning authority that specifically controls the planning and development of green spaces for both cities. Despite the absence of a separate government funded planning authority, green development for both London and Winnipeg has become non-statutory. Unlike the National Capital Commission and the Meewasin Valley Project, the Green Development Plan for London exists and has evolved over time without a separate government funded planning authority.

The second lesson is the importance of functional layering as demonstrated in London's 1991 Green Strategy (i.e. pedestrian layer, cycleway layer, ecological corridor layer, etc.). Functional layering will promote individual pedestrian experiences and allow the Greenway to operate in a highly efficient hierarchical manner.

The third lesson is the avoidance of prioritisation. To further explain, both Winnipeg and London do not have a separate government funded planning authority to delegate the development of open space. As a result, green development in Winnipeg and London occurs all over the city and not in a sequential order. For example, Winnipeg has seventeen parkways and seven

greenways that are not connected to each other. The Winnipeg Trails Association in association with Al Baronas from the Algis Corporation have compiled a Strategic Trails Plan for Winnipeg that details the prioritisation for green development in Winnipeg (the North West Quadrant – west of the Red River and north of the Assiniboine River, the North East Quadrant – east of the Red River and north of Nairn/Regent Avenue, the South East Quadrant – east of the Red River and south of Nairn/Regent Avenue, and the South West Quadrant – west of the Red River and south of the Assiniboine River). These prioritisations within the quadrants are set out in order of importance based upon the linking potential and the ease of completion.

3.5. The Vancouver Greenways Plan

> "A greenway is a linear public corridor that connects parks, nature reserves, cultural features, historic sites, neighbourhoods, and retail areas, often along either natural corridors like river or ocean fronts or along rail rights-of-way or streets shared for transportation use."
>
> ----Vancouver Urban Landscape Task Force, Greenways-Publicways

In 1991, Vancouver City Council appointed an Urban Landscape Task Force. Their final report, Greenways/Publicways, proposed the development of a system of greenways connecting all parts of the city. This system would connect larger

open spaces and then would connect smaller community and residential neighbourhoods to these larger open spaces. The report outlined two strategies within one system, both City and Neighbourhood Greenways (see Figure 16) (Vancouver Greenways Plan 6).

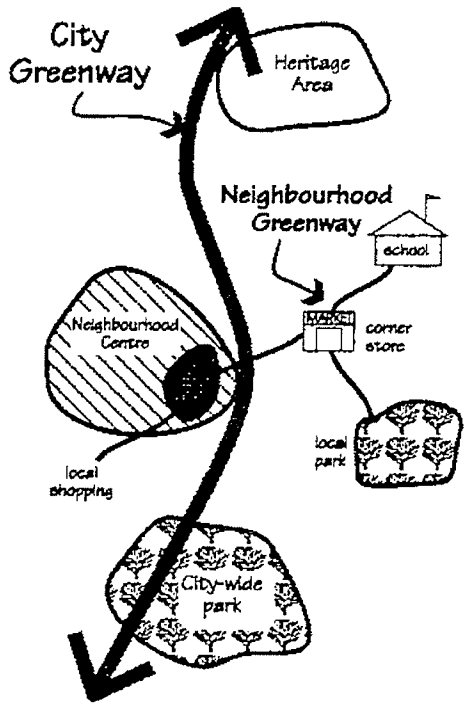


Figure 16. The Conceptual Plan for Vancouver's Greenway System
Source: Vancouver City Council, *The Vancouver Greenways Plan* (Vancouver: Vancouver City Council, 1995) 6.

The City Greenways join important destinations and create a network that continues throughout the entire city (see Figure 17). The Greenways Team (City of Vancouver, Engineering Services) is in charge of designing these greenways with the support of the public. The City Greenways Plan proposes 14 routes that will make up this network. The proposed waterfront routes are Seaside and

Seawall Route, Harbour Route, and Fraser River Trail. The proposed downtown routes are City Centre Circuit and Downtown Historic Trail. The east-west routes are Parkway, Central Valley Trail, Midtown Way, Ridgeway, and North Arm Trail. The north-south routes are Eastside Crosscut, Ontario Street Greenway, Arbutus Way, and Spirit Trail (Vancouver Greenways Plan 15-16). These routes were chosen because each one exhibits a distinct character, contributes to an understanding of Vancouver, and creates a city-wide network (Vancouver Greenways Plan 14).

The second component of the Vancouver Greenways Plan is the Neighbourhood Greenways. The Neighbourhood Greenways are smaller scale connections, which include typical streets and parks that have been transformed by local residents to give their communities distinction within a larger network (Vancouver Greenways Plan 21). Local residents are in charge of designing and developing the Neighbourhood Greenways and the city provides assistance where and when required. One of several Neighbourhood Greenway projects initiated and completed in 1994 is the East 19th Avenue Neighbourhood Greenway.

This City Greenways Plan
illustrates the 14 routes that make up the City Greenways Network. The routes are general corridors, their exact locations will be determined after further public discussion and detailed study.

The Neighbourhood Greenways
are not illustrated on this Plan. They will be located throughout the City in response to local needs, and generally be initiated by local residents.

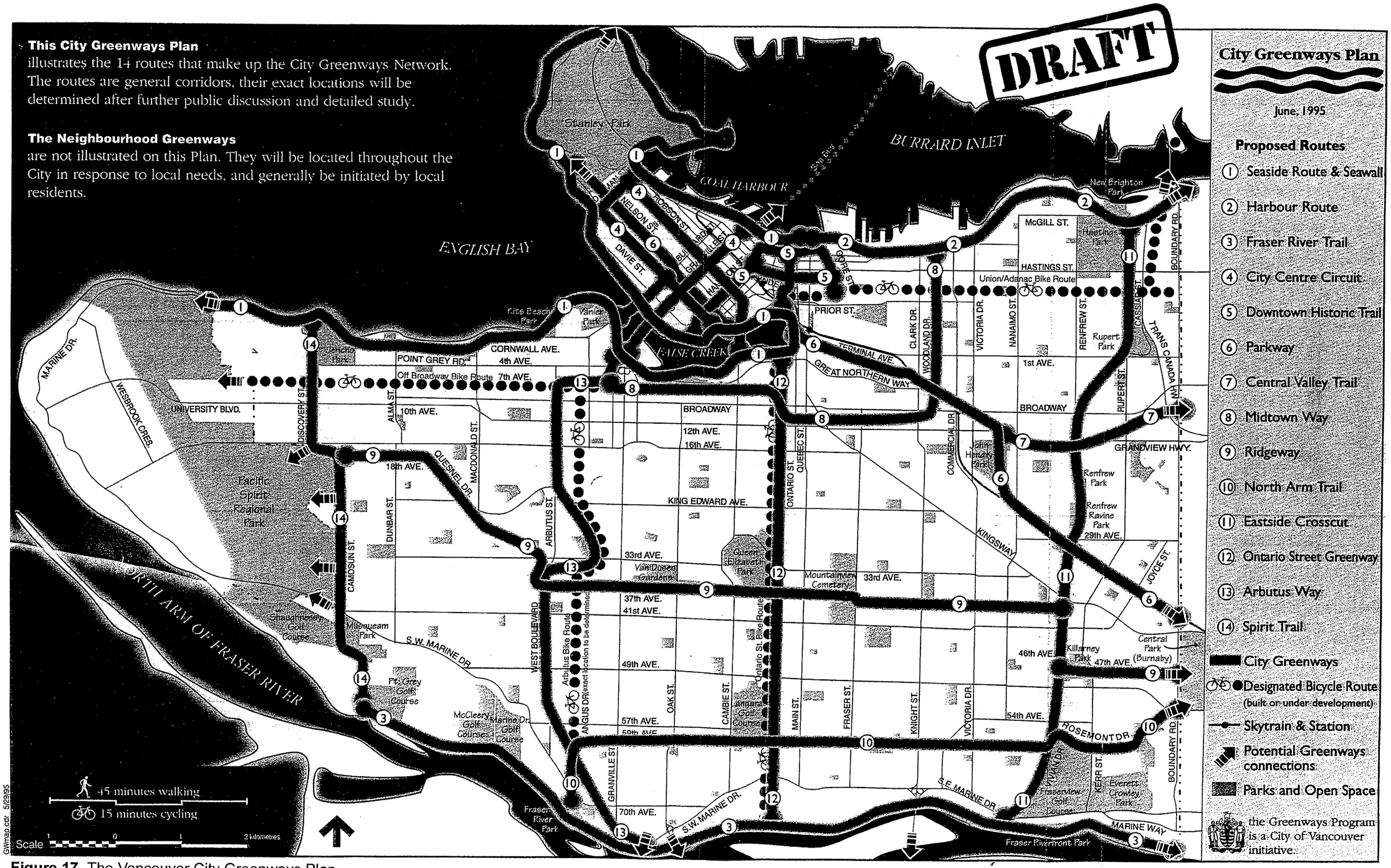


Figure 17. The Vancouver City Greenways Plan
Source: Vancouver City Council, *The Vancouver Greenways Plan* (Vancouver: Vancouver City Council, 1995) 17.

This Greenway connects a residential neighbourhood and an elementary school at East 19th Avenue and Fleming Street. An unoccupied right-of-way was transformed into a small community park that facilitated movement of both pedestrians and cyclists. Local residents designed and developed the park and received monetary assistance from the Park Board and aid from the city. This park is maintained by the local residents and the cost of maintaining this park is offset by grant money received from city programs.

Presently, the Greenways Team (City of Vancouver, Engineering Services) has completed eight Neighbourhood Greenways, five City Greenways, and are in the process of completing two additional Neighbourhood Greenways (Avalon and Tupper). The eight completed Neighbourhood Greenways include Atlantic, Cedar Cottage, John Street, Keefer Overpass, Prince Albert, Renfrew Ravine, Napier, and Windsor Castle (See Figure 18 and 19).

The Napier Neighbourhood Greenway is the most recently completed project. This project was completed in 2002 and was designed to enhance the pedestrian link between Commercial Drive, the Britannia Community Centre, and Britannia Primary and Secondary Schools. The design process encompassed community members holding workshops, on-site information sessions, and canvassing local businesses for additional support and input. The final design installations include several seating areas using benches, chairs, and rocks, pedestrian scale lighting, bike racks, thirteen cedar posts, and a meandering pebble mosaic created by

