

**Finding Their New Land:
Site Selection and Conceptual Design for an
Urban Farm for Newcomers in Winnipeg's Inner City**

by

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ABSTRACT

This project examines the potential for urban agriculture to address different barriers to settlement for newcomers (recent immigrants and refugees) living in Winnipeg's inner city. This project utilizes a geographical information systems (GIS) mapping analysis to identify underutilized parcels of land in Winnipeg's inner city that could be developed into suitable urban agriculture sites. A focus group has provided recommendations for site selection and the elements needed on the site. This information is incorporated into a conceptual site plan for one of the recommended sites, which addresses questions of how such a site could be implemented in a Canadian context. The practicum concludes with reflections on the project and directions for future research.

Key words: *Urban agriculture, Winnipeg, newcomer, refugee, farming, nutrition, food security, GIS, mapping, land use.*

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I Introduction

This chapter introduces the topic of urban agriculture for a newcomer population that is explored in this practicum. It begins with a background describing the situation of newcomers in Winnipeg's inner city, which is the study area examined in chapters 2 through 6, and how urban agriculture programs may support their settlement in a new country. The second section in this chapter introduces four key research questions that this practicum aims to address. The third section discusses the potential significance of the research.

I.I Background

Winnipeg's inner city is a census area composed of more than thirty neighbourhoods surrounding the central business area (see Figure 1). The area is home to 121,000 people; of these, more than thirty percent (31.7%) were born outside of Canada (versus 18.7% as a city-wide average) (Social Planning Counsel of Winnipeg, 2011). Nearly 8,000 people (6.6%) of the total inner-city population are recent immigrants or refugees (Statistics Canada, 2006).

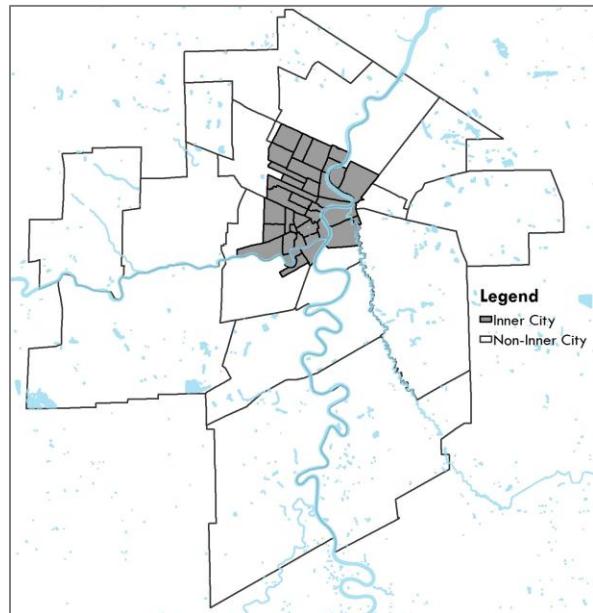


Figure 1: Winnipeg Neighbourhoods: Inner City (grey) and areas outside the inner city (Kroeker, 2017)

For the purposes of this practicum, new refugees and other recent immigrants will collectively be referred to as “newcomers.” According to the Winnipeg Regional Health Authority (WRHA), “It is important to consider using the term *newcomers* to distinguish between those immigrants who have been in Canada for a significant length of time, and those who may still be facing the more immediate challenges of adaptation and acculturation to meet their basic needs” (WRHA, 2010, p. 14). Unless stated otherwise, this project uses the definition of Statistics Canada’s “recent immigrants,” referring to people who arrived in Canada within the last five years, as an equivalent to the length of time a person may be considered as a “newcomer.”

In 2014, more than 85 per cent of the 14,600 newcomers to Manitoba settled in Winnipeg (Manitoba Labour and Immigration, 2014). According to a 2014 study by Food Matters Manitoba, a growing number of newcomers are living in Winnipeg’s North End and other parts of the inner city. “Over a five-year period between 2006 and 2011,” the study notes, “the recent Newcomer population in the North End more than doubled.” This growth “has occurred throughout the neighbourhood, with some census tracts now reporting recent immigrant populations higher than 15%. [...] While more recent data is not available, community workers interviewed in this project indicated that immigration numbers in the North End have remained high and it is likely that the Newcomer population is even larger than reported in the 2011 National Household Survey” (Food Matters Manitoba, 2014).

The difficulties of urban life are even greater for refugees who have come from rural environments. Many of the immigrants who settle in Manitoba each year are refugees who have come from Bhutan, Somalia, Myanmar, and the Democratic Republic

of Congo (Larios, 2013). The Food Matters Manitoba report (2014) highlights the growing population of newcomers in the inner city from Asian countries like the Philippines and from some of the African countries mentioned above. It also notes there is a decline in the number of newcomers from European or South American countries (Food Matters Manitoba, 2014, p. 4).

This means many refugees have come either directly from rural areas or from refugee camps. In one study of a refugee population who recently immigrated to Edmonton, none of the group had prior experience in an urban environment (Larios, 2013; Houston, 2005). Many of these newcomers are primarily moving into inner city areas because of housing availability and affordability in these locations (Statistics Canada, 2006). Newcomers with a lack of experience in urban environments can therefore struggle with achieving several “barriers to settlement” including food security, health, and a regular source of income (Carter, 2008).

The needs identified above can be (and are already being) addressed in several ways, including employment services, language training, counselling, and health care. Malabar and Grant’s 2010 report provides a summary of inner city organizations serving newcomers, from those working to provide short term hunger relief (like Winnipeg Harvest) to those working towards capacity-building community development, such as cooking programs provided by the North End Community Renewal Corporation (NECRC) and community gardens provided by various non-profit organizations in the inner city (Malabar and Grant, 2010; Gyepi-Garbrah et al., 2013).

In addition to the programs listed above, several additional organizations have recently started working to link Winnipeg's newcomer population to places where they can grow their own food. These organizations include the NorWest Co-Op Community Food Centre (CFC), the Immigrant and Refugee Community Organization of Manitoba (IRCOM) and the Immigrants Integration and Farming Worker Co-op (IIFC).

There is a natural fit between newcomers and support for urban agriculture. The Food and Agriculture Organization of the United Nations defines urban agriculture as "the growing of plants and the raising of animals within and around cities" (FAO, 2016). It therefore may include activities like gardening in a community garden, beekeeping, edible landscaping or growing vegetables for a livelihood on a Community Supported Agriculture (CSA) farm. April Philips, in her book entitled *Designing Urban Agriculture*, explains that "urban and peri-urban agriculture provides food products from different types of crops (grains, root crops, vegetables, mushrooms, fruits), animals (poultry, rabbits, goats, sheep, cattle, pigs, guinea pigs, fish, etc.) as well as non-food products (e.g. aromatic and medicinal herbs, ornamental plants, tree products)" (Philips, 2013, p. 48). According to the 2014 Food Matters Manitoba report, "Many newcomers arrive with food related skills and knowledge about cooking, food production and food preservation" (Food Matters Manitoba, 2014). Some have skills in "traditional food preparation methods" and others even have knowledge of farming. "Farming is not only a skill many participants brought with them from their countries, but was a way of life for some before coming to Canada—especially in the Karen [Myanmar] and Congolese communities" (Food Matters Manitoba, 2014). As mentioned above, these same groups have significant populations in Winnipeg's inner city.

This practicum builds upon the way newcomers' needs are being met through programs that use gardening and urban agriculture to improve access to healthy food by exploring one of the key recommendations about how to support newcomer farming initiatives in Winnipeg, as identified in a 2014 report. The report indicates the need to identify new land that could be used to help newcomer families to grow grains, vegetables, and fruit—giving them direct access to healthy food (Food Matters Manitoba, 2014, p. 16). This practicum helps to address this recommendation by undertaking i) a GIS mapping analysis of vacant and underutilized parcels of land in Winnipeg's inner city and ii) a conceptual site design that helps to identify further steps needed to implement urban agriculture projects in Winnipeg's inner city.

1.2 Research Questions

The following four research questions guide this practicum's examination of urban agriculture for refugees:

- 1) Can urban agriculture address some of the barriers to settlement faced by newcomer populations?
- 2) What is required to improve urban agriculture for newcomers in Winnipeg's inner city?
- 3) Is there land in Winnipeg's inner city that could fulfill the identified urban agriculture needs?
- 4) What planning and design considerations are necessary to implement and maintain a successful urban agricultural site in this context?

1.3 Significance of Research

The research project identifies sites that are suitable for urban agriculture in Winnipeg's inner city using a geographic information system (GIS). No full "vacant land inventory" of this kind has been done in Winnipeg, even though similar studies have taken place in Portland, Vancouver, Seattle, Cleveland, Detroit, Toronto, Chicago, New York (McClintock et. al, 2013; Mendes, 2008; Ackerman, 2011). The findings of the analysis could be a significant contribution in themselves, as site suitability studies of this kind have been used to encourage policy and planning change regarding urban agriculture in cities like Portland (Mendes, 2008).

Secondly, this study is expected to assist to Winnipeg's newcomer community and organizations working with immigration and food security to improve urban agriculture for newcomers in Winnipeg. The non-profit food security organization Food Matters Manitoba has expressed interest in the development of this project's GIS maps. Government policy makers may also be interested in a community economic development-based approach to counteracting food security issues.