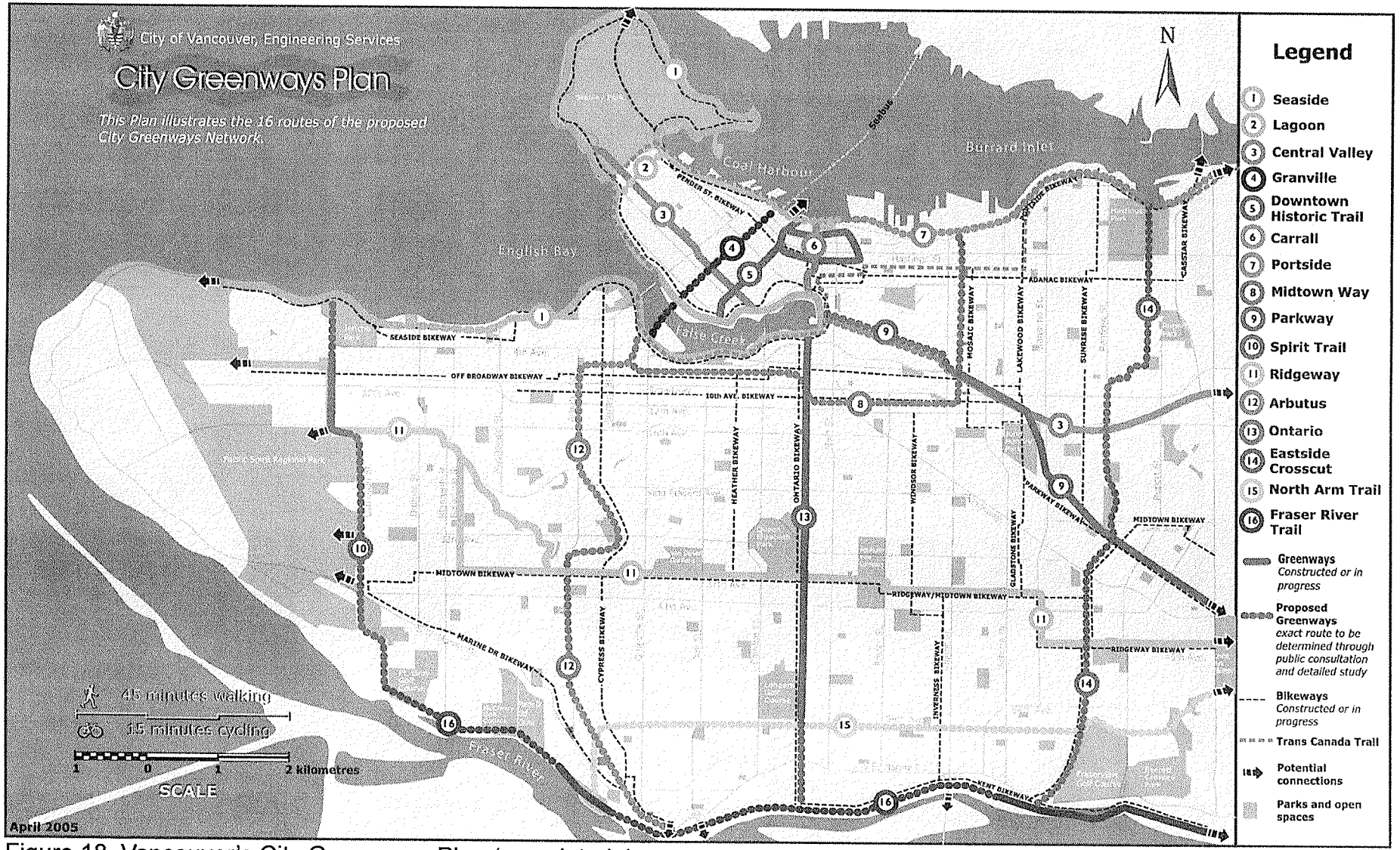


Figure 18. Vancouver's City Greenways Plan (completed, in progress, and proposed)
Source: City of Vancouver, Engineering Services, Vancouver Greenways Program (June 2005) <http://www.city.vancouver.bc.ca/engsvcs/streets/greenways/>.

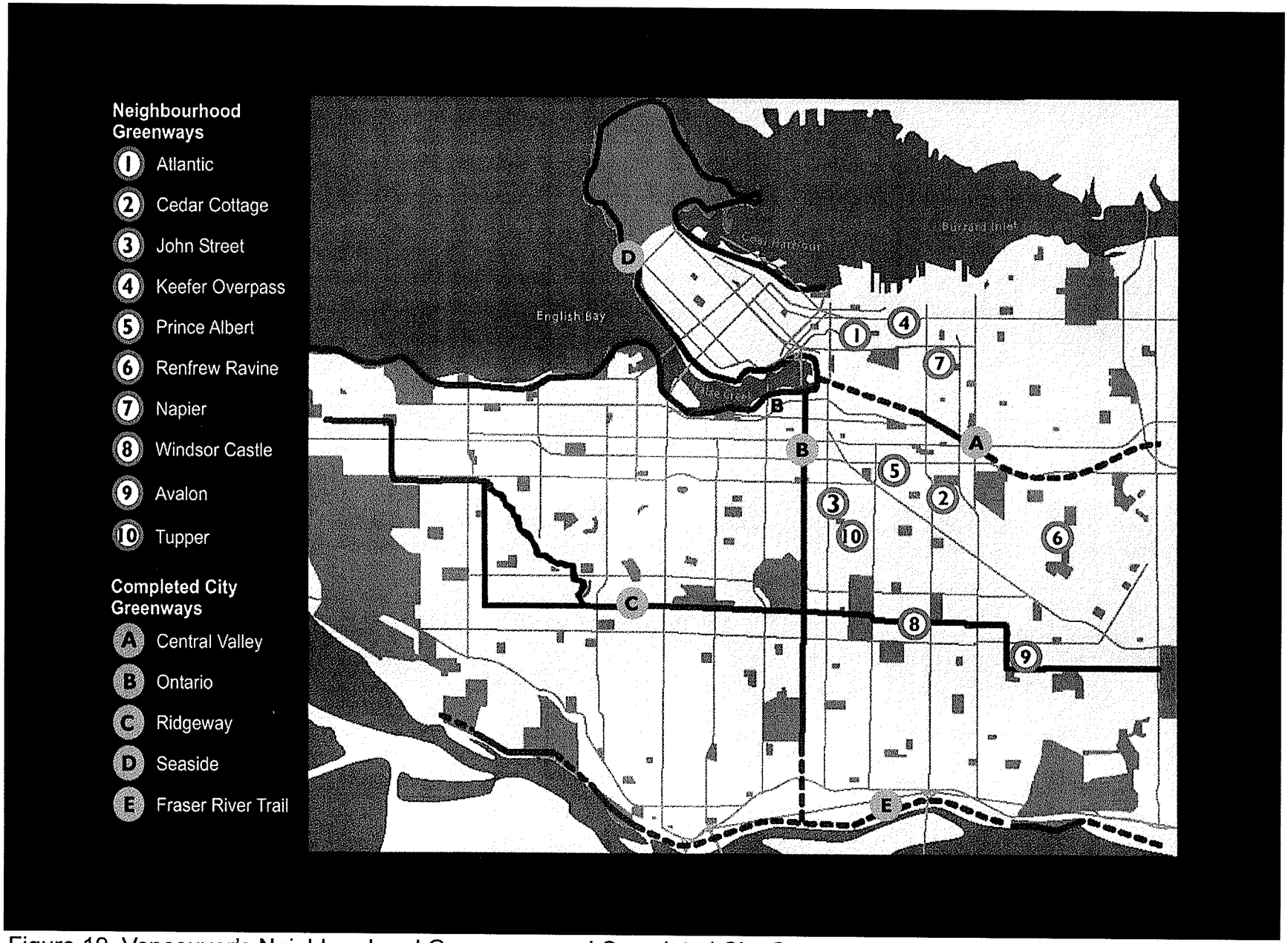


Figure 19. Vancouver's Neighbourhood Greenways and Completed City Greenways
Source: City of Vancouver, Engineering Services, Vancouver Greenways Program (June 2005) <http://www.city.vancouver.bc.ca/engsvcs/streets/greenways/>.

community members (City of Vancouver, Engineering Services).

The Ridgeway City Greenway is the only City Greenway that is completely developed. The other four City Greenways, which are Central Valley, Ontario, Seaside, and Fraser River Trail, still have proposed sections that have yet to be developed. This City Greenway extends 13km across the City from Pacific Spirit Park to the City of Burnaby's Central Park. The Ridgeway Greenway is primarily on residential streets that have been designed for pedestrian and cyclist safety and comfort. Except for a mixed-use path in Jones Park pedestrians use the sidewalk and cyclists share the road with motorists along traffic calmed streets. The recreational activities found along this greenway include walking, running, cycling, sports fields, children's playgrounds as well as disc golf, pitch and putt, and tennis at Queen Elizabeth Park (City of Vancouver, Engineering Services).

The Vancouver Greenways Plan was chosen as a precedent to be examined for this practicum because, similar to Winnipeg, Vancouver also does not have an official planning authority for the design and development of Greenways. Instead, the City of Vancouver appointed The Urban Landscape Task Force to mediate the design and development of the Vancouver Greenways Plan. This task force does not have planning, design, and development authority, but rather mediates the players involved in the various Greenway Projects. For example, the City of Vancouver wanted to determine which routes were frequently used and why. The Urban Landscape Task Force held a workshop and invited the public to

participate. Each resident who participated in the workshop was given a map of the city and asked to draw pedestrian routes that they use on a regular basis. These maps were then overlapped to reveal a snapshot of the most frequently used pedestrian routes throughout the city. The urban Landscape Task Force is a mediator that creates opportunities for both the city and the public to gather information and voice opinions about current and future Greenway Projects. Another lesson is the attention the city has placed on developing both City and Neighbourhood Greenways. The Greenways Team (City of Vancouver, Engineering Services) has determined the importance of implementing both types of greenways and has clearly outlined their intentions in the Vancouver Greenways Plan along with the appointment of the Urban Landscape Task Force.

Analysis

Discovering the Connections

4. Analysis: Discovering the Connections

I chose to conduct the analysis phase of my practicum by using maps to organize information about five types of circulation related to the design of a Greenway for Winnipeg. These five types of circulation are pedestrian circulation, vehicular, hydro, and rail circulation, wildlife circulation, greenspaces, and transit circulation.

4.1. Pedestrian Circulation

After compiling and overlaying several maps that contain information relevant to pedestrian circulation, it has been discovered that pedestrian pathways and trails in the northeast area do not connect to each other. However, roads in this area are connected on a grid pattern. For example, the Bunn's Creek Greenway stops at the east bank of the Red River and does not connect across the river to the Hearts in Motion Trail. Dedicated pedestrian pathways are an important element that requires careful consideration of how both pedestrians and motorists move in space (see Figure 20). Pedestrians move adjacent to vehicles along the same corridors and where pedestrians and vehicles cross paths, the vehicle is the dominant element. By overlaying and examining the Public Access Figure Ground Map and the vehicle and pedestrian pattern map, the following observations can be made:

Pedestrian Circulation

Public Access Figure Ground Map

Figure 20

1. Vehicular circulation is laid out in a grid pattern and pedestrian circulation follows this grid pattern because provisions have not been made to allow pedestrians to follow a different pattern.
2. Pedestrians and motorists therefore have to follow similar movement patterns because the majority of pedestrian surfaces are roadside sidewalks, even though, pedestrians and motorists do not interpret space in a similar way nor do they move within space in a similar way.
3. The ratio of publicly accessible to non-publicly accessible spaces is much larger than I had anticipated. Naturally, public access is limited to areas of common use such as public sidewalks, public parks, public streets, public corridors, and public buildings (i.e. Civic Buildings). Privately accessible areas include residential lots, privately owned buildings, privately owned parking lots, and privately owned gardens.

Pedestrians view spaces at a slower time interval than motorists. Motorists move through spaces at an accelerated rate and possibly do not absorb the same amount of information or the same type of information as pedestrians. Although the experience of spaces may seem both rich and exciting to both the motorist and the pedestrian, the details of space is gathered and processed in two different ways. Motorists may obtain different details about or accounts of a particular space than pedestrians because their primary focus is the road and other vehicles. Pedestrians should have a greater opportunity to gather details about a particular space because their primary focus is the pathway and other

pedestrians. In this particular context, "details" of space should be measured by the primary focus for each user. Motorists have a responsibility to focus on the road, whereas pedestrians are able to focus on their surrounding environment.

As mentioned earlier dedicated pedestrian pathways are an important element. Within the micro site a lot of the property along the Red River is privately owned. As a result, there are not a lot of pedestrian pathways and access points along the Red River and across the Red River. A pedestrian pathway is already present along the Bunn's Creek Greenway, but it ends at Henderson Highway just before the Red River. An opportunity to extend this pathway across Henderson Highway and the Red River exists. The Hearts in Motion Trail is also located within the micro site on the west side of the river. By extending the pathway along Bunn's Creek Greenway across Henderson Highway and the Red River, an opportunity to connect this pathway to the Hearts in Motion Trail also exists.

Three roadway types which pedestrians will have to cross exist in the micro site. Major roads such as Henderson Highway, major roads entering a suburban community such as Main Street, which enters the Riverbend Community and the Riverdale Community, and residential roads such as Foxdale Avenue, Strood Avenue, and Headmaster Row (see Figure 21). All three road types have different traffic speeds, number and width of traffic lanes, and sidewalk to road connections. The three different types of pedestrian crossings identified should

be designed with the above differences in mind, in order to ensure pedestrians are safe while crossing roads located in the micro site.