This practicum is organized in six chapters. The following chapter presents a review of the literature. The third chapter includes research findings from the focus group and follow-up questionnaire. The fourth chapter contains the land suitability study. The fifth chapter describes the process for the conceptual site design. The sixth chapter includes a summary of the findings and recommendations for future research.

2 Literature Review

2.1 Introduction

This literature review offers a detailed summary of articles, reports, and studies related to urban agriculture for a newcomer population. A literature review provides a summary of research from a variety of different situations and locations, which informs the new research that is undertaken in the context of this practicum. The literature review includes three sections. The first section outlines the barriers to settlement for newcomers in Winnipeg's inner city. The second section explores how urban agriculture could be used to address some of these settlement barriers. The chapter will close with a summary of the research findings.

2.2 Newcomers in Winnipeg's Inner City

This section examines how urban agriculture aims to address the three barriers to settlement for newcomers living in Winnipeg's inner city identified in a 2008 report: food security, health, and a regular source of income (Carter, 2008). The three barriers are examined in more detail in the following three subsections.

2.2.1 Income and Food Security Challenges

“The biggest barrier to settlement,” according to a focus group study of recent refugees in Winnipeg, is a newcomer’s “inability to gain employment” (Carter, 2008, p. 20). Newcomers in Carter’s study provided the following reasons for their difficulty in finding employment: strong accents or challenges with the English language, no Canadian work experiences or employment references, their refugee claimant status, and even

“discrimination in the hiring process” (Carter, 2008, p. 20). This problem is especially important for refugees, who “have not had an opportunity to learn English before they arrive, so they must do this while also learning new cultural norms, Canadian laws, and how to navigate the social services available to them” (Food Matters Manitoba, 2014).

To complicate matters, a newcomer’s chances for finding employment in Winnipeg’s inner city are less than they would be in other parts of the city. Like many Canadian city centres—where the wealthiest members left for the suburbs during the middle of the 20th century—these Winnipeg inner city neighbourhoods have higher levels of unemployment (8.1% versus 5.4%) and a lower median household income (\$37,725 versus \$64,691) than the neighbourhoods outside the inner city (Statistics Canada, 2011). Not surprisingly, it is challenging for newcomers to succeed in this unfamiliar environment. In fact, the median household income for recent immigrants in the inner city is only \$17,504, while their unemployment rate is 9.8% (Statistics Canada, 2011).

Life for a newcomer can become desperate when money is scarce due to expenditures or unemployment. In these situations, people can lose *food security*, or the certainty they will be able to provide food for themselves and their households (Magoon, 2005). The phrase “food security” is most easily defined by examining its reverse situation: food insecurity. De la Salle and Holland (2010, p. 95) describe food insecurity as the “limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways.” The Canadian Community Health Survey (2011) finds that newcomers to Canada are

almost two times as likely (12.6%, compared to 7.5%) to experience food insecurity as people born in the country (Statistics Canada, 2011).

According to the 2014 report by Food Matters Manitoba, some newcomers “are living in poverty and are forced to used food banks, where the food is often not culturally acceptable, familiar, or even nutritious. [Others] stated that late social assistance payments sometimes resulted in running out of food,” (Food Matters Manitoba, 2014, p. 6). Other barriers to newcomer food security outlined in Magoon’s 2005 study include the challenge of being forced to cook with different foods than those available in the newcomer’s country of origin, as well as the cost of fresh fruits and vegetables (compared to junk food).

The cost and availability of nutritious food is particularly challenging in Winnipeg’s inner city. According to a 2010 food assessment report, which surveyed five corner stores in the Point Douglas neighbourhood, apples cost 75% more than they did in a suburban Superstore. The price of cheese was 70% higher, whereas beef and chicken were both more than 40% more expensive. “Overall,” the report finds, “if one purchased each of the items in this food survey, they would pay 49% more for their groceries [than at Superstore]. This is significant, when the transportation demographics of the North End [which is within the boundaries of the inner city] are considered. It is estimated that people will not walk more than a few blocks” (Malabar and Grant, 2010, p. 18). Any problems with food security also have a ripple effect on other aspects of human well-being, increasing “the risk of poor health outcomes, including chronic disease and mental health issues” (Food Matters Manitoba, 2014, p. 3).

2.2.2 Health and Social Challenges

Newcomers, who may experience challenges finding employment and food security, are particularly vulnerable to health issues and social challenges. Most obviously are the consequences of hunger or poor nutrition. Health officials in Magoon's research on newcomers expressed concern that the poor nutrition of newcomer populations would lead to "obesity, diabetes, and dental health concerns" (Magoon, 2005, p. 35).

The potential mental health problems experienced by newcomers are also notable. Several recent refugees in Carter's study said life in Canada shortly after they arrived was so difficult they experienced prolonged anxiety and even clinical depression (Carter, 2008, p. 22). Some found life in Winnipeg so difficult in their first few years that "they would have returned to their country of origin if they could have, despite any threats to their lives" (Carter, 2008, p. 22). These characterizations coincide with findings by Dunn and Dyck (2000) and Newbold and Danforth (2003), who find that newcomers, even those who leave situations in war-torn countries or refugee camps, actually experience a significant decrease in health during their first few years in Canada. They discovered the people most vulnerable to health risks are "individuals with lower levels of education and income, and those who are not in the labor force or are older" (Newbold and Danforth, 2003, p. 1192). Unfortunately, many newcomers living in Winnipeg's inner city often meet several of these risk factors at the same time.

2.3 Urban Agriculture

As described in the introduction, one of the ways to address the challenges faced by newcomers is by giving newcomers access to spaces where they can participate in

urban agriculture. Lim and Liu, in their 2010 book, *Smartcities + Eco-warriors*, write, “Urban agriculture would result in food immediacy within cities, providing nutrition and health benefits. It would create job opportunities, generate income for urban poverty groups and provide a social safety net. Urban organic waste would be turned into an agricultural resource. Social inclusion of disadvantaged groups and community development would be facilitated, and the city would benefit from urban greening and the maintenance of green open spaces” (Lim & Liu, 2010, p. 16). In the following sections, these claims will be examined in detail to assess the potential benefits urban agriculture could provide for newcomers in Winnipeg’s inner city.

2.3.1 Income and Cost-Saving Opportunities through Urban Agriculture

The first benefit of urban agriculture is contributing to food security and providing a source of income. Although less prevalent in Canada and the United States, urban agriculture is an essential source of food and income for people in many cities around the world. Urban agriculture could be particularly beneficial for newcomers with a farming background who are struggling to find other forms of employment. According to a study published in *Food Policy* journal by Alberto Zezza and Luca Taschiotti, “Urban agriculture can have a positive impact on household food security as it generates direct income for the household concerned as well as providing direct access to the food produced” (Zezza et al, 2010, p. 269). This strategy has been confirmed by recent studies, which have shown that once an urban agriculture project is established, it will help to provide income and food security for families involved in growing crops (Zezza et al, 2010; Van Veenhuizen, 2006).

Income-generating urban farming opportunities are currently operating in Vancouver, in Malawi, in Mexico City—indeed, “in nearly every major city in the world” (FAO, 2008; Mendes, 2008; Mkwambisi et al, 2011). According to the United Nations Development Programme, as of 1996, an estimated “800 million people are engaged in urban and peri-urban agriculture world-wide. Of these, 200 million are market producers, employing 150 million people full-time” (Baudoin and Descher, 2008, p. 22). In *Agropolis*, Luc Mougeot analyzes survey data from 24 cities from different countries in the world. He found that urban agriculture “represents a sizeable source of employment and income” for people in these cities (Mougeot, 2005, p. 8). For example, in Shanghai, China (in the year 1997), there were 2.7 million farmers, which made up more than 30 percent (31.8%) of the overall workforce. Even in a city like London, England, there were 30,000 garden allotment holders, 3,000 jobs in urban agriculture, and 1,000 bee-keepers (Mougeot, 2005, p. 8). In many countries, Mougeot finds, “Incomes and wages from UA [urban agriculture] tend to compare favourably with those of unskilled construction workers. They are often larger than those of mid-level civil servants (Tanzania, Cuba). [...] Selling some of the harvest generates income that can subsequently be used to meet other basic needs, such as schooling for children” (Mougeot, 2005, p. 8).

In Mkwambisi, Fraser, and Dougill’s study, entitled “Urban agriculture and poverty reduction: evaluating how food production in cities contributes to food security, employment and income in Malawi,” they interviewed urban farmers in the Malawian cities of Lilongwe and Blantyre to find out the effects of urban agriculture on income. Their study finds, “On average, the households could support themselves

entirely on the food they produce on urban agricultural plots” (Mkwambisi et al, 2011, p. 187). The study also indicated that there was a significant indirect benefit of employment through urban agriculture in Malawi. “Results show that 17 percent of all households interviewed had worked for a wage on some sort of urban agriculture enterprise during the 2004/2005 agricultural year. This makes urban agriculture the second most important source of income of all households surveyed after formal employment” (Mkwambisi et al, 2011, p. 192). Furthermore, urban agriculture was used as a source of paid employment for more than half (55.2%) of female-headed households and more than two-fifths (42.5%) of low-income households interviewed (p. 192).

However, the benefits of urban agriculture differed depending upon the income of the farmers. Wealthier households headed by males obtained “significantly larger harvests than the poorer, less educated and female-headed households . . . which only harvested 68 kg/capita [of cereal] from urban agriculture, which is considerably below what they would need to survive, while high-income households harvested 306 kg/capita from their plots” (p. 187). Therefore, the people who could have benefited the most from urban agriculture were the unfortunately the ones who produced the least.

Mkwambisi et al attribute this disparity in harvests to the fact that higher-income households had better farming tools and access to larger farming plots (p. 188).

Although the main urban agriculture crop in Malawi was maize (corn), which may not be a main crop grown in inner city Winnipeg, the example provides an important lesson to the local urban agriculture context. That is, the quality of the equipment and the size of land available to grow crops will have a significant effect on the overall benefit of urban agriculture to a crop grower. The authors write, “Without government intervention,

market information and extension services, urban agriculture consistently underperforms relative to its potential. Another problem was that the poor also lacked storage facilities and space for their produce, forcing them to sell during harvesting time where prices were low due to over-supply" (Mkwambisi et al, 2011, p. 196).

This reliance on "government intervention" to provide funding support for urban agriculture operations is a particular barrier to newcomers interested in farming. In North America, it is challenging for any prospective urban farmer, let alone a newcomer, to get loans necessary to purchase the equipment or land necessary to grow crops. In his book, *Nowtopia*, Chris Carlsson writes, "Urban gardens need nurturance from cheap land costs and/or grants and donations from private foundations or government agencies," (Carlsson, 2008, p. 104). However, acquiring this land or grants is a challenge in North America. The Ontario urban agriculture report says, "Interviewees cited financial institutions' reluctance to provide loans to those interested in starting a farm business within Ontario as a barrier" (Janz, Dietrich-O'Connor, & Stewin, 2012, p. 10). The same study found "many lenders do not associate independent farms as being profitable enough to warrant the risk. The lack of existing farmland ownership and access to financial capital, paired with the challenges new farmers face in securing external funds, makes entering the agricultural business sector particularly difficult for newcomers to Canada" (Janz, Dietrich-O'Connor, & Stewin, 2012, p. 10). Indeed, without established programs that work towards giving newcomers the access to land and equipment, few newcomer urban agriculture operations are likely to overcome these barriers.

However, there are established strategies to address the financial challenges that urban farms encounter. In an article entitled “Financing Urban Agriculture,” Cabannes draws upon extensive research from 17 cities in Latin America, Asia and Africa to show that urban farms can survive and thrive if farmers receive initial help from subsidies and credit. Cabannes also offers innovative solutions to urban agriculture financing that could be applied to a North American context. Three of these key strategies include “diverting mainstream financial resources to urban agriculture,” creating “evolutionary loans,” and “the creation of community banks and the issuing of local and regional currencies, such as the Banco Palmas in Fortaleza and its local currency, the palma” (Cabannes, 2012). In addition to the ideas described above, micro-loans (including those available online through websites like kiva.org) are currently used to support many small agriculture operations in low and middle-income countries. This system has the potential to also work in a Canadian context for newcomer urban agriculture sites.

Despite the challenges of securing funding, there are several advantages that urban agriculture has over rural agriculture that can help get farmers or gardeners better income for their produce, as discussed by De la Salle and Holland. The first benefit is related to the shorter distance that produce grown in a city must travel before it reaches a market. “Shorter distances from the garden to the customer also allow just-in-time picking,” de la Salle and Holland write, “which makes it a lot easier to deliver enhanced flavour and freshness, which in turn helps urban farmers get good prices” (de la Salle & Holland, 2010, p. 166).

A second benefit is access to a bigger market. “For urban agriculturalists,” they continue, “customers are much closer and more plentiful than for country farmers. A

big market also has a better chance of including wealthy people who will pay more for local food for ethical and political reasons” (de la Salle & Holland, 2010, p. 166). This certainly applies in a city like Winnipeg, as evidenced by the success of multiple farmers’ markets around the city, including the St. Norbert Farmers’ Market, which sees “as many as 10,000 people browsing the market wares on a sunny Saturday” (St. Norbert Farmers’ Market, 2016). A report by the Food and Agriculture Organization of the United Nations supports these findings. “Urban vegetable growers spend less on transport, packaging and storage, and can sell directly through street food stands and market stalls,” the report explains. “More income goes to them instead of middlemen” (FAO, 2016).

Farmers can earn income from urban agriculture through the sale of produce or through wages from employment at an existing farming operation. The sale of produce may be direct to consumers, such as through a farmers’ market or CSA (Community Supported Agriculture) system, or indirect, such as sales to restaurants or grocery stores. Both direct and indirect sales benefit from urban areas where the largest pool of potential customers is located. Access to this diverse group of people also gives farmers a market for specialty crops or “novelty products,” which can be sold at premium rates. De la Salle and Holland give the example of a farmer named Ward Teulon, who grows purple and white carrots in a rooftop garden. Teulon sells these specialty carrots at 50-cents each due to their unique appeal (de la Salle & Holland, 2010, p. 166). Bob Baloch, an immigrant from Pakistan who is one of the successful farmers involved in Ontario’s FarmStart program (described in more detail below), takes a similar approach to the production of specialty crops. Baloch grows specialty purple and red carrots which

cannot be found in other local stores (FarmStart, 2010). Newcomers living in Winnipeg with the knowledge and desire to grow specialty foods from their home countries can (and do) also profit by selling these foods in farmers' markets and shops.

In their *Plan Canada* article “Urban Farms in Canada,” Adin and Kurnicki (2014, p. 13) write, “Urban farming offers employment opportunities - 'green jobs' - often to lower income residents. For example, the SOLEfood Urban Farm (founded as an enterprising non-profit in Vancouver's Downtown Eastside) provides employment for this neighbourhood's residents” (Adin & Kurnicki, 2014, p. 13). There are significant economic results from these initiatives. “Studies have found that every \$1 invested in community gardens yields \$6 worth of vegetables. The average median yield for a community garden plot is \$200 to \$500.”

These economic benefits are consistent with an American example detailed in Patricia Hynes’ book, *A Patch of Eden: America’s Inner-City Gardens*. Hynes writes, “In 1989, thirty-two hundred volunteer master gardeners and composters in the USDA Urban Gardening Program worked with two hundred thousand low-income urban gardeners, the majority of whom were senior citizens and women of color. Together they produced \$22.8 million worth of produce - all with a budget of \$3.5 million!” (Hynes, 1996). In this case, every dollar invested in the program yielded more than six dollars of produce.

Even in situations where agriculture is not considered a main source of economic income, newcomers may still benefit from the economic savings that growing one's own food can provide. Michael Hough explains the cost-savings benefits of urban

agriculture in *Cities and Natural Process* (2004). He says, "The urban poor can spend 60 to 80 per cent of their income on food, so self-grown food can represent considerable savings on food expenditures ... Urban agriculture can create self-employment and income that can be a significant, but often uncertain contribution to household support" (p. 167).

Every item of food grown in a garden is one less item to purchase at a grocery store. The same is true when a person who grows food shares this food with other members in their community. One Winnipeg newcomer who grows vegetables at the Immigrants Integration and Farming Worker Co-op's (IIFC) Rainbow Garden confirms this practice. "I didn't have to buy tomatoes because we share," he says in an evaluation report on this garden. "All different people gardening share with you if you meet in the same place [sic]" (Food Matters Manitoba, 2013, p. 7). Growing food and sharing food may therefore help to improve food security for many members in tight-knit communities.

However, these success stories notwithstanding, urban agriculture should not be considered as a standalone fix to food insecurity problems. In a 2012 article entitled "Making Local Planning Work for Urban Agriculture in the North American Context," J. Thibert writes, "Despite the fact that UA [Urban Agriculture] now figures prominently in the North American food security debate, it is not considered to be a solution to food insecurity on a large scale. For instance, most of the community organizers and UA practitioners interviewed agreed that the potential contribution of UA to the nutrition of lower-income households is somewhat limited" (Thibert, 2012, p. 350).

Emily Rene Smith, in a thesis examining Somali Bantu refugees in Boise, Idaho's newcomer urban farming program, goes even further in questioning the economic assumptions behind such programs for newcomers. "Neoliberal principles were inherent to the Star Farm development project," she writes. "Its goals were to make refugees self-sufficient and personally responsible for their and their family's financial wellbeing, and to be market-oriented individuals. . ." (Smith, 2011, p. 67). She argues that these resettlement programs see newcomers, particularly those from poorer economic countries, as problems that need to be solved. These programs then go on to see the "solution" to these "problems" also in economic terms; if urban agriculture can provide newcomers enough income, then they will be effectively resettled and the problem solved.

Instead, Smith finds that "in practice, farmers did not seem to value the farm primarily as an economic integration tool. First, the year-end results of the farm revealed low individual earnings; second, my observations and interviews on the farm demonstrated that marketing the produce was often not a top priority. While refugee participants expressed that earning money from the farm was important, their actions and responses during interviews indicated that they had many reasons for participating, all of which were important" (Smith, 2011, p. 67). The following sections discuss some of these other important reasons for urban agriculture.