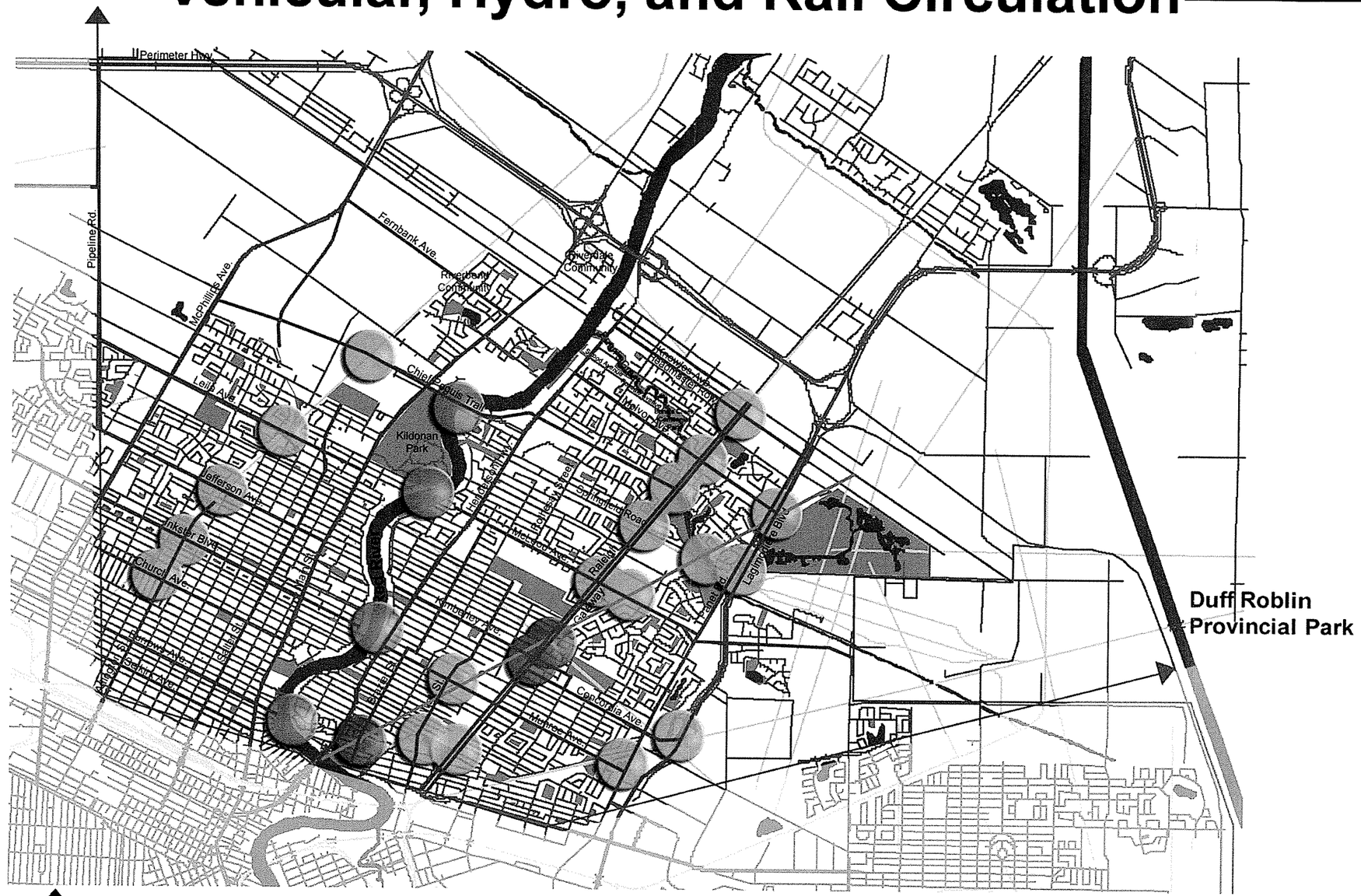
The only pedestrian bridge across Bunn's Creek in the micro site is to the east of Bunn's Creek Centennial Park. The proposal for another pedestrian bridge across Bunn's Creek should be considered between the existing pedestrian bridge and the Red River. An additional pedestrian bridge across Bunn's Creek would allow pedestrians to cross the creek west of the existing pedestrian bridge when it is not frozen.

4.2. Vehicular, Hydro, and Rail Circulation

Vehicular circulation throughout the northeast area or macro site is extensive. Major roads connect and link to other major roads without interruption (fragmentation). Hydro lines and Rail lines provide opportunities for routes and corridors to be designed for pedestrian access and use (see Figure 21). Both hydro and rail lines run diagonally and across the macro site. These lines are continuous and create an opportunity to connect existing and proposed Greenways, Pathways, and Trailways. A unique feature about both the hydro and rail lines is they do not run along the same grid as vehicular traffic.

The Red River creates both opportunities and constraints regarding pedestrian access across the river. There is only one rail line connection and one vehicular

Vehicular, Hydro, and Rail Circulation



Legend

- Major Vehicular Circulation
- Hydro Lines
- Rail Lines
- Red River
- 2 Link Nodes
- River Link Nodes
- 3 Link Nodes

Figure 21

bridge (with pedestrian sidewalks) connecting both sides of the Red River. The location of the rail line connection is from Springfield Road across the Red River to Kildonan Park. The vehicular bridge is located along Chief Peguis Trail (from Main Street across the Red River to Henderson Highway). A proposal for additional access points will be addressed in the design chapter of this document and can be integrated into areas along the Red River that welcome pedestrian access. An example of such a place is located in the micro site where the Bunn's Creek Greenway runs directly to the Red River, but becomes a dead end when the Red River is not frozen (see Figure 22). At this location, a pedestrian bridge should be considered in order to provide a year round connection between the east and west banks of the Red River. In addition, a proposal for a pedestrian crossing across Henderson Highway will also be addressed in the design chapter of this document in order to continue the connection from Bunn's Creek Greenway to the east bank of the river where the pedestrian bridge would connect both banks of the Red River (see Figure 23).

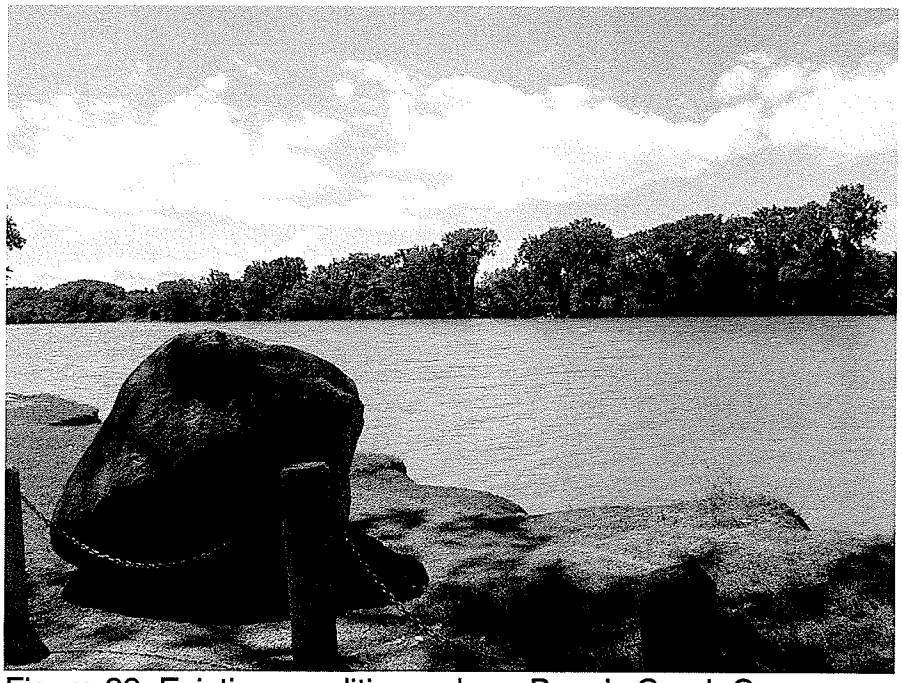


Figure 22. Existing conditions where Bunn's Creek Greenway connects to the Red River

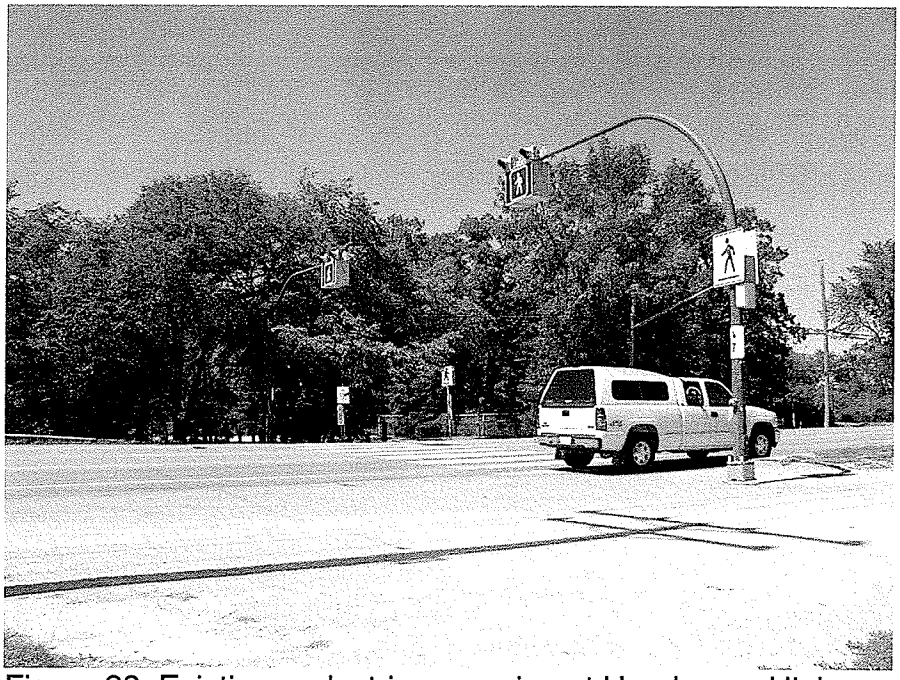


Figure 23. Existing pedestrian crossing at Henderson Highway and Bunn's Creek Greenway

While examining all three types of circulation - vehicular, hydro, and rail - it was observed that there were areas within the macro site that had all three types of circulation merging together or crossing each other. A detailed examination of the macro site displayed several areas that had two link nodes (areas where two types of circulation merged or crossed paths), however, only two areas within the macro site displayed three link nodes (areas where three types of circulation merged or crossed paths). These two areas are Kimberley Avenue, Gateway, and Raleigh and Brazier Street (between and parallel to Henderson Highway and Watt Street). These three link nodes provide greater opportunities for pedestrian access and use within the macro site.