2.3.2 Health and Social Opportunities through Urban Agriculture

Some of the most important other benefits of urban agriculture are improvements to physical and mental health. Newcomers interviewed in the Winnipeg

study of the Rainbow Community Garden said, “Gardening is a way to get physical activity, meet neighbours, practice speaking English, and learn new skills” (Food Matters Manitoba, 2013, p. 31). The opportunity to meet neighbours and learn new skills is vital to overcoming the challenges of settling into life in a new country. With access to garden space, newcomers are also able to grow some of the foods from their home countries that are not readily available in Winnipeg stores. This helps to mitigate the challenges of finding new nutritional foods to eat.

In a 2010 report published in the journal *Food Policy*, Zizza and Tasciotti studied food surveys done in 15 countries to see if there was a correlation between urban agriculture and the dietary adequacy of the people who grow the food. They measured dietary adequacy by counting the different food groups and food items which farming households consumed in the timeframe set by the survey. They also analyzed kilocalorie intake in four countries where this detailed data was collected. Zizza and Tasciotti found “evidence that engagement in farming in urban areas is positively associated with greater dietary diversity in 10 out of 15 countries when it is measured using the dietary diversity score. ... These results provide a fairly robust confirmation ... that engagement in farming by urban households can allow them consuming better, more nutritious diets” (Zizza and Tescotti, 2010, p. 270).

These benefits are also documented in several more in-depth studies. One report by the Council for Agricultural Science and Technology (CAST) highlights multiple benefits of urban agriculture, which include “recreation and leisure; economic vitality and business entrepreneurship; individual health and well-being; community health and well-being; landscape beautification; and environmental restoration and

remediation” (Butler & Maronek, 2002). Another study, which examined the benefits of gardening on residents in Toronto’s Regent Park social housing complex, showed that the gardens gave residents “better access to food (an issue of particular importance for gardeners with low incomes), improved nutrition, increased physical activity and improved mental health” (Wakefield, Yeudall, Taron, Reynolds, & Skinner, 2007, p. 5). This study also highlighted the physical and mental health benefits for gardeners, particularly for those who are elderly. The gardens gave people a chance to interact with nature and to build important social connections to other people who were gardening. “People come together,” one interviewee in the report says about the garden; “It breaks isolation” (Wakefield, Yeudall, Taron, Reynolds, & Skinner, 2007, p. 7).

These were some of the same benefits described by the gardeners in the Boise, Idaho Global Gardens project (the same ones who experienced only limited economic success in their farming). Emily Smith’s research on the farm found “Somali Bantu experiences with the farm affirm that the farms were important community spaces, and the food produced from the farms was important for sustaining the community” (Smith, 2011, p. 70). Smith says her study in Idaho echoed the findings of a seminal study of newcomers and urban agriculture by authors Saldivar-Tanaka and Krasny, who examined Latino community gardens in New York City in an article entitled “Culturing Community Development, Neighbourhood Open Space and Civic Agriculture” (2004). This article found that the true value of urban agriculture is not found in revenue generated from farming, but instead from a farm’s ability to build community, to

promote social interaction and to establish cultural identity in a new land. (Saldivar-Tanaka & Krasny, 2004).

Similar findings have been seen on urban agriculture projects in a Canadian context. For example, a 2007 study in Edmonton, Alberta, also shows how urban agriculture benefitted newcomers there, particularly seniors. Findings from the study are published in an article by Mary Beckie and Eva Bogdan entitled “Planting roots: Urban agriculture for senior immigrants,” published in the *Journal of Agriculture, Food Systems, and Community Development*. The project involved a community-university initiative “to train and involve senior immigrants in Small Plot Intensive (SPIN)-Farming, a commercial approach to urban agriculture” (Beckie & Bogdan, 2010, p. 77). This study also recognized that “many senior immigrants living in Edmonton were known to come from rural and farming backgrounds” (Beckie & Bogdan, 2010, p. 79). The study interviewed the thirteen seniors who actively participated in this project by preparing, seeding, tending, and harvesting the gardening plots, under the guidance of a coordinator. Participants were able to take home as much produce as they wanted from the gardens. A surplus of food was harvested at the end of summer, which the seniors then sold at markets, earning \$1,000 (\$300 of this was made in one day of sales). Each senior took home an equal share of this income: around \$100. While the financial gains were not large, participants still found the experience valuable. One interviewee said, “This [project] is beautiful because all the different people come together and work together. That is first for me, then the vegetables to eat, and last money” (Beckie & Bogdan, 2010, pp. 80-81). Another newcomer senior involved in the project highlighted its benefits for mental health. The participant said, “This project, for me, is good,

because of the stress [at home]. At the garden I forget my problems” (Beckie & Bogdan, 2010, p. 84).

The benefits described in the Edmonton SPIN gardening project and the Toronto Regent Park reports echo the words shared by newcomer gardeners in Winnipeg studies. The newcomers in the Winnipeg study also cited that urban agriculture had a direct benefit for their mental health. “Sometimes I’m worried about everything here,” one gardener explained, “We are new here and have to think about how to do everything. But here, I can just garden” (Food Matters Manitoba, 2013, p. 7).

As mentioned, urban agriculture alone will not solve problems regarding newcomer employment, food security, or health issues. However, urban agriculture can address some of these common “barriers to settlement,” at least for those newcomers who choose to spend time in the garden.

2.4 Challenges to Urban Agriculture

If the identified benefits of urban agriculture are true, what is preventing more newcomers in Winnipeg’s inner city from participating in gardening? As mentioned above, organizations like IRCOM and IIFC have dedicated programs offering immigrants access to land for growing food. These programs are active and provide an essential service to the immigrant community. However, newcomers must overcome several barriers before they are able to grow food to feed their families: the climate, transportation, and finding land that is available for urban agriculture and free from contaminants.

2.4.1 Climate

Winnipeg's winter climate is one of the other major hurdles restricting newcomer urban agriculture in Canada. The Food Matters Manitoba study, "Exploring Food and Healthy Eating: A Study with Newcomers in Winnipeg's North End," (2014) reports that many newcomers struggle with "unfamiliarity with the Canadian climate and growing conditions [...] and a climate not favourable for cultivation of certain produce" (Food Matters Manitoba, 2014). Obviously, Winnipeg's winter makes it impossible to grow crops outside for several months of the year. With normal garden plots, people that rely on the food they grow during the summer to eat must find other ways to acquire food in the winter months.

However, urban agriculture technology could mitigate some of these challenges. In Montreal, for example, an urban agriculture company named Lufa is operating hydroponic greenhouses in both new greenhouses and old warehouses that have been adaptively reused to grow lettuce, tomatoes, eggplants and zucchinis year-round (Halais, 2014). The same technology is also being utilized in Manitoba. Neva Hydroponic Farms near the town of Landmark grows lettuce twelve months of the year in their two greenhouses, which total 12,000 square feet in size. Ultimately, the cost of building and maintaining these greenhouses is the most prohibitive factor to growing food year-round in Manitoba. This cost makes year-round gardening for newcomers in Winnipeg's inner city unlikely without significant government support.

However, many of the benefits of urban agriculture (identified in the subsections above) do not require a full-year growing season. In his book *Cities and Natural Process*,

Michael Hough creates his own experiment to estimate the potential benefits of urban agriculture by growing food in a garden in his Toronto-area backyard. Hough's garden produced much more food than he predicted. "Thus," he says, "it may be seen that even a tiny plot of land in a city with a relatively short growing season (May to September) can produce considerable net gain in produce, and increase the margin of self-sufficiency for low-income families" (Hough, 2004, p. 174). The number of newcomers in Winnipeg who are currently growing their own food suggests that this barrier is not enough to deter them from urban agriculture.

2.4.2 Transportation

The second major barrier to urban agriculture encountered by newcomers is transportation to the place or places where they grow their food. Within Winnipeg's inner city, four neighbourhoods have a considerably higher proportion of newcomers per capita than the average in the rest of the city: William Whyte, Burrows Central, Robertson, Inkster Faraday, and St. John's (Malabar and Grant, 2010). However, "These communities also feature low levels of household income and personal vehicular transportation (42.2%, 56.8%, 73.1%, 63.1% and 52.5% respectively)—meaning that those people who find it hardest to pay for food also find it hardest to access it" (Malabar and Grant, 2010). Urban agriculture, such as box gardens in low-income housing areas, can help to mitigate some of the effects of living in places in so-called "food deserts" where food access is low. Unfortunately, some of the key urban agriculture sites for newcomers in Winnipeg are also located in areas that require vehicular transportation to access.

The largest urban agriculture site for newcomers in Winnipeg is the Immigrant Integration & Farming Community Co-op's (IIFCC) Rainbow Community Garden, where "148 new immigrants and refugee families from 23 different nationalities have gardening space during the summer" (Immigrant Integration & Farming Community Co-op, February). The Rainbow Community Garden is located on a large parcel of land west of the University of Manitoba: at least a half-hour drive from Winnipeg's inner city. This location provides challenges to many of the people who want to garden in this location. In a report on the garden written by Food Matters Manitoba, gardeners expressed frustration with finding transportation to this part of the city. Few of the newcomers owned cars and many said that they often did not have money to buy bus tickets for travel to tend the garden on a regular basis. "A lot of people don't have means to come to the university where the garden is and they rely on friends to give them rides when they're available," one gardener noted in the report. "But half the time when some people want to go there they can't go. They can't make it, which makes the garden much neglected" (Food Matters Manitoba, 2012).

Similar challenges have been noted in urban agriculture programs for newcomers in other Canadian provinces. An evaluation report on Ontario's FarmStart program for newcomers, which links newcomers to agriculture opportunities outside city limits says, "The majority of interviewees cited transportation as the most difficult challenge faced by newcomers to Canada interested in working and training on farms" (Janz, Dietrich-O'Connor, & Stewin, 2012, p. 10). The report concludes, "In order to encourage newcomers to pursue agricultural careers, land must be made available within close proximity to urban areas" (Janz, Dietrich-O'Connor, & Stewin, 2012, p. 11). The

identification of larger areas of land that may be used for agriculture closer to where newcomers live is therefore essential to promoting urban agriculture in Winnipeg.

2.4.3 Finding Vacant or Underutilized Land

Unfortunately, finding available land for agriculture larger than the size of an inner-city lot is not an easy task in the downtown areas of most North American cities. Aside from garden space that can be developed on the rooftops of buildings or in residential backyards, land for urban agriculture is largely restricted to what is considered to be vacant or underutilized land.

North American cities contain significant amounts of land that is vacant or underutilized; a study of 21 major cities by Pagano and Bowman entitled “Vacant land in cities: An urban resource” calculated that these cities classified an average of fifteen percent of their land in this way (Pagano & Bowman, 2000, p. 3). Ackerman (2011) found 860 acres of potential agricultural space in one of the most urban environments on our planet: Manhattan (see more information on Ackerman’s criteria for finding space in section 4.2.1 below). In a similar study of Oakland, California, McClintock et al, calculated there was a potential to produce between 2.9 and 7.3 per cent of Oakland’s daily food consumption from currently underutilized sites within city limits (McClintock, 2013).

However, “underutilized” land is a difficult concept to define because it is inherently subjective. For example, a land developer may consider a piece of agricultural land as “underutilized,” while a farmer might see the same piece of land as being put to its best use. Margaret Kirnbauer tries to clarify the definition in her doctoral thesis

entitled “A Decision Support System for the Productive Reuse of Vacant and Underutilized Urban Land” as follows:

“Underutilized land refers to publicly or privately held residential, industrial, commercial, institutional, agricultural, open space and parkland that is not utilized to its full potential. Understanding the past orientation of a space and the current needs of neighbourhoods can assist in bringing underutilized land back into a productive, value-enhancing amenity space for neighbourhoods” (Kirnbauer, 2012, p. 120).

According to Kirnbauer, it is only possible to say whether a site is “underutilized” by looking at a) what it was used for in the past and b) how it meets, or does not meet, the needs of the surrounding area. For example, a once-thriving department store in a neighbourhood with a high demand for housing may be considered underutilized if several of its floors are now empty. The definition may also apply to sites that are not neglected or in decline; for example, a school with two baseball diamonds might consider the land area for one of them as “underutilized” if the school could use that same land to build a needed outdoor running track.

“Vacant land” is somewhat easier to define than “underutilized land,” even though, according to Pagano and Bowman, “No formal or standardized definition of vacant land exists” (Pagano & Bowman, 2000, p. 2). Regarding a definition for “vacant land,” Nemeth and Langhorst, in an article entitled “Rethinking urban transformation: Temporary uses for vacant land,” write,

“We use a broad definition of vacant land to include all land that is unused or abandoned for the longer term, including raw dirt, spontaneous vegetation and emergent ecologies, land with recently razed buildings, perimeter agricultural land fallen out of cultivation, brownfields and other contaminated sites, or land that supports long-term, abandoned derelict

structures. When no structure exists, one can consider land vacant if the property is not currently used by humans" (Nemeth & Langhorst, 2014, p. 144).

For sites where there are still standing structures, Nemeth and Langhorst cite Pagano and Bowman, who say that according to their research "there is also no standardized definition of abandoned structures . . . for example, some cities contend that a structure is abandoned (and therefore presents "an imminent danger" to the community or threatens the city's "health and safety") if it has been unoccupied for 60 days; others use 120 days or longer as the threshold" (Pagano & Bowman, 2000, p. 2). These definitions of "vacant land" may not account for every situation (for example, if squatters occupy a building, is it considered abandoned or unoccupied?); however, they do provide a framework to understand the intent behind the use of the terms in this practicum.

2.4.4 Soil Quality and Contamination

As described above, identifying vacant and underutilized land is essential to promoting urban agriculture. Michael Hough says, "The availability of urban land is potentially enormous in almost all major Western cities. Railway, public works and public utility properties, vacant lots, [...] and industrial lands form a major proportion of unbuilt-on land that has been, and remains, ineffectively used and frequently contaminated" (Hough, 2004, p. 174).

Contaminated soil is an important consideration in urban agriculture. Nabulo, Black, Craigon and Young address some of these concerns in their article, "Does consumption of leafy vegetables grown in peri-urban agriculture pose a risk to human

health?” (2011). The first step in estimating soil safety is to study a site’s land use history (Heinegg et al. 2002). Sites that were former industrial locations have a much higher risk of contamination than sites that were only used for residential purposes, for example. Of course, the only way to confirm whether a site is contaminated is through a soil test. Soil pH is relatively easy to test (Nabulo et al. 2011). However, tests for specific contaminants can get to be costly, which limits its effectiveness when budgets are restricted.

If contaminants are found, the site may still be usable for urban agriculture with some work. Raised beds with new soil can be placed on contaminated ground (or even asphalted areas). Contaminated earth can be excavated or protected by geotextiles, while the growing area is filled with clean soil. With a longer timeframe, microbial remediation and phytoremediation (using plants to take up contaminants from the soil) can be effective and relatively low-cost techniques for soil remediation (Heinegg et al. 2002). This practicum will consider these methods of contaminant analysis and treatment when identifying potential sites for urban agriculture.

2.4.5 Site Size

Several programs support newcomer gardening close to where many newcomers live, in Winnipeg’s inner city. One of these programs is IRCOM’s Newcomer Greening Initiative, which gives newcomers access to raised garden beds and garden boxes on balconies in IRCOM House. An evaluation report on this program calls it “a huge success” but notes, “not every family that wants to start a garden is able to access space. In focus groups, women mentioned that they would like to start a garden

but do not know where to get a plot from” (Food Matters Manitoba, 2013, p. 32).

There are also other limitations to IRCOM’s garden program. First, it is only available to newcomers for the initial three years they live in Winnipeg; once this period has expired, gardeners must look for new land to grow their food.¹ Second, the allotted space per family is not large enough to meet the demand from many newcomers. “Some gardeners said that it would be nice to have more space – either to provide more plots to enable more people to garden or to increase the size of the plots for existing gardeners,” the report notes (Food Matters Manitoba, 2012, p. 10).

This need for larger spaces for gardening is echoed in the 2014 Food Matters Manitoba report; one of its key recommendations is to “support and enhance Newcomer gardening/farming initiatives by helping Newcomers find space to grow food to feed their families” (Food Matters Manitoba, 2014). This need cannot be met by only adding garden boxes around newcomer residences; indeed, many newcomers are renters and are not permitted to build garden boxes in their yards (Food Matters Manitoba, 2014). Therefore, this need can only be met by finding larger areas of underutilized land available for urban agriculture in proximity to newcomer residences.

De la Salle and Holland suggest that many cities are willing to offer use of underutilized municipally owned land for urban agriculture at no cost because of the other benefits associated with having the land used in this way. Cities that support urban

¹ Newcomers must also move out of IRCOM House three years after they arrive. This time limit is intended to help accommodate new arrivals, while still giving people enough time to find a more permanent residence. However, this can provide challenges to newcomers who had a garden space through the IRCOM program.

agriculture do so because it supports food security and social structures in low-income neighbourhoods and, more banally, it saves the city money on lawn mowing. They cite a Philadelphia study, which “estimated that turning ten 0.2 to 0.4-hectare (half-to-one-acre) lawns into farms would save the city treasury \$50,000 USD per year, based on seventeen annual mowings costing \$200 USD each” (de la Salle & Holland, 2010, p. 166).²

In recent years, the City of Winnipeg has shown it understands the benefits of urban agriculture described above. It has offered up municipally owned land to be used for several large urban agriculture projects, including the South Osborne Orchard and the Landless Farmers Collective’s CSA farm. However, the City currently does not provide a clear method of identifying and promoting land that might be available for purposes of urban agriculture.

2.5 Precedents for Larger Urban Agriculture Sites from Other Contexts

The approach described above—where newcomers who wish to pursue agriculture more seriously (as a business, for example) are given access to larger areas of land, equipment and training—has been proven to work in numerous cities around the world. Canadian examples of such programs can be found in Common Roots Urban Farm in Halifax, Nova Scotia and FarmStart in southern Ontario, while American examples include Global Gardens in Boise, Idaho; the International Institute Garden

² It is not entirely clear how the \$50,000 USD figure was derived from de la Salle and Holland’s calculations. The total cost, based on their estimated numbers, would be \$34,000. Regardless, this makes an economic case for converting lawns into community gardens or other urban agriculture sites.