Within the micro site there are two areas that have two link nodes and these two areas are where the rail line connects to Knowles Avenue, Raleigh Street, and Gateway Road and McIvor Avenue, Raleigh Street, and Gateway Road. These two link nodes in the micro site are shown in Figure 23. They provide an opportunity to connect two residential communities that have been divided by the Bunn's Creek Greenway. Residents in these two communities are within comfortable walking distance of this rail line and could travel north and south within the micro site having access to transit stops that have more frequent service. This rail line also provides an opportunity to connect residential communities bordering this rail line located within the macro site to the residential communities bordering this rail line located within the micro site (see Figure 2). To take this opportunity one step further, residential communities throughout the

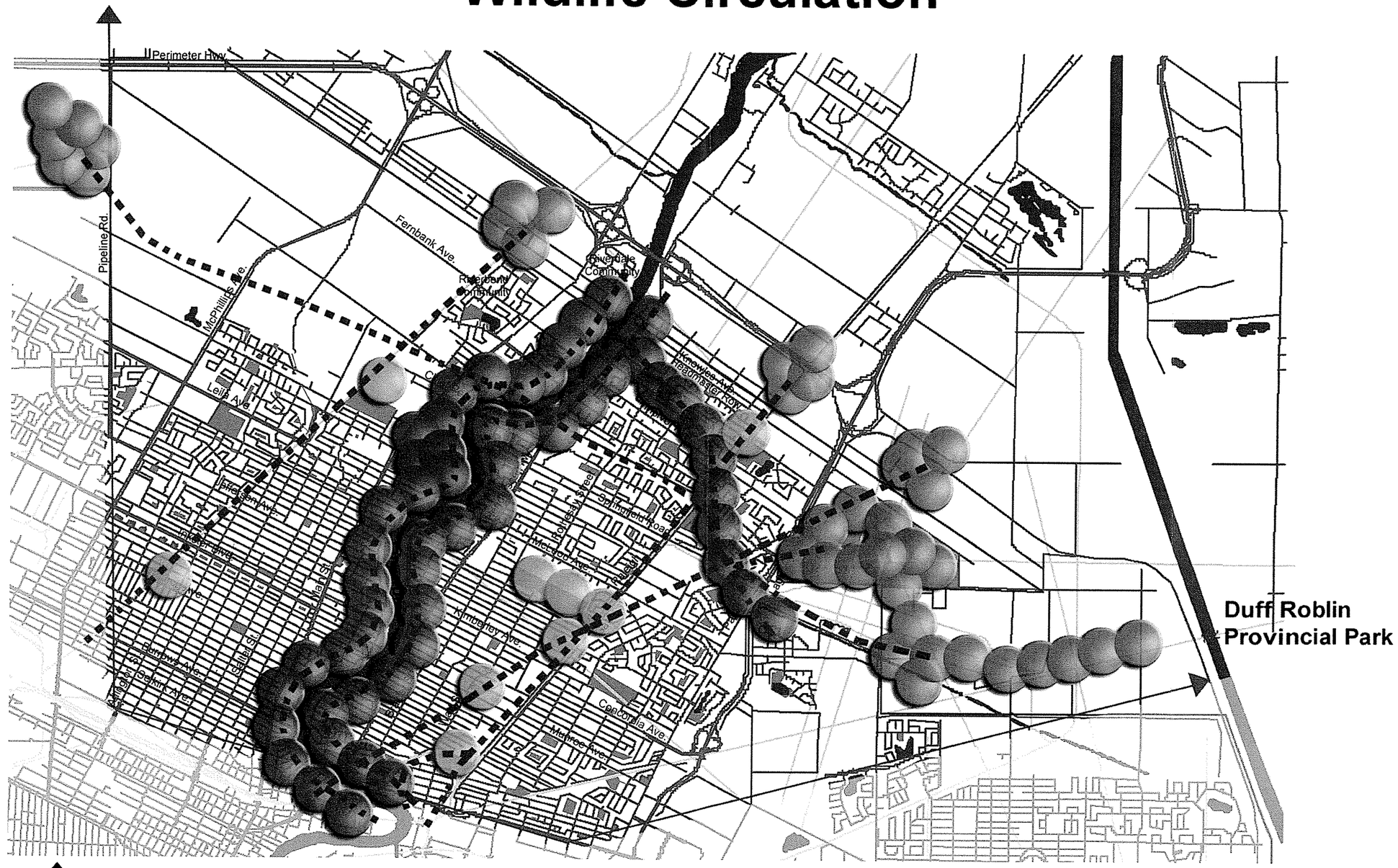
entire City of Winnipeg that border this rail line can be connected using it as a common element.

4.3. Wildlife Circulation

The main wildlife corridors that exist within the macro site are along the rail lines, hydro lines, Bunn's Creek (Greenway), and the river. The types of wildlife that can be found in the macro and micro site are large mammals such as deer, small mammals such as squirrels and rabbits, as well as mice, birds, and insects. A source node is an area within the macro site where permanent wildlife habitat can be found. The source nodes are located along the river, Bunn's Creek (Greenway), the edges of the macro site, and rail and hydro lines. A sink node is an area within the macro and micro site that provides food and temporary shelter to wildlife as they travel through these open spaces. Food and temporary shelter allows wildlife to pause and/or breed. As a result, wildlife have a higher rate of survival and disperse into the network (Dramstad et al. 43). The network refers to connectivity between corridors, source and sink nodes within the macro and micro site. The sink nodes are open spaces located along the rail and hydro lines within macro and micro site.

One observation that I have made from the wildlife map (see Figure 24) is that the City of Winnipeg acts as a filter for wildlife movement. The source nodes surround the edges of the macro site where wildlife enters it. The Red River and

Wildlife Circulation



0 500 1000 1500 2000 2500 3000 3500 4000

Legend

- Source and Sink Nodes
- Red River
- Source Nodes
- Sink Nodes
- Wildlife Corridors

Figure 24

Wildlife Map

Bunn's Creek (Greenway) are vegetated corridors that provide habitat for wildlife and facilitate their movement to smaller connected open spaces such as Bunn's Creek Centennial Park located in the micro site.

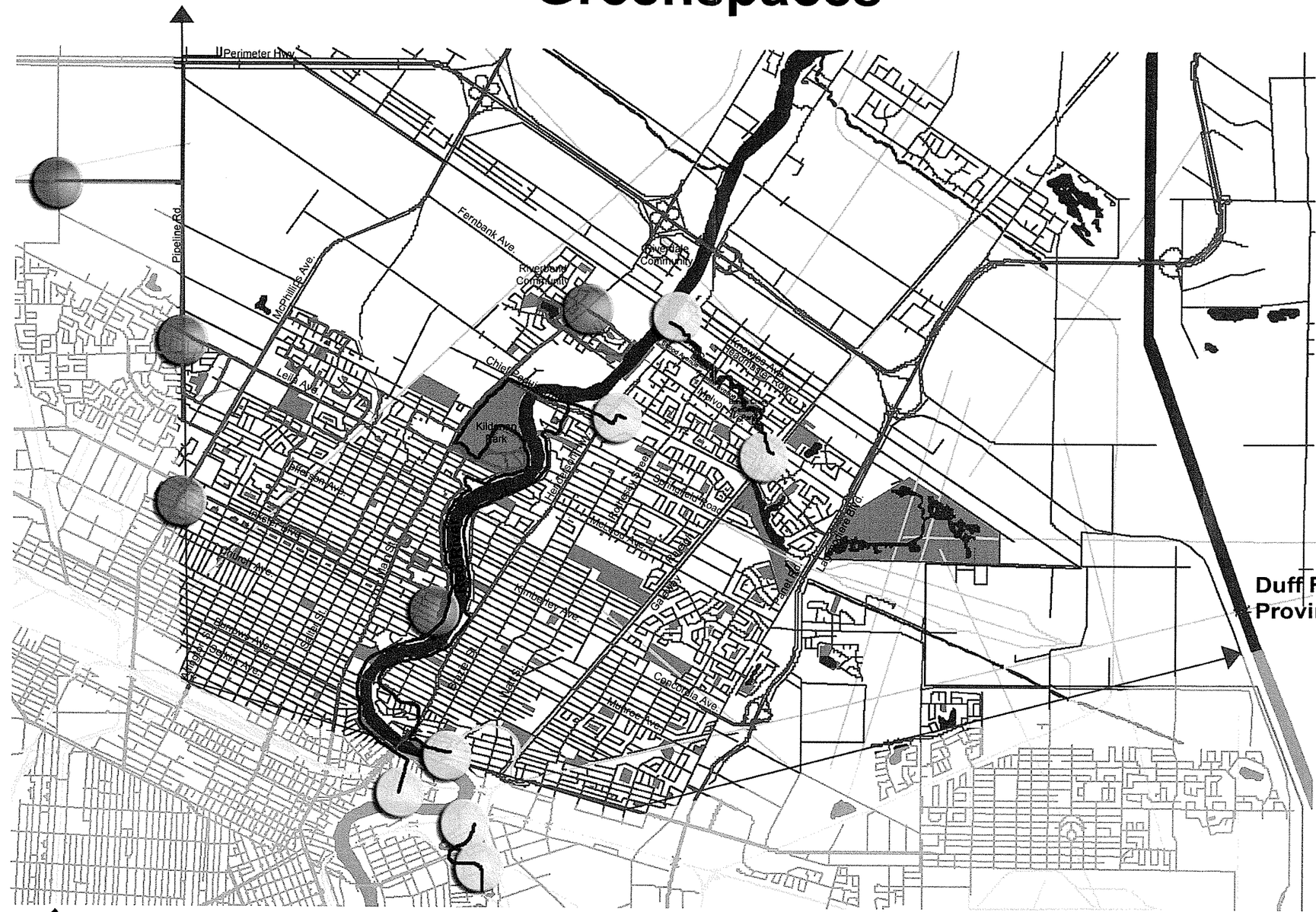
4.4. Greenspaces

Within the macro site, all of the greenspaces, which include municipal and recreational parks, golf courses, playgrounds, tot lots, greenways, and trailways, have been identified on the Greenspace Map. This map identifies potential pedestrian linkages where pedestrian connections are weak. The Greenspace Map also identifies potential greenway nodes and trail nodes (see Figure 25). The nodes are areas where both existing greenways and trails have "lost" connections to other existing greenways and trails. These nodes identify opportunities to "find" connections between existing and proposed greenways and trails.

The major opportunities that exist in the macro site are:

1. Opportunity to connect parks along Springfield Road to the rail bridge that crosses the Red River to Kildonan Park using pedestrian pathways, trails, and existing sidewalks.
2. Opportunity to connect greenspaces along Inkster Boulevard east toward the Hearts in Motion Trail at the Red River and west toward the Hearts in Motion Trail at McPhillips Avenue using pedestrian pathways, trails, and

Greenspaces



Greenspace Map

Figure 25

existing sidewalks.

3. The Hearts in Motion Trail already crosses Leila Avenue at three different points; therefore, there is an opportunity to connect this trail to Leila Avenue using designated pedestrian crossings at the three points where both the trail and Leila Avenue merge (see Figure 25).

The major opportunities that exist in the micro site are:

1. Opportunity to connect the Bunn's Creek Greenway to the Red River using existing and proposed pedestrian crossings, pathways, trails, sidewalks, and vegetation.
2. Opportunity to connect the Bunn's Creek Greenway to the Hearts in Motion Trail across the Red River using a proposed pedestrian bridge, pathways, trails, and vegetation.
3. Opportunity to connect vegetation in the wildlife corridors of the Bunn's Creek Greenway and the Red River. There is also an opportunity to extend and connect the Bunn's Creek Greenway to Duff Roblin Provincial Park using vegetation.

These opportunities exist because the greenspaces are closely clustered, cover a larger area of space, and are used by pedestrians. The result being a greenway that connects existing greenspaces and allows users to travel continuously throughout the city.

4.5. Transit Circulation

Transit routes in the macro site are limited and services are infrequent (see Figure 26). The transit routes that have the most frequent service are situated along major vehicular routes such as Henderson Highway, Main Street, Inkster Boulevard, Leila Avenue, and Salter Street. Services on these routes run on a regular schedule throughout the day, but they do not provide direct access to suburban communities. The transit routes that provide access to the suburban areas run during rush hours (7:30-9am and 4-6pm). Unfortunately, if you live in a suburban community and you want to use the transit system outside of rush hours, you will have to walk to the closest transit stop situated on Henderson Highway, Main Street, Inkster Boulevard, Leila Avenue, or Salter Street where the service is more frequent. For the residents who are willing to walk, a greenway would provide additional connections to the above mentioned transit routes. As a result, the residents who are willing to walk would be able to use the greenway to get to a more frequently serviced transit route and use transit or they could drive to their destination.