Project in Saint Louis, Missouri; the New Entry Farm in Lowell, Massachusetts; New Farms for New Americans in Burlington, Vermont; New Roots Community Farms in San Diego, California; Spaces of Opportunity in Phoenix, Arizona; and the new World Garden Commons in Rabanus Park in Fargo, North Dakota (only 350 kilometres from Winnipeg).

Many of these programs are still in their infancy, having been established within the last ten years. Therefore, most of the information available about these programs is sourced from the material produced by the organizations that run them; only a few of these programs have been evaluated by outside sources. This section will summarize the operations of some of the more established newcomer urban agriculture programs in North America.

2.5.1 FarmStart – Ontario, Canada

Ontario's FarmStart program is the most well-established startup farming program in Canada. FarmStart is a charitable organization in southern Ontario (including Brampton and Hamilton) that gives people interested in farming access to training, land and farm equipment through its various programs and grants. One of these programs is called New Canadians, New Farmers program, which helps to link newcomers with an interest in farming to retiring Ontario farmers, with the goal to helping newcomers start their own successful farms.

FarmStart operates two large farm facilities where newcomers and new farmers can “share equipment and markets as well as growing techniques” (FarmStart, 2015). These farms are each between 45 and 50 acres of land (although not all this land is

currently in production). The land is divided into sections for different types of farming programs. The McVean Farm in Brampton, for example, includes “9 farm enterprises, 22 allotment gardeners, and 5 training farm participants” while the Earth to Table Farm in Hamilton includes “3 farm enterprises, 4 test croppers and 2 Livestock Training Farm participants” (FarmStart, 2015).

FarmStart also runs training courses which are titled “Digging into Farming: Planning your Farm Business Development” and “Fearless Farm Finances: Using Financial Tools for Confident Decision Making” (FarmStart, 2015). These courses are open to all who are interested in starting a new farming business.

Another component of FarmStart’s program is FarmLINK, which, as the name suggests, links people looking for land to farm with people who have land they are willing to share.

FarmStart operates with an annual revenue around \$600,000 (\$580,272 in 2015). This revenue comes from various sources. In 2015, 75 percent of FarmStart’s revenue came from grants, 11 percent came from farm revenue, five percent from training and resources, one percent from rental and eight percent from other sources. This means that almost \$65,000 was generated from farm revenue in that year and almost \$30,000 from training and resources. However, FarmStart’s heavy reliance on grants raised concerns about how the programs would function if funding was cut. Furthermore, FarmStart’s expenses were \$12,736 more than their revenue in 2015, causing additional concerns about the sustainability of the project. As an example of these challenges, farm expenses (12%) exceeded farm revenue, while payroll (42%), contract services (25%),

and operating costs (15%) together exceeded the total revenue from grants combined with revenue from training and resources.

There are also a few shortcomings in looking at the FarmStart program as a precedent for newcomer farming in Winnipeg's inner city. First, newcomer farming is only one component of FarmStart's larger programming. The success of FarmStart with newcomers in particular is unknown outside of the profiles of several newcomer farmers FarmStart provides as promotional material. Second, its two large farms are located in more rural settings outside of large urban areas. Not surprisingly, a study done for FarmStart through the University of Guelph entitled "Immigrants, Agriculture and Settlement Outside the GTA" lists a lack of transportation and social isolation as two of the key barriers prohibiting rural farming for newcomers (in this program, it is assumed that newcomer farmers would either commute or move out of the city onto FarmStart's larger farms during the growing season) (Janz, Dietrich-O'Connor, & Stewin, Immigrants, Agriculture, and Settlement Outside the GTA, 2012).

2.5.2 Global Gardens – Boise, Idaho

Global Garden started out in 2004 as a community garden project of the Idaho Office for Refugees (Global Gardens, 2017). Funding was provided by a three-year federal grant, "which offers gardening space and equipment to [refugees], many of whom have grown up in cultures steeped in farming and agriculture" (Haugen, 2010, p. 25). In addition, local landowners and non-profit organizations have donated all the farmland used for this project. Sponsor organizations oversee the gardens on the land they have donated (Haugen, 2010, p. 25) (Global Gardens, 2017).

The project now involves more than 200 newcomer families (particularly refugees from east African countries as well as Afghanistan, Bhutan, Bosnia, and Uzbekistan) working on several community gardens and farms (including Star Farm, discussed below) between two or three acres in size (Global Gardens, 2017) (Haugen, 2010, p. 25).

The project began with the newcomer community gardens (similar to the newcomer gardening programs currently active in Winnipeg). However, “The focus shifted more towards farmer entrepreneurship training in 2008 . . . There have been several spaces used to train our farmers, but the main farming spaces include the Five Mile Church of the Nazarene (8 plots), the space adjacent to St. Stephen’s Episcopal Church . . . and a community garden/farm plot-hybrid space at 520 N. Liberty Street” (Global Gardens, 2017). This new emphasis on farmer entrepreneurship is implemented through a special entrepreneur program for refugee families who are considering pursuing farming as a career. Global Gardens provides “winter classes, training, and hands-on technical assistance” in addition to allocating “farmland to refugees” (Global Gardens, 2017). Refugees in the program start with a maximum of a half-acre of land to farm during their first three years. After this time, program “graduates” are assisted in negotiating leases for new land they can use (Global Gardens, 2017).

Farmers can sell their produce through local farmers’ markets or through an innovative CSA (Community Supported Agriculture) subscription program run by Global Gardens. In the CSA program, farmers from the various garden sites in the Global Gardens program pool their harvests together for sale. This gives the refugee

gardeners a straightforward way to sell their produce to subscribers, with funds that come in before the harvest season (Global Gardens, 2017).

However, studies of the Global Gardens project also challenge some of the assumptions of newcomer urban agriculture. Through interviews with newcomers in the project, Emily Smith found that a farming background was not as advantageous to newcomer urban agriculture as was predicted. “In actuality,” she writes, “the refugees on the Star Farm had spent years in refugee camps where there were minimal opportunities to farm. Those that had farmed previously, were not able to easily apply their skills to the Idaho context. They did not know how to plant their farms efficiently, care for the types of crops that they planted, or have experience with irrigation farming. Their experience with the farm, highlights the complexities of refugee identities, and underscores the need to address context” (Smith, 2011, p. 66). Despite these challenges, many of the interviewees in Smith’s study recognized the social benefits of urban agriculture, even if the economic benefits were limited.

2.5.3 International Institute Global Farms – St. Louis, Missouri

The International Institute Global Farms is a program for newcomers to grow food on two urban teaching/production farms in urban St. Louis, Missouri (IISTL Global Farms, 2017). Each of the farms is approximately one acre in size (Carnahan, 2015). Gardeners in the program have immigrated from similar places to those described above who live in Winnipeg, including Burma, the Democratic Republic of Congo, Rwanda, Sudan and Somalia (IISTL Global Farms, 2017).

The Global Farms program has also put an emphasis on training and equipment. Its newcomer farmers are given farming tools, seeds and training in agricultural practices (including techniques such as the Indigenous mound planting system called The Three Sisters, which inter-plants beans, squash, and corn) (City of St. Louis, MO, 2013). Newcomers are also encouraged to plant crops from their home countries. According to program directors, “One such plant making a popular showing is called Roselle; a species of Hibiscus native to the more tropical climates” (City of St. Louis, MO, 2013). Bitter eggplant, another food grown in the gardens, has become a best seller and brings in \$6 to \$7 per pound at markets (Hesson, 2015).

Markets where newcomer farmers in the program sell their food include the West End Farmers Market, City Greens Market, Local Harvest Grocery, and Saint Louis University’s Fresh Gatherings Cafe (City of St. Louis, MO, 2013), (Carnahan, 2015). This is an important source of income for farmers, which brought \$4000 to two newcomer families, according to the farm manager (Carnahan, 2015). Ted Hesson, who wrote about the Global Farms in *The Atlantic*, notes, “While the profits aren’t huge, the entrepreneurial program offers refugees who may speak little or no English a chance to learn how to operate in the local economy” (Hesson, 2015).

The organizers of the program see it as a testing ground for newcomers who are considering agriculture as a career in North America. They write, “After completing the Global Farms Program, refugees who wish to make farming their career are eligible to apply for a loan from the International Institute Community Development Corporation to lease or buy their own land for farming” (IISTL Global Farms, 2017). The International Institute Community Development Corporation has financed more than

500 of these loans for newcomer-owned businesses in Saint Louis, each between \$500 and \$35,000. However, they do not specify how many of these loans went to farming businesses (14% of their loans go to the food sector, although this includes restaurants and other food businesses) (IISTL Global Farms, 2017).

2.5.4 New Entry Farm – Lowell, Massachusetts

New Entry Farm in Lowell, Massachusetts is regarded as the first newcomer farm program in the United States. New Entry Farm provides agricultural programs for newcomers that include farmer training, food systems development, and livestock and poultry raising. The program is widely regarded as a success and “continues to thrive” (Brown, 2011).

Through the program, newcomers may choose to pursue a farming apprenticeship, a farming internship, or to test out their own operation on an incubator farm between a quarter acre and one acre in size. These fields are cultivated through the program and are ready for planting. New Entry Farm does charge a small fee for the use of the land; however, it is often subsidized. The program also provides tools, irrigation, and other supplies. Tufts University Friedman School of Nutrition offers training to farmers who enroll in this program, as it does for the New Farms for New Americans program in Vermont (Mason, 2016).

The New Entry Sustainable Farming project also provides support for newcomers who want to pursue farming as a business after the apprenticeships or incubator farming. They will match farmers that have completed the farmer training with farmland that people own around across the state through an online database. New

Entry Farm has also produced a plain language guide to help newcomers with business planning, entitled “How to Begin Your Small Farm Dream.”

2.6 Summary

Although urban agriculture alone is not able to address all the challenges newcomers face in urban environments, research shows that it can provide mental and physical health benefits, social benefits, and cost-saving benefits to newcomers who work on farms and gardens. According to McClintock, “Local food production is central to a local food system that is accessible to all and is necessary in order to stave off precisely the sort of social dislocation arising from economic crisis” (McClintock, 2010). Indeed, urban agriculture may be a cost-effective tool that a city like Winnipeg can use to support its newcomers while they adjust to life in a new country. Many of these findings were confirmed and further explored by a focus group of representatives from newcomer gardening programs in Winnipeg, which is summarized in the next chapter.

3 Focus Group & Questionnaire Findings

3.1 Introduction

This research project assembled a focus group and a follow-up online questionnaire to provide first-hand information on urban farming for newcomers in Winnipeg. There are several reasons why these were the preferred feedback methods for this research. According to Krueger and Casey, a focus group “looks for the range of ideas or feelings that people have about something [and] pilot test ideas, materials, plans, or policies” (Krueger & Casey, 2009, p. 24). The focus group identified a “range of ideas” that people closely involved with newcomer farming had about improving the current opportunities for urban agriculture in Winnipeg. It was also used to get feedback on the research materials produced through this practicum, including the site suitability study. The group setting helped to generate discussion and feedback that might not have occurred in individual interviews. This coincides with Krueger and Casey’s finding that “a group possesses the capacity to become more than the sum of its parts, to exhibit a synergy that individuals alone don’t possess” (Krueger & Casey, 2009, p. 24).

Specifically, the focus group in this research project accomplished several important goals. First, it helped to identify what professionals in non-profit organizations working with newcomer food security knew about the ways urban agriculture can contribute to food security, as well as the needs to identify land for urban agriculture in Winnipeg’s inner city. Second, the focus group could inspect and comment on the methods used to identify potential urban agriculture sites and highlight any considerations that were

missing in the initial mapping research. Lastly, the focus group helped to discuss the various site elements that would be necessary to achieve a successful urban agriculture site in Winnipeg's inner city.

The focus group methodology required approval from the University of Manitoba's Joint-Faculty Research Ethics Board. This approval was granted on September 9, 2015. The focus group was held on November 27, 2015. A second round of feedback, gathered through an online questionnaire, took place in November 2016. The following section presents a detailed description of the research methods used in the focus group and the online questionnaire.

3.2 Focus Group Methods

This section describes the methods used in setting up and undertaking the focus group, which follows the standard methodology for focus group plans established by researchers Krueger and Casey. They state that focus group plans should "include the purpose, background information, types of information needed, target audiences, plan of action, products or deliverables, timeline, and budget" (Krueger & Casey, 2009, p. 37). These items will be discussed in the subsections below.

3.2.1 Focus Group Participants

The focus group participants targeted for this research were program directors of Winnipeg non-profit or government organizations that work with food security, urban agriculture, or immigration services (particularly related to nutrition) in Winnipeg's inner city. This group was identified because program directors have first-hand experience finding agricultural sites, managing gardens, and providing services for

newcomers. These program managers interact with vulnerable populations (like refugees or recent immigrants) closely in their work; however, they themselves are not vulnerable (see more in the *Potential Risks* subsection below). The focus group participants were invited to this focus group to reflect on their work as *professionals* and as people who were involved closely in newcomer gardening programs.

Invitations to participate in the focus group were sent to program directors via email. The program directors invited worked with the following organizations: Food Matters Manitoba, the Immigrant and Refugee Community Organization of Manitoba (IRCOM), the NorWest Co-Op Community Food Centre (CFC), William Whyte Residents Association Neighbourhood Immigrant Settlement Program (WWRA-NISP), The Peaceful Village Gardening Project, and the Immigrants Integration and Farming Worker Co-op (IIFC). Invitations were also sent out to two urban Community Supported Agriculture (CSA) farms: The Landless Farmers Collective Urban Farm and Metanoia Farmers (operating out of the Canadian Mennonite University).

Three participants (from the NorWest Co-Op CFC, Food Matters Manitoba, and the WWRA-NISP) were able to attend the focus group, which fell short of the target size for the group at six participants. However, representatives from IRCOM, Peaceful Village, and The Landless Farmers Collectives Urban Farm who were unable to attend the focus group did provide comments during the second round of feedback via an email questionnaire.

3.2.2 Potential Risks

There were minimal risks to the participants in the focus group and online questionnaire. The questions asked did not address personal or confidential issues. The project also focused on speaking with project managers, who could speak in a professional capacity. This allowed the project to avoid the potential ethical concerns that would have accompanied a study that interviewed newcomers directly. Such a study may have raised false expectations among a vulnerable population regarding the identification of potential gardening space, most of which will never be developed. It may have also duplicated interviews with newcomers who are gardening in Winnipeg, which already form part of the literature review in this project (e.g. Food Matters Manitoba, 2014).

3.2.3 Time and Location

The focus group was held at Food Matters Manitoba's office (640 Broadway Avenue), which provided a central location as well as a space most participants had been to before. The room had wall space for displaying printed material and a whiteboard for focus group exercises. To accommodate Food Matters Manitoba's schedule, the focus group was held on a Friday afternoon from 3:00pm to 4:30pm.

3.2.4 Moderation & Facilitation

The researcher led the focus group activities, welcomed participants to the event, operated the audio recording equipment, and moderated the discussion. Before the focus group began, the researcher explained the ground rules that encouraged open and active participation from all attendees. There were four key ground rules in the focus

group: there are no right or wrong answers; everyone is encouraged to participate; what is said in the room stays in the room (for example, once the meeting is over, do not share the names or opinions of others who are at this focus group); and that all comments would be kept anonymous in any reporting. Participants agreed to allowing the focus group to be audio recorded for the sake of transcription purposes.

3.2.5 The Focus Group in Detail

The focus group began with personal introductions from the participants around the table. Each participant was asked to give their name and answer how they have been involved in working with immigration, food security or urban agriculture. Following this introduction, the researcher led the group in a discussion about the strengths and opportunities for refugee urban agriculture in Winnipeg. Participants were asked how important they thought urban agriculture was in terms of providing food security to newcomers. Participants then identified important factors in selecting urban agriculture sites for a newcomer population (e.g. proximity to newcomer residences, access to water, etc.). To conclude the discussion, the researcher asked the participants to discuss the different site elements that would be found in an ideal inner city urban agriculture site. See (Appendix A) for a full list of the questions proposed during this portion of the focus group. Focus group research findings are discussed in Section 3.3.

3.2.6 Second Round of Feedback

During the focus group, the researcher asked participants if they would be interested in receiving a summary of the research findings for this project, as well as their preferred method for communication about this project. Each one of the

participants at the focus group said they were interested in receiving more information about the research findings and participating in follow-up research through an email questionnaire. The method of using an online questionnaire as a follow-up feedback tool was highlighted and confirmed in an Ethics Renewal application, which was approved on September 7, 2016.

To gather the second round of feedback, the researcher sent out an email invitation to each of the ten participants who were invited to the original workshop. In the email, participants were invited to participate in a questionnaire to review the findings from the focus group and comment on some of the new research that had been completed since that time (including GIS mapping work). Informants were sent a link to the online questionnaire (which was created using Google Forms) in a second email, which was sent on November 3, 2016. Participants were given ten days to review the material and provide their feedback using the online questionnaire. Seven of the ten invited participants provided feedback on this questionnaire.

Focus Group Participant	Questionnaire Participant	Invited Participants (by Organization)
Yes	Yes	William Whyte Residents Association Neighbourhood Immigrant Settlement Program (WWRA-NISP)
Yes		NorWest Co-Op Community Food Centre (CFC)
	Yes	Immigrant and Refugee Community Organization of Manitoba (IRCOM)
	Yes	Immigrants Integration and Farming Worker Co-op (IIFC)
	Yes	The Peaceful Village Gardening Project
	Yes	The Landless Farmers Collectives Urban Farm (2 participants)
		Metanoia Farmers (CMU Farm)
Yes	Yes	Food Matters Manitoba

Table 1: Focus Group and Questionnaire Participants by Organization

3.2.7 Research Methods: Analysis

In qualitative research, the emphasis in explaining research methods often focuses largely on the process behind setting up interviews or focus groups, while little time is spent discussing the methods for analysis that occurs after the data is gathered. Researchers and software developers Thomas and Lynn Richards describe typical qualitative data analysis as a process akin to sorting needles that are found in haystacks. They write, “The language of qualitative research methods is imbued with the metaphors and methods of creating and ordering ideas by classificatory categories. The task of the researcher is presented as finding and exploring categories and patterns of categories in unstructured, even chaotic, records. To do so is to make sense of, understand, expound and illuminate, the records” (Richards & Richards, 1995).