Within the micro site the most frequently serviced transit routes are along Henderson Highway and Main Street. In addition, a transit route runs through the Riverbend Community, but the service is a limited or express downtown route. The other transit route located in the micro site runs from Rothesay Street to Headmaster Row to Raleigh Street (see Figure 26). There are two pedestrian

Transit Circulation Map

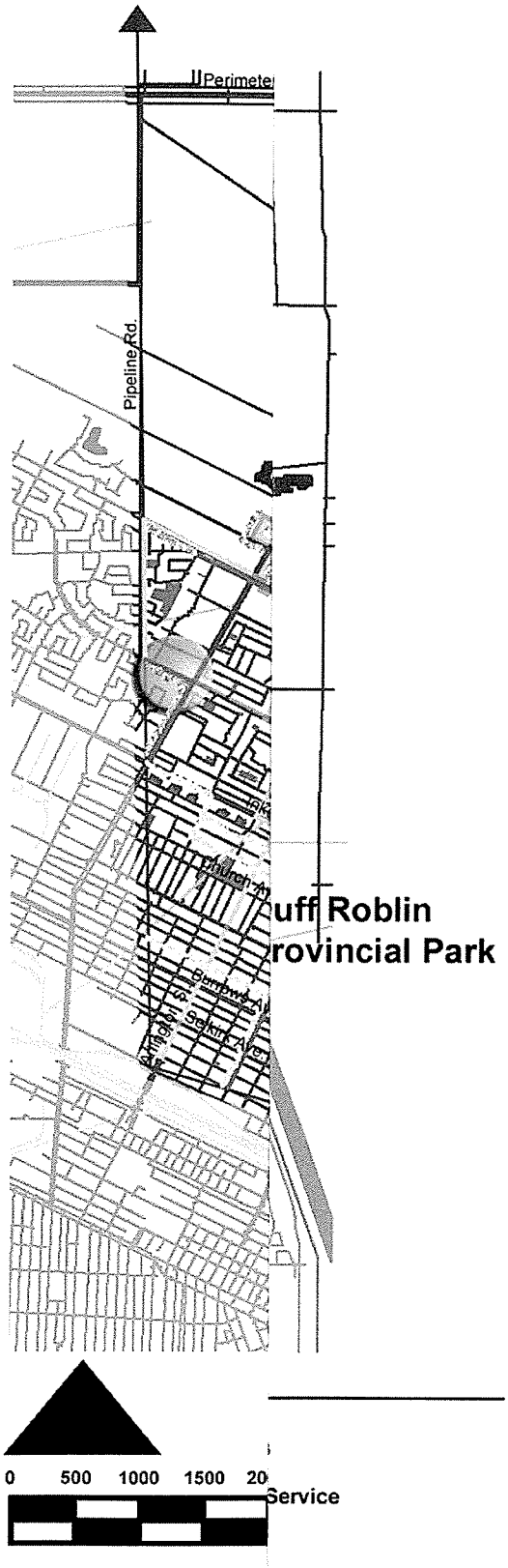
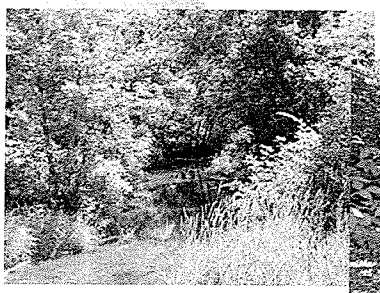


Figure 26

accessibility nodes located in the micro site; one in the Riverbend Community and the other where McIvor Avenue, Raleigh Street and the Bunn's Creek Greenway merge. A pedestrian accessibility node illustrates areas where more than two transit routes overlap. I anticipate that where more than two transit routes service an area residents will require more pedestrian crossings, bridges, pathways, trails, and sidewalks to connect to these areas. These proposed and existing pedestrian crossings, bridges, pathways, trails, and sidewalks will provide pedestrians with safe and barrier free access to public transit.

I have illustrated in Figure 26 the walking distance from each residential community to transit routes in the micro site. A comfortable walking distance is approximately 220m (Harris and Dines 340-4 - 340-5); therefore, for residents who are willing to walk, all the areas within 220m from transit routes should be examined during the design process to create connections that will meet the criteria of a comfortable walking distance.

The Design
Found Connections



5. The Design: Found Connections

In starting the design process, I overlaid all five analysis maps, the Pedestrian Circulation, Vehicular, Hydro Line, and Rail Line Circulation, Wildlife Circulation, Greenspaces, and Transit Circulation Maps, resulting in the Macro Area Design Concept Map (see Figure 27). The Macro Area Design Concept Map is an illustration of proposed connections within the macro area. The flower symbols represent the "prettiness" I see when I examine greenspaces in Winnipeg. However, I also know that a flower is much more than "pretty". When examined closely, a flower is a structure with intricate details running throughout it. These details are connected to complete the flower. I have randomly placed fully visible flowers throughout the macro area where some flowers are touching and others are not because these fully visible flowers are a symbolic representation of the connections that do and do not exist between greenspaces in this area. The opaque flowers are a symbolic representation of the connections that can be found between the existing greenspaces in this area. When shown together as I have done in the Macro Design Concept Map the visible layer of flowers and the opaque layer of flowers illustrate the possibilities to connect greenspaces in this area.

The five analysis maps are layers of information that I have used to find connections between existing parkways, greenways, and open spaces within the area of study. The connections I have found at a larger scale do not meet all of

Macro Area Design

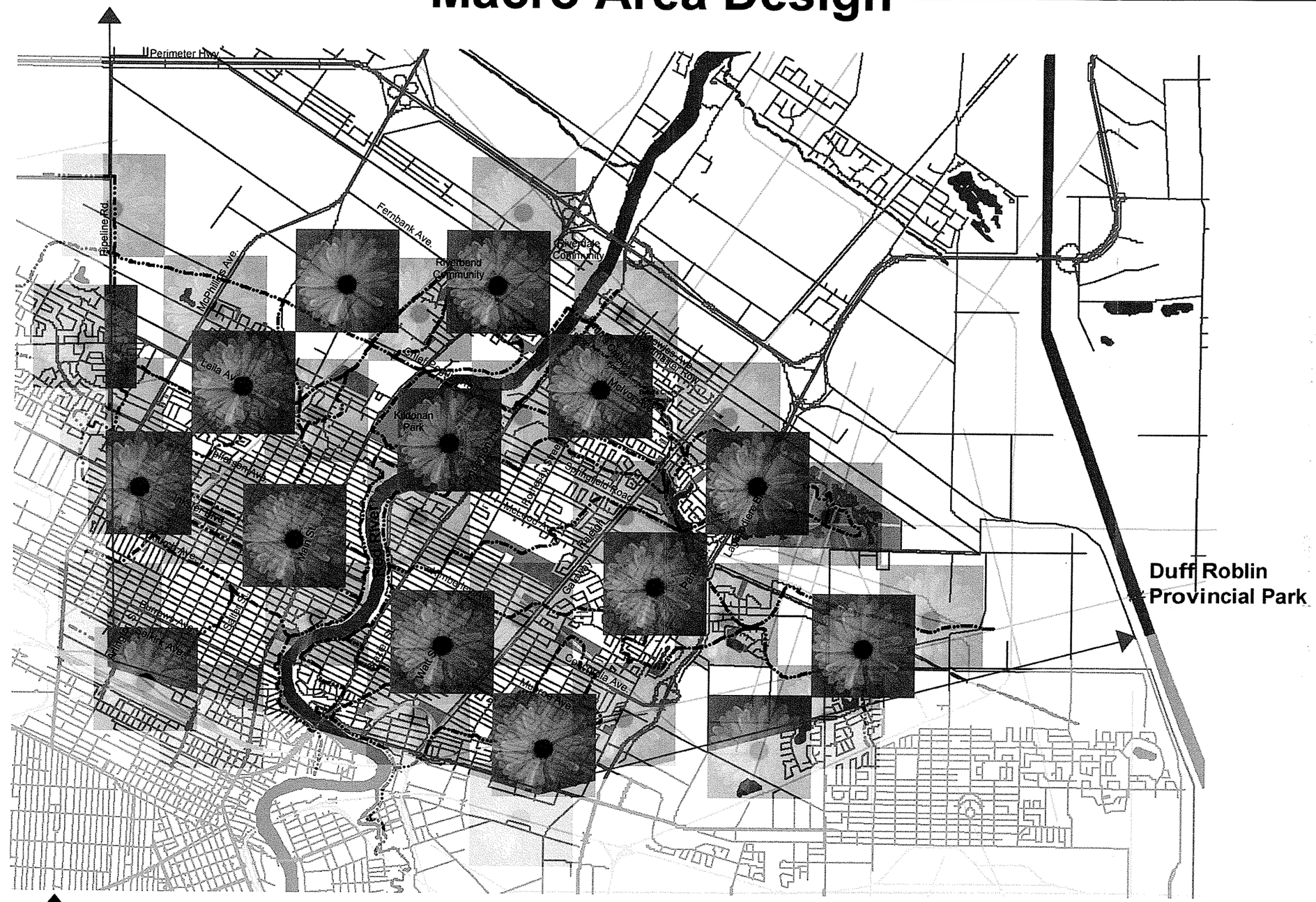


Figure 27

Macro Area Concept Design

the goals and objectives outlined earlier in this practicum. In order to demonstrate how the goal and objectives can be met I have chosen a smaller site to design.

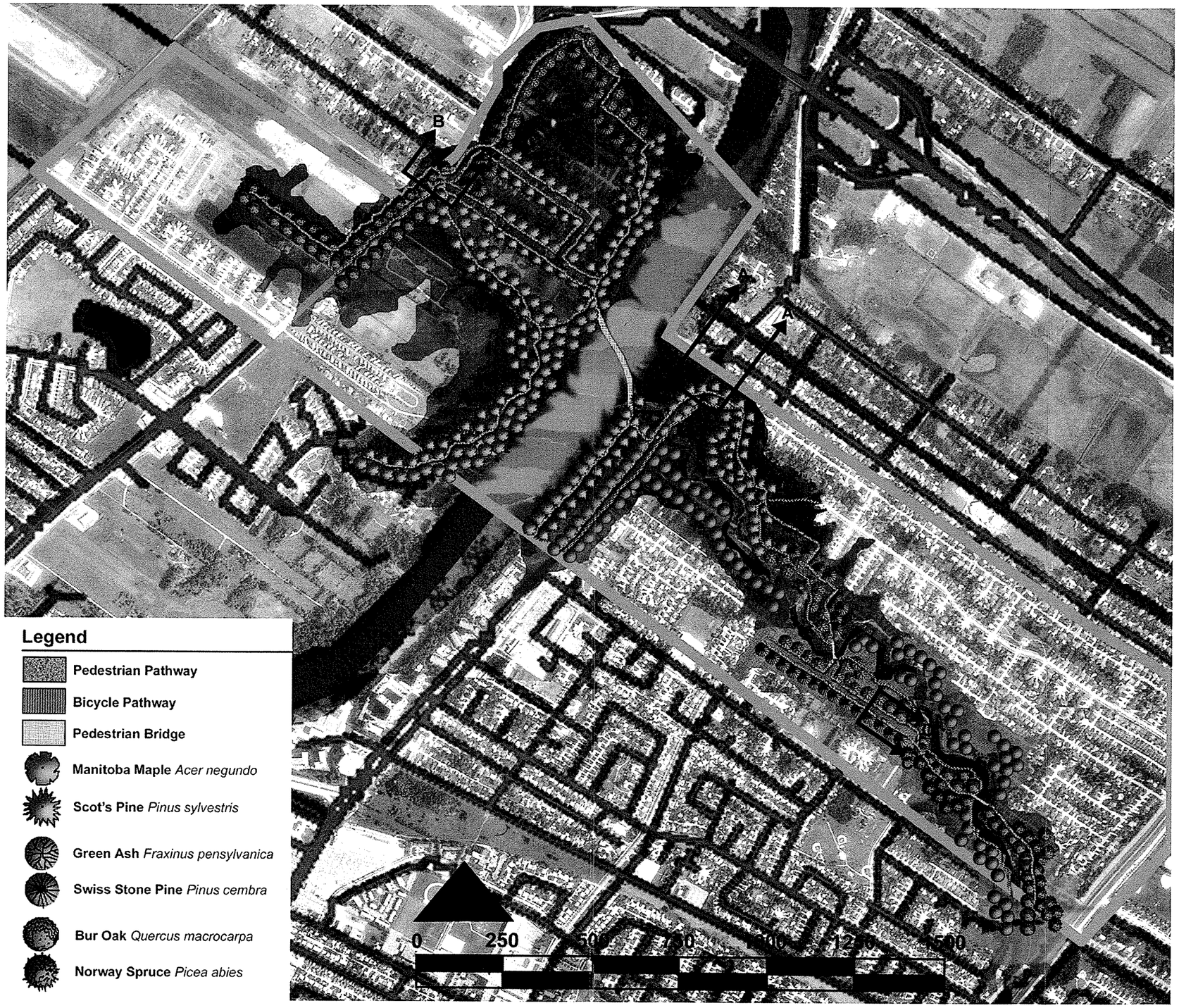
The design of a smaller site is to illustrate how the greenway will function at a pedestrian scale. The boundaries of the site I have chosen are outlined in the Macro and Micro Site Area Map (see Figure 2). I chose this site because the Bunn's Creek Greenway is the only existing greenway in this area and is a strong connection to the surrounding parkways and open spaces.