With only one focus group and questionnaire, the analysis of the qualitative data in this practicum was not as daunting as wading through stacks of chaotic records. Instead, analysis followed a primarily deductive approach of categorizing (or “coding”) sentences from a transcript of the focus group or responses from the questionnaire into categories that were identified in the literature review.

Three broad categories (or “parent codes”) formed the basis for analyzing the data: perceived benefits, barriers, and opportunities for improvement. Within these categories, information was further divided into several sub-categories coinciding with literature review findings. For example, sub-categories within the barriers to urban agriculture category include logistical barriers, site-specific barriers, and regulatory barriers. In some cases, participants provided responses that were not anticipated in the

literature review. For example, some participants discussed an opportunity for improving urban agriculture related to seed saving and sharing, which was not covered in literature review material. In this case, an inductive approach was used to develop a new sub-category that would be appropriately classify the data. The categories and sub-categories developed for this practicum were therefore treated as a flexible, not rigid, means to analyze the data.

It should be acknowledged that there are limitations to using largely deductive data analysis methods for research. The largest limitation is that the findings are analyzed through the interpretation of the researcher, which may force the participant's words into an unintended context or bias the questions that are asked during interviews or focus groups. An alternative approach is grounded theory, which is "a qualitative strategy of inquiry in which the researcher derives a general, abstract theory of process, action, or interaction grounded in the views of participants in a study" (Creswell, 2002, p. 13). In grounded theory, interviews with participants are the first step in the research process, which take place before the researcher is influenced by a literature review. The researcher then analyzes the data using an inductive approach to develop categories based solely on the words of interviewees.

However, a grounded theory method was not possible to undertake this practicum precisely because the researcher was already aware of the literature and had information about newcomer urban agriculture programs in Winnipeg before the study even began. This pre-existing knowledge has undoubtedly influenced this research through the development of the research questions through to the analysis of the focus group findings. To counteract this bias as much as possible, direct quotes from research

participants are used as much as possible in the following analysis, rather than the paraphrasing of the researcher.

3.3 Research Findings

The focus group and online questionnaire findings have been analyzed and categorized in three broad categories: perceived benefits, perceived barriers, and perceived opportunities for urban agriculture in Winnipeg. Largely, comments from participants support the findings of the literature review. However, there are certain instances where the opinions of participants contradict findings in the literature review. In these cases, the participant's statements are nonetheless provided, without added commentary to debate the veracity of the claims.

3.3.1 Perceived Benefits of Urban Agriculture

During the focus group, participants were asked to identify some of the benefits they saw urban agriculture provided for newcomers in Winnipeg. There were three categories of responses: social, mental and physical health benefits; benefits related to increasing the availability of traditional foods, and economic benefits.

3.3.1.1 Social, Mental, and Physical Health Benefits

According to focus group participants, the most important benefits of urban agriculture for newcomers come from building up social ties and providing mental and physical health benefits. One participant said there is “a network of sharing and exchange of vegetables among newcomer families.” Participants noted that newcomers

who grew vegetables usually gave away surplus food to friends or relatives, or traded their excess produce with other gardeners for herbs or other vegetables.

Participants also emphasized how growing food also provides mental and physical health benefits. One participant said urban agriculture “helps with mental health benefits of being outdoors and the social benefits of meeting people.” When asked if there were any other comments they would like to share regarding newcomer gardening or urban agriculture in Winnipeg's inner city neighbourhoods, questionnaire participants also wanted to highlight the benefits of urban agriculture for newcomers. One respondent said that participating in organic food production would help newcomers with a farming background to “reduce the stress in a new home.” Another respondent wanted to see “more opportunities for people to participate.” This would “allow for some cross learning so that people learn from other people and share their own native plants with others.”

3.3.1.2 Benefits Related to Increasing the Availability of Traditional Foods

Already, newcomers involved in urban agriculture in Winnipeg are building new social networks with people who have come to the city from around the world. Focus group participants noted that the newcomers wanting to get involved in gardening programs in Winnipeg are coming from countries like Burundi, Rwanda, The Congo, Myanmar, The Philippines, Ethiopia, Somalia, Mali, and the Punjab region of India. Many of these newcomers are now growing food in Winnipeg.

One focus group member, a former refugee who is now working as a gardening program coordinator, confirmed the 2014 Food Matters Manitoba newcomer food

study identifying that many newcomer families worked as farmers in their home countries. This participant said she was also an immigrant who had come from a 3-acre family farm in her home country. She said this gives newcomers an advantage for successfully growing crops, even in a very different climate. Some of the most common foods grown by newcomers include pumpkin and crown melon. Newcomers are also using urban agriculture to grow traditional food from their home countries that is not available in Winnipeg stores. This gives newcomers the ability to cook the traditional foods they are already skilled at making while increasing the variety of nutritious foods available to others in the city.

Two focus group participants identified potential opportunities related to the availability of traditional foods, which included seed saving and starting seedlings. They mentioned that there could be a big demand for newcomers to get involved in seed saving or starting seedlings of plants that were grown in their home countries. Participants felt this service would become increasingly valuable as more newcomers are getting interested in growing food from their home countries. The participants thought there might be a potential business opportunity for a newcomer to sell seeds and seedlings to newcomers and other people interested in the particular crops and varieties they were growing.

3.3.1.3 Economic Benefits

Participants said there are also economic benefits to newcomers who are involved in urban agriculture. They mentioned there are a few newcomer families in Winnipeg who sell some of the extra produce they grow. One participant told the story

of a newcomer senior citizen with a family of eight who made \$400 selling produce last year, on top of the produce kept for his own family or given away to friends.

Participants noted that the quantity of food grown by newcomers in Winnipeg right now might not have a significant impact on the overall food security of the newcomer population. However, they believed that urban agriculture had an enormous potential to improve newcomer food security in the future, especially as newcomers with gardening expertise had access to larger areas of land. This demand already exists in some groups of newcomers involved in urban agriculture in Winnipeg. For example, one focus group participant noted that some of the families who were involved in the William Whyte Neighbourhood Association gardening program expressed an interest in making a business out of growing food, particularly the seniors in the community. One person was also specifically looking for a job on a farm.

3.3.2 Perceived Barriers to Urban Agriculture in Winnipeg

Focus group and questionnaire participants were also asked to talk about some of the barriers to urban agriculture for newcomers they perceived in Winnipeg. Participants had many comments related to the barriers they perceived. There were three categories of responses: logistical barriers, site specific barriers, and policies, programming and regulatory barriers. More specific categorizations are discussed below.

3.3.2.1 Logistical Barrier: Transportation

According to participants, one of the key logistical barriers to urban agriculture in Winnipeg is transportation. When asked what to look for in identifying a site for gardening or other kinds of urban agriculture, one questionnaire respondent said,

“proximity to newcomer/refugee populations [...] plus location access by biking, busing, and walking.”

These considerations for multiple forms of access to a site are important due the current challenges of accessing existing gardening sites in Winnipeg. One focus group participant mentioned the problems associated with transportation (i.e. a one-hour bus ride from the inner city) for the more than 120 newcomer families who currently have garden plots at the Rainbow Community Gardens near the University of Manitoba.

Another focus group participant highlighted the opportunities related to the more than 40 newcomer families who were involved in gardening programs at the William Whyte Neighbourhood Association (the program was shut down in 2017 due to government funding cuts). The participant said that almost all the families who were involved in the gardening program were requesting bigger spaces to grow food in the areas close to their homes. Many of these families had gardens in the suburbs of the St. Vital neighbourhood, which also required a long bus ride from the inner city.

3.3.2.2 *Logistical Barriers: Finances and Volunteers*

The second logistical barrier to urban agriculture in Winnipeg participants described were the challenges of finding finances and volunteers, which they said are just as important to the success of a community garden as good land. For example, one questionnaire respondent stressed the financial barriers to urban agriculture. He said, “Make financial/resources available. Provide gardening managers/volunteers with honoraria to encourage them and recognize their time and contribution to new immigrant/refugee food security.”

This need to overcome financial barriers was also highlighted by another respondent, who said, “Access to gardening funding/gardening resources are as difficult as finding a gardening space. [There is] no support from governments and public agencies [and] very limited financial/resources support from [private] organizations to help promote community gardening!”

In addition to financial resources, respondents also highlighted the need for volunteers. One said, “Larger community gardens cannot survive without dedicated volunteers, who commit their time and own resources to get their project run every year.” Of course, finding and retaining volunteers is also a continual challenge for many non-profit organizations.

Winnipeg urban agriculture programs have been doing several things to mitigate the challenges of finding finances and volunteers. For example, to encourage participation in its gardening program, the NorWest Co-Op Community Food Centre is planning to set up food workshops in conjunction with a drop-in gardening program. However, this requires strong administrative support. A good committee is crucial, one participant said; “You need more than one person to do it right.”

3.3.2.3 *Logistical Barrier: Finding Land*

The third logistical barrier participants described was the challenge for organizations to find land within Winnipeg’s inner city for urban agriculture. Larger areas of land were particularly hard to find. “It is easier to find funding to start a garden than to find space to get a garden,” one participant said. When asked in the follow-up online questionnaire whether they agreed