The design for this site began with the analysis of the larger scale. As I examined a smaller area I determined residents in this area were limited by the ways they could get from one destination to another. In the analysis phase I created five analysis maps I refer earlier to as layers of information. From these layers of information I determined that there were limitations to movement from point A to point B. The existing pedestrian pathways in the site do not always pass along common destinations such as elementary, junior, and high schools, places of employment, grocery stores, convenience stores, movie stores, coffee shops, family restaurants, hardware stores, and public open spaces. In addition to pedestrian pathways not passing along frequented destination points, public transportation in the site is limited to major streets such as Henderson Highway, Chief Peguis Trail, Watt Street, Raleigh and Gateway and only operates through local streets during peak hours (see Figure 26). A greenway would provide a

delightful and rewarding network of connected pathways, trails, cycleways, sidewalks, and vegetated corridors for all users such as pedestrians, motorists, cyclists, and wildlife. This being said I began to design by finding the strongest connections in the site.

I found the strongest connection in this site to be located where the Bunn's Creek Greenway intersects with the Red River (see Figure 28). This connection is strong because the Bunn's Creek Greenway is the only existing greenway in this site, the Red River runs through the entire city, and Bunn's Creek forms a natural connection by running into the Red River. As strong as this connection is already, I wanted to reinforce it through several designed elements in the greenway. These designed elements include different species of vegetation planted as a means of wayfinding throughout the greenway, a pedestrian crossing across Henderson Highway connecting Bunn's Creek Greenway to the Red River, and a pedestrian bridge across the Red River continuing the connection from Bunn's Creek Greenway across Henderson Highway to the east bank of the river and across the Red River to the west bank (see Figure 28).

As mentioned earlier, I started to design this site focusing on the strongest connection, which I believe is where the Bunn's Creek Greenway meets the Red River on the east bank. I used this location as the foundation to create, find, and strengthen other connections diverging from this point. The first designed element that I will discuss is the use of different species of vegetation as a



Site Plan

Figure 28

means of wayfinding throughout the greenway. I have proposed the dominant use of three species of coniferous and deciduous trees in order to create a physical continuous link to and from the place where the Bunn's Creek Greenway and the Red River meet. Referring to the Site Plan the first layer of trees extends 500m from the Red River and consists of Manitoba Maple *(Acer negundo)* and Scot's Pine *(Pinus sylvestris)*. The second layer of trees is linked to the first layer ending 1000m from the Red River and consists of Green Ash *(Fraxinus pensylvanica)* and Swiss Stone Pine *(Pinus cembra)*. The third layer of trees is linked to the second layer ending 1500m from the Red River and consists of Bur Oak *(Quercus macrocarpa)* and Norway Spruce *(Picea abies)* (see Figure 29). Through the use of different species of vegetation I have helped the user find their way back to the crossing of Bunn's Creek Greenway and the Red River, have ensured the user knows where (place marker) they are along the Greenway in relation to the Red River, and have also ensured the user knows how far (time marker) away the Red River is from where they are within the Greenway. I have also reinforced Winnipeg's existing character by introducing the use native species in each grouping/layer of trees.

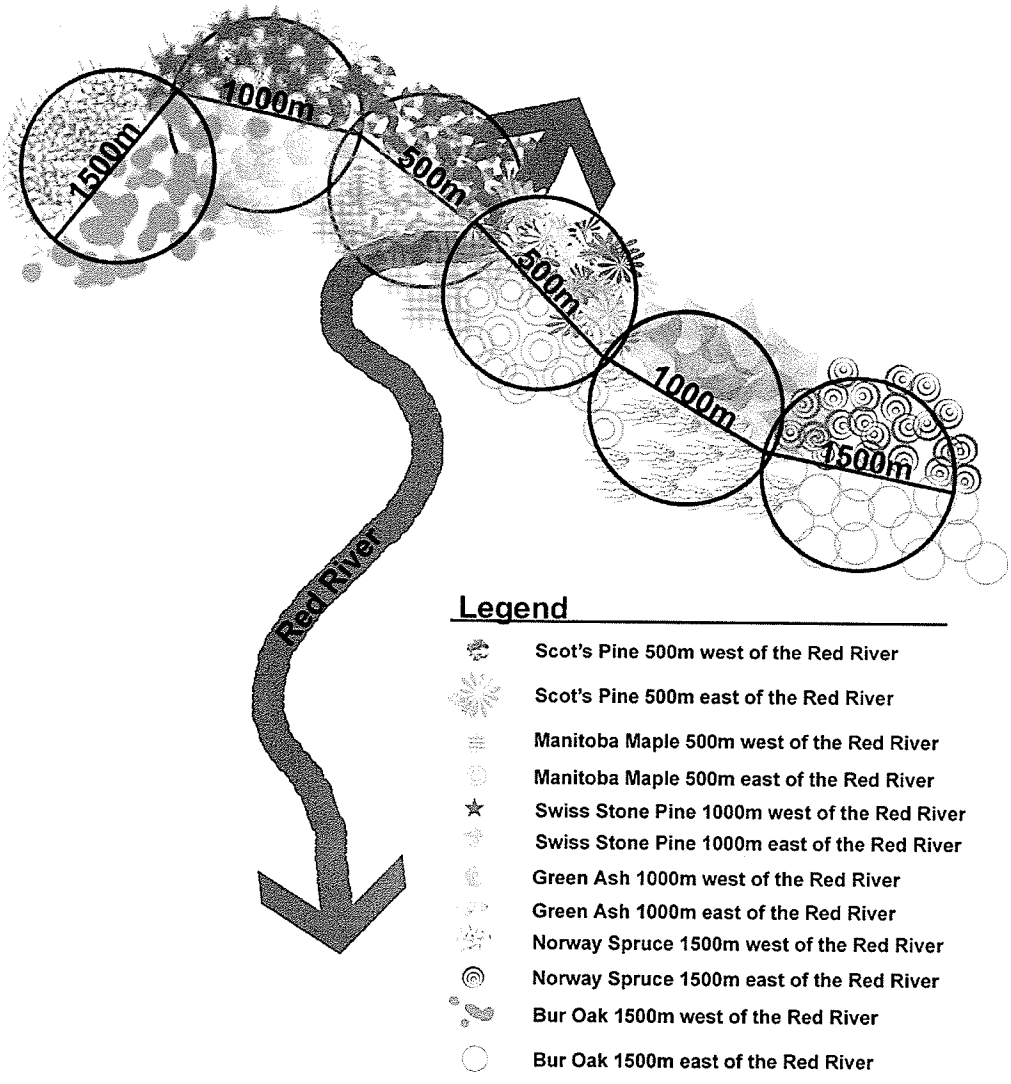


Figure 29. Conceptual diagram illustrating the use of different species of vegetation as a means of wayfinding throughout the Greenway

Planting additional trees throughout the Greenway will absorb greenhouse gases reducing the total amount of carbon dioxide left in the atmosphere, protect waterways through absorption of storm run-off, reduce the urban island heat effect by shading buildings and paved surfaces, and create recreation areas and homes to users such as animals and people and occupants such as diverse plants.

In addition to planting additional trees throughout the Greenway, residents can "take action on climate change" by participating in the One Tonne Challenge. The Government of Canada has "dared" all people living in Canada to take the One Tonne Challenge. The government guarantees that anyone who participates in this challenge will use less energy, save money, improve air quality, and protect our environment. The One Tonne Challenge is not a designed element, but rather a catalyst for residents to participate in their community and a chance to better the environment and space they live in (for further information about the One Tonne Challenge please refer to the website <www.climatechange.gc.ca/onetonne/english/index.asp>).

The second designed element is a pedestrian crossing at Henderson Highway that connects Bunn's Creek Greenway to the Red River. This pedestrian crossing is illustrated in Section A (see Figure 28 and 30). Section A illustrates various uses of this greenway. Two pathways, a pedestrian and a bicycle route, provide pedestrians and cyclists with the opportunity to move through this space. The pedestrian and bicycle pathways have been designed with versatility in mind. The pedestrian pathway is a softer surface such as crushed gravel or wood chips and the bicycle pathway is a harder surface such as asphalt or paving stones. For example, pedestrians who are rollerblading, pushing strollers, or jogging may require a harder surface and can use the slower lane of the bicycle pathway dedicated for this use. The pedestrian pathway will be a softer surface when separated from the bicycle pathway and when the two pathways converge the

Section A

Section A-A

Figure 30

pedestrian pathway will be a lane dedicated to pedestrians only. Using separate pathways whenever possible and dedicating specific lanes to specific use will help to prevent collisions between the different greenway users. Certain areas of the greenway will only permit one pathway that must be used by all. The pathway in these areas will have multiple lanes and will accommodate multiple uses such as cycling, walking, jogging, rollerblading, and skateboarding. The picnic areas provide an alternative opportunity to stop and use the space. For example, as a cyclist I would follow the bicycle pathway approaching Henderson Highway on the east side. As I approach Henderson I notice that motorists are slowing down and merging into the centre lane while the outside lane transitions into a pedestrian platform. I dismount from my bicycle and walk it across Henderson Highway. As I walk across Henderson Highway I notice the asphalt has changed into red and gray pavers and the distance I have to cross is two lanes rather than four lanes. The pavers and the pinching of two lanes increases both my safety because I am crossing two rather than four lanes, and the texture of the pavers slows traffic down before it reaches the pedestrian crossing. I reach the pedestrian platform on the west side of Henderson Highway and mount my bicycle heading towards the Red River. I stop in the picnic area to rest for a while before crossing the river. The pedestrian bridge links the east bank of the Red River to the west bank. This connection is strong for cyclists and pedestrians because the bridge is designed for their safety and visual experiences looking out onto the Red River. I eventually arrive at my friend's house, my destination, but I have also experienced a part of Winnipeg the way I have chosen to experience it. Section A (see Figure 30) illustrates pedestrian, cyclist, and motorist connections approaching and crossing a major roadway, such as Henderson Highway.

In order to illustrate how the Greenway can be connected across different types of roads (major

arterials, minor arterials, and residential streets) and how users will traverse throughout the Greenway, I have accompanied Section A (see Figure 30) with two additional sections, Section B (see Figure 31) and Section C (see Figure 32). The second pedestrian crossing is illustrated in Section B (see Figure 28 and 31). The location of Section B is along Main Street approaching the Riverbend suburban community. Both a bicycle and pedestrian pathway allow pedestrians and cyclists to move through this space. The community centre and shopping plaza on the east side of Main Street and the residential units on the west side of Main Street are destination points. As a pedestrian leaving my house to go to the grocery store along Main Street I would walk along the pedestrian pathway towards Main Street. As I approach Main Street I notice the bicycle pathway that runs down the median separating one lane of traffic on either side of the median. The median segregates traffic and increases the level of safety for cyclists using this part of Main Street. I cross Main Street and continue towards the grocery store arriving at my destination. Section B (see Figure 31) illustrates pedestrian, cyclist, and motorist connections between residential units and destination points, such as grocery stores.

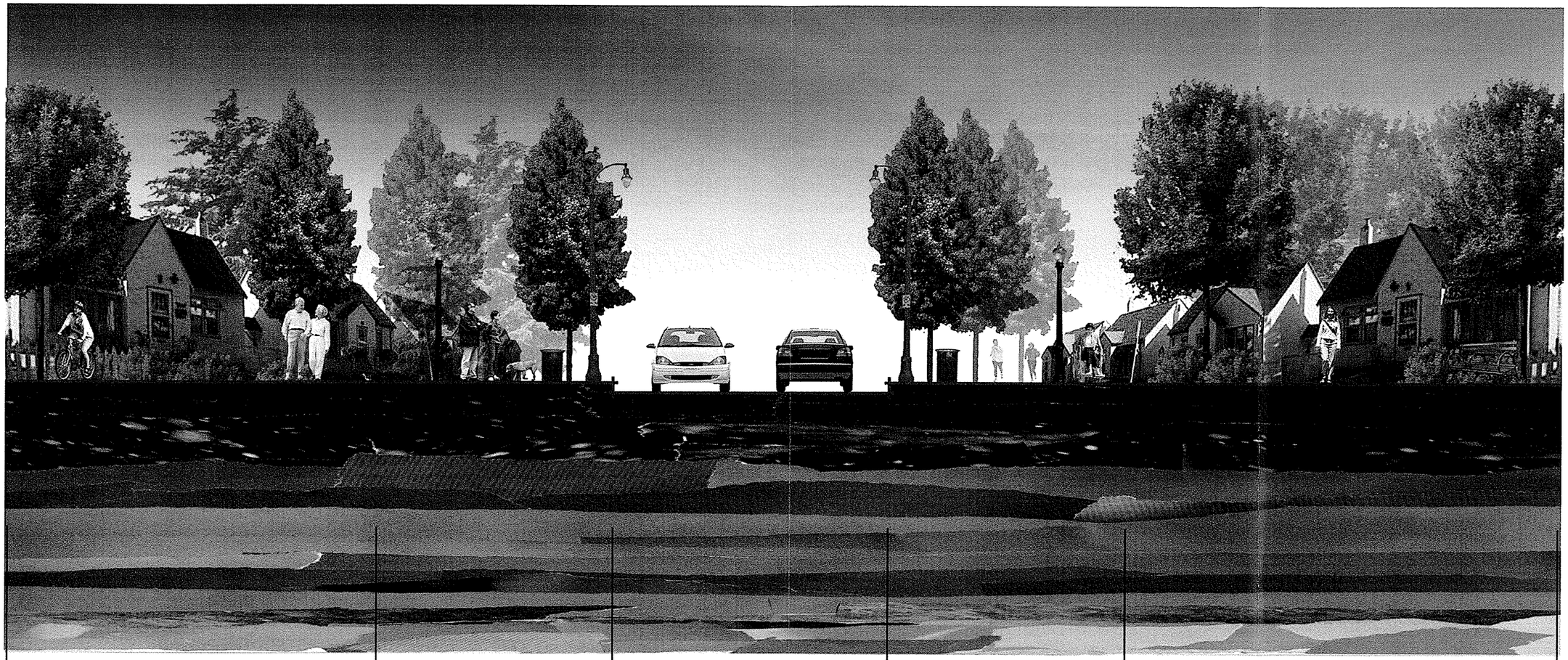
The third pedestrian crossing is illustrated in Section C (see Figure 28 and 32). The location of Section C is along Foxdale Avenue, a local street off of Rothesay Street. Pedestrian pathways follow the north and southsides of Foxdale Avenue and the bicycle pathway is located north of Foxdale Avenue closer to Bunn's Creek. As a pedestrian jogging through this space I choose to head south towards Foxdale Avenue from Bunn's Creek. I merge onto the pedestrian pathway along Foxdale Avenue and immediately notice the houses are setback from the local street with a vegetation buffer between me and the street. I am focused on the character of the residential units and vegetation that surrounds me as I jog through this space. I continue along this pathway east towards the Bunn's Creek Centennial Park where the bicycle pathway converges with the

Section B

Section B-B

Figure 31

Section C



Section C-C

Figure 32

pedestrian pathway. I know I am approximately 1000 m away from the Red River because I have just entered the third interval of dominant vegetation indicated by Bur Oak *(Quercus macrocarpa)* and Norway Spruce *(Picea abies)*. Section C (see Figure 32) illustrates pedestrian, cyclist, and motorist connections along a local street, such as Foxdale Avenue. All three pedestrian crossings are part of a larger network that have been connected to each other using vegetation, pedestrian pathways, trails, sidewalks, bridges, crossings, cycleways, and wildlife corridors.

The third designed element I have used to reinforce the strength of where the Bunn's Creek Greenway meets the Red River is a pedestrian bridge crossing (see Figure 28). The pedestrian bridge I am proposing will connect the east and west banks of the Red River. This bridge will provide users with an additional way to cross the river. Users of the greenway can cross the Red River when the river is frozen and should the City of Winnipeg provide waterbus service to this area, users would also be able to take advantage of traveling along the river by boat. Boating docks would also have to be built along the river in order to extend the waterbus service to this area. Waterbus service will provide an alternative to cross and travel along the Red River and expand upon the existing public transportation in this area. A pedestrian bridge would provide users with a third alternative to cross the Red River. It has been proven that the process of developing a pedestrian bridge engages citizens to get involved in their communities' development. The citizens involved in the planning of the Provencher Pedestrian Bridge received a prestigious award from the International City/County Management Association for their volunteer work on

this bridge. Residents of Winnipeg wanted to be a part of strengthening the connection between the Forks and the St. Boniface French Quarter (The City of Winnipeg Public Works). Past public participation in development projects is indication that residents will also want to be a part of strengthening the connection between communities in River East, Riverbend, and Riverdale. Residents can volunteer to work on a local project, the Pedestrian Bridge, which is part of the larger network, the Greenway.

In addition to connecting larger open spaces, connecting smaller open spaces also needed to be explored. Examining connections at two scales is a process that will bring diversity, variations, and completion to the greenway design. Connections are found at different scales. Therefore, finding connections at larger and smaller scales and finding ways to link these spaces together is part of my design for this greenway. Similar to the Vancouver Greenways Plan, I have proposed a two tiered Greenway system where the City Greenway will be connected to smaller Community Greenways. These Community Greenways will be initiated by the residents in local communities and will explore the different socio-cultural backgrounds found throughout the City of Winnipeg. Residents will be encouraged to get involved in greenway projects happening in their communities. These projects can be promoted and organized through community groups, clubs, and newsletters. Residents who are interested in a particular project can volunteer their time and resources. Through research and citizen involvement, each community greenway project will express the historical

significance of the area being developed and the socio-cultural backgrounds of the peoples living in this area.

The Community Greenways I have proposed for the site design are illustrated in Figure 28 by a layer of multiple colours that represents several community greenway projects that will be connected to a larger network, the City Greenway. Each Community Greenway will be unlike any other Community Greenway because local residents will incorporate elements into their Community Greenway that are reminiscent of the dominant culture and history of their community within the City of Winnipeg (see Figure 33).

An example of a Community Greenway Project that is currently in construction is the Millennium Gardens located east of Henderson Highway where Chief Peguis Trail merges with Henderson Highway (see Figure 2). These gardens were designed by local residents and contain elements that are unique to their cultures and the historical background of this area. For example, a resident I met and who is a retired horticulturalist helped to design, in collaboration with other senior residents, various planting boxes suitable to their physical needs as elderly people. The boxes range in size and height and in the type of vegetation they hold. Some of the boxes were planted with vegetables and others with flowers and herbs. These planting boxes are rotated yearly and maintained by local residents of all ages.

Community Greenway

Illustration of a Community Greenway

Figure 33

In addition to planting boxes, this local community has also found the history of the area an important aspect of their Community Greenway. In June 2003, the Millennium Gardens Community Board was in the process of hiring an artist to help design and paint the gazebo and garden shed to reflect the historical background of their community (see Figure 34). One of the most important requests the residents had regarding this process was that they be allowed to participate in the painting of the gazebo and garden shed. At a Community Board meeting I attended, the residents were adamant that they be included in the painting of the gazebo and the garden shed. They felt a strong connection to the history of the area where they grew up and lived for many years and wanted to be a part of the memory making stage.

Figure 34. Gazebo and garden shed at the Millennium Gardens

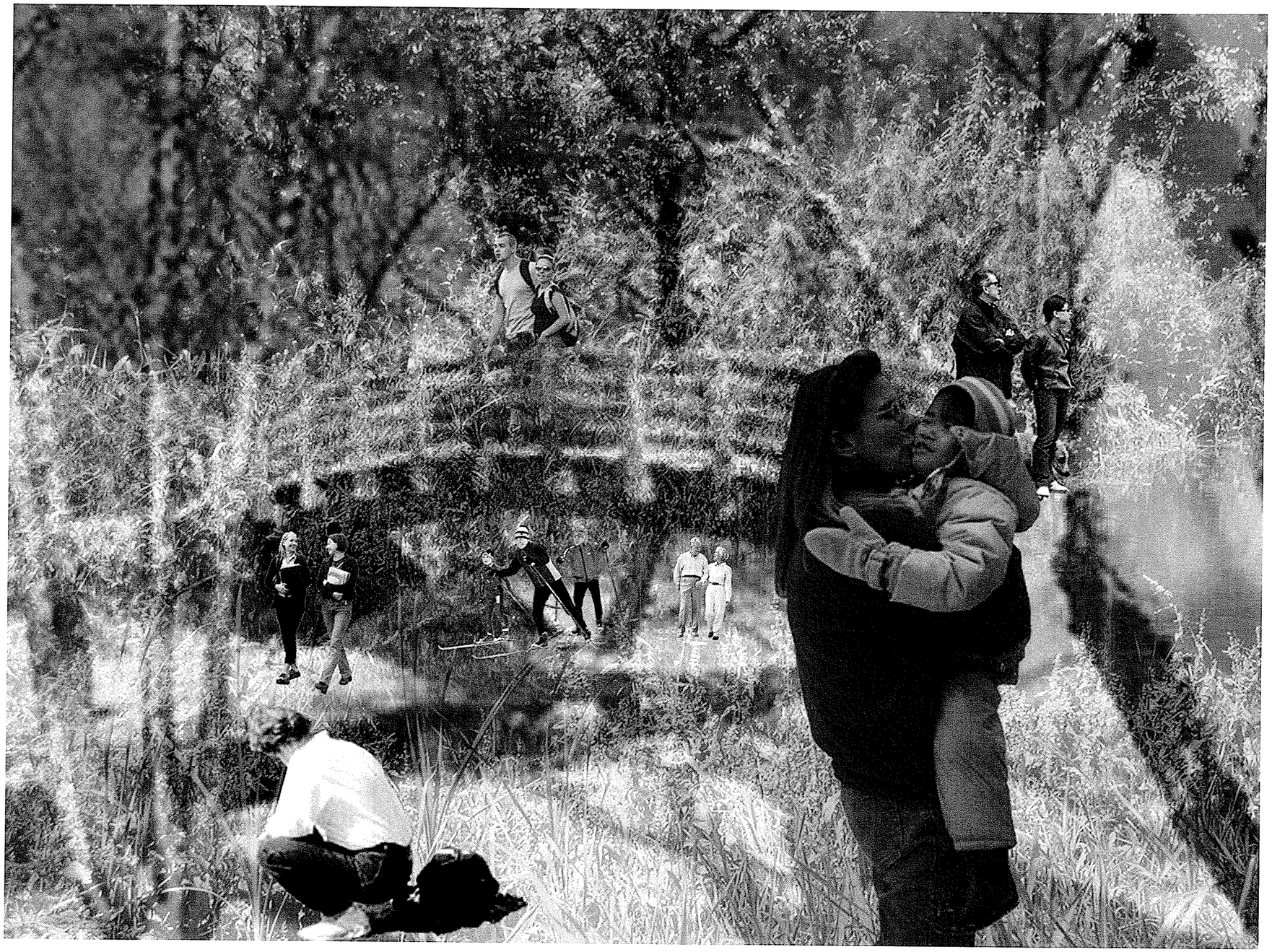
When I talk about Winnipeg one of the strongest memories I have of growing up

is the changing of the seasons, with one particular season that stands out in my mind and that is winter. Winter was always an important time of year because my family, friends, and I were always enjoying outdoor activities such as skating, cross country skiing, and tobogganing. As a result of these memories I wanted the design of this Greenway to reflect the celebration of seasonal changes in Winnipeg. Figure 35, a view from the east bank of the Red River, illustrates how the frozen river can be used as a connection during the winter season. Figure 36, a proposed pedestrian bridge at Bunn's Creek, illustrates the dynamic of two contrasting seasons, winter and summer, and how seasonal changes do not have to interrupt connections and limit the choices residents can make when using the Greenway. A pedestrian bridge provides a connection along Bunn's Creek during the summer season when the water is not frozen. During the winter season Bunn's Creek becomes frozen providing another connection in addition to the pedestrian bridge.

View from the Eastbank of the Red River

Figure 35

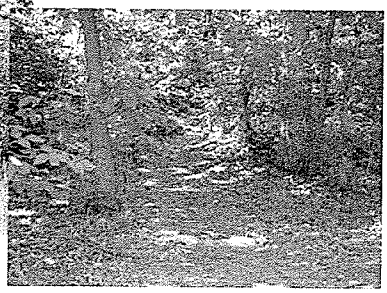
Pedestrian Bridge at Bunn's Creek

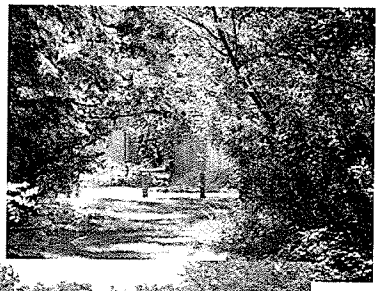


Perspective 2

Figure 36

Conclusion





6. Conclusion

The goal and objectives have been addressed and met in the completion of my practicum. The macro and micro site design will be used as a prototype to continue the Greenway throughout Winnipeg.

I was asked an intriguing question at my Final Practicum Presentation December 3, 2004. The question was if your Greenway Design was to be implemented what lessons would others be able to learn from your precedent example? I answered that there are three lessons I would like others to learn from my design example and they are:

1. The Red River is a strong connection for the entire design. The design starts and ends with the Red River. The Red River creates a foundation because it is a common landscape feature throughout my Greenway Design.
2. The design has a two tiered approach. The City Greenways make larger connections and smaller connections are made by local communities as they connect their Residential Greenways to the larger City Greenways
3. The use of vegetation throughout the Greenway to anchor the strongest connection, the Red River. The intervals of vegetation become a place and time marker allowing users to navigate throughout the Greenway in relation to the Red River.

The Greenway I have designed for the City of Winnipeg is a circuit of connections providing spaces that are rewarding, delightful, and necessary to all users, pedestrians, cyclists, motorists, and wildlife. I have proposed design strategies that address the three environmental issues outlined in the methodology and inventory chapter of this practicum. The tool I used to derive these design strategies is the Environmental Quality Target Concept. I adapted this tool from Thomas Votsmeier's Environmental Quality Targets in the City of Wiesbaden. I used the same structure that Thomas Votsmeier used for the City of Wiesbaden, but I adapted the Environmental Quality Targets to represent the City of Winnipeg. The concept is a five level process that identifies a vision for a sustainable Winnipeg, details Winnipeg's vision and philosophy by separating 'environment' into various segments, defines Winnipeg's quality targets and standards for various environmental segments, establishes avoidance and minimisation targets, and derives measures and instruments for the City of Winnipeg to reach their targets. These design strategies are the measures and instruments I have derived for the City of Winnipeg to meet their targets. I then used these design strategies to design a continuous greenway that would meet the City of Winnipeg's targets.

The first design strategy that I will discuss is the use of vegetation, which addresses all three environmental issues, Urban Climate Change, Urban Forest Management, and Water Quality.

The use of vegetation is an effective biofilter. More specifically, by using large trees throughout the Greenway carbon dioxide from greenhouse gas emissions will be absorbed leaving less carbon dioxide in the atmosphere. For those that are willing to walk, cycle, skateboard, or rollerblade, a continuous greenway with pedestrian pathways, cycleways, trails, bridges, and crossings will provide an alternative to driving. In return, cutting greenhouse gas emissions will also reduce the total amount of carbon dioxide left in the atmosphere.

The addition of vegetation such as large trees to the urban forest will not only contribute to the slowing of global warming and aid in the absorption of carbon dioxide, but will also protect waterways by absorbing storm run-off, provide recreation areas and homes to animals and people and reduce the urban heat island effect. The use of different species of vegetation creates a means of wayfinding throughout the greenway. This adds value to both the environment and the experience of the users of the Greenway.

The quality of waterways in Winnipeg such as the Red River and Bunn's Creek has been compromised by surface run-off. Uncontrolled surface run-off contains pollutants such as phosphorus and nitrogen contaminating these waterways and harming breeding grounds, nurseries, food sources, shelter, and hiding places for small mammals, birds, and insects. The creation of greenways allows for the reintroduction of native plant species that trap and absorb these harmful pollutants, making the shorelines along waterways such as the Red River and

Bunn's Creek effective natural filters and buffer zones.

The second design strategy that I will discuss is the connections found both at the city and community level. I have proposed the connection of larger open spaces at the city level to smaller open spaces at the community level through the use of vegetation, pedestrian pathways, cycleways, trails, bridges, and crossings. Residents will be encouraged to get involved in the planning, design, and development of greenways within their own communities. Community involvement presents an opportunity to educate residents about the issues discussed in Chapter Two with respect to Winnipeg's changing climate, urban forest, and water quality. For example, community meetings and forums can be used as a medium to educate residents about how native plant species act as a natural filter that absorbs greenhouse gas emissions such as carbon dioxide, traps pollutants such as phosphorus and nitrogen along Winnipeg's waterways, slows global warming, and reduces the urban island heat effect. Upon completion of the community greenways, local residents will possess a sense of pride for their community and city.

In conclusion, I have also envisioned the implementation of this Greenway design by examining the lessons I would like others to gather from this design as a precedent example. The connections were lost, but through design I have rediscovered them.

7. Literature Cited

Breuste, J., H. Feldmann, and O. Uhlmann, ed. *Urban Ecology.* Berlin: Springer, 1998.

City of Vancouver, Engineering Services. *"Vancouver Greenways Program."* June 2005 <http:www.city.vancouver.bc.ca/engsvcs/streets/greenways/>.

Cunningham, William P., Barbara Woodworth Saigo. *Environmental Science: A Global Concern.* Chicago: Wm. C. Brown Publishers, 1997.

Dramstad, Wenche E., James D. Olson, and Richard T. T. Forman. *Landscape Ecology Principles in Landscape Architecture and Land-Use Planning.* Washington: Island Press, 1996.

Environment Canada. *"Ecoaction: A Community Funding Program."* January 2004 <http:www.ec.gc.ca/ecoaction/index_e.html>.

Fabos, Julius Gy., and Jack Ahern, ed. *Greenways: The Beginning of an International Movement.* Amsterdam: Elsevier Science B.V., 1995.

Government of Canada. *"One Tonne Challenge."* November 2005 <http:www.climatechange.gc.ca/onetonne/english/ >.

Harris, Charles W., and Nicholas T. Dines. *Time-Saver Standards for Landscape Architecture*. 2nd ed. New York: McGraw-Hill Publishing Company, 1998.

Knowles, Hugh. *Woody Ornamentals for the Prairies*. Edmonton: University of Alberta Faculty of Extension, 1995.

London County Council. *The County of London Plan*. 1943.

Manitoba Climate Change Task Force. *Manitoba and Climate Change Investing in our future*. Winnipeg: Manitoba Climate Change Task Force, 2001.

Manitoba Hydro. *Voluntary Challenge and Registry Program 2002 Update.* Winnipeg: Manitoba Hydro, 2002.

Marsh, William M. *Landscape Planning: Environmental Applications 3rd Ed.* New York: John Wiley & Sons, Inc., 1998.

Moriyama, Raymond. *The Meewasin Valley Project: 100 Year Conceptual Master Plan of the South Saskatchewan River Environment*. Toronto: Raymond Moriyama Architects and Planners, 1978.

Platt, Rutherford H., Rowan A. Rowntree, and Pamela C. Muick, ed. *The Ecological City: Preserving and Restoring Urban Biodiversity.* Amherst:

The University of Massachusetts Press, 1994.

Smith, Daniel S., and Paul Cawood Hellmund. *Ecology of Greenways.* Minneapolis: University of Minnesota Press, 1993.

Statistics Canada. *"Canadian Statistics, Motor Vehicle Registrations."* March 2005 <http:www.statcan.ca/English/pgdb/trade14b.htm>.

The City of Winnipeg Public Works. *"The Provencher Bridge."* March 2005 <www.winnipeg.ca/publicworks/engineering/provencherpedbridge.asp>.

The National Capital Commission. *The National Capital Commission: Greenbelt Master Plan.* 1996.

Turner, Tom. "Greenways, blueways, skyways and other ways to better London." *Landscape and Urban Planning* 33 (1995): 269, 270, 271, 272, 273, 275.

Walker, Melissa, ed. *Reading the Environment.* New York: W. W. Norton and Company, 1994.

Winnipeg Civic Environmental Committee. *"Environmental Issue Summaries: A Final Report."* June 2002 <http://www.winnipegcec.org/publications/index.html>.

---. *"Sustainable Winnipeg: A Comprehensive Environmental Strategy."* February 2004 <http://www.winnipegcec.org/publications/index.html>.

Vancouver City Council. *The Vancouver City Greenways Plan.* Vancouver: Vancouver City Council, 1995.

8. Literature Review

Altman, Irwin, and Ervin H. Zube, ed. "Public Places and Spaces." *Human Behavior and Environment: Advances in Theory and Research.* Volume 10. London: Plenum Press, 1989.

Balmori, Diana. "Public Space and Public Life: Designing a Public Life." *Modulus* 21 (1991) 84-95.

Barton, Hugh, ed. *Sustainable Communities: The Potential for Eco-Neighbourhoods.* London: Earthscan Publications Ltd., 2000.

Cullen, Gordon. *Townscape.* New York: Reinhold Publishing Corp., 1914.

Descombes, Georges. *Shifting Sites.* Giordano Tironi, ed. Roma: Gangemi editore, 1988.

Flink, Charles A., and Robert M. Searns. *Greenways: A Guide to Planning, Design, and Development.* Washington: Island Press, 1993.

Hillier, Bill. *Space is the Machine: A Configurational Theory of Architecture.* Cambridge: Cambridge University Press, 1996.

Hillier, Bill, and Julienne Hanson. *The Social Logic of Space.* Cambridge: Cambridge University Press, 1984.

Hopkins, Lewis D. *Urban Development: The Logic of Making Plans.* Washington: Island Press, 2001.

Hough, Michael. *City Form and Natural Processes: Towards a New Urban Vernacular.* London: Croom Helm, 1984.

---. *Out of Place: Restoring a Sense of Regional Identity to the Landscape.* New Haven: Yale University Press, 1990.

Jacobs, Allan B. *Great Streets.* London: MIT Press, 1993.

---. *Looking at Cities.* London: Harvard University Press, 1985.

Jacobs, Allan B., Elizabeth MacDonald, and Yodan Rofé. *The Boulevard Book:*

History, Evolution, Design of Multiway Boulevards. Cambridge: The MIT Press, 2002.

Jim August Consultants. *Rivers West Business Plan: The Voyageur Route: Where Manitoba's Past and Future Meet*. Winnipeg.

L'Orange, Gerry. *Trans Canada Trail: The 16,000 Kilometre Dream*. Erin: Boston Mills Press, 2000.

Nuttall, Dan. *Landscape Ecology Lecture Notes*. Winnipeg, 2002.

Seine River Task Force. *Seine River Greenway Study*. Winnipeg, 2000.

The International Institute for the Urban Environment. *The Ecological Footprint of Cities: A Series of Public Debates.* Amsterdam: Theatre de Balie, 1997.

The Landplan Collaborative Ltd. *Ontario Waterfront Experiences*. Guelph: Canadian Cataloguing in Publication Data, 1995.

The Province of British Columbia. *Community Greenways: Linking Communities to Country, and People to Nature*. B.C.: Lanarc Consultants Ltd., 1995.

Tolley, Rodney, ed. *The Greening of Urban Transport: Planning for Walking and*

Cycling in Western Cities. 2nd Ed. New York: John Wiley & Sons, 1997.

Turner, Tom. *City as Landscape: A Postmodern View of Design and Planning*. London: E & FN Spon, 1996.

---. *Landscape Planning*. New York: Nichols Publishing Company, 1987.

Warren, Roxanne. *The Urban Oasis: Guideways and Greenways in the Human Environment*. New York: McGraw-Hill, 1998.

Whiston, Anne S. *The Granite Garden: Urban Nature and Human Design*. U.S.A.: Basicbooks, 1984.

Zegarac, Mike. *An Analysis of the Effects of Greenspaces on Residential Property Values: A Windsor Case Study*. Windsor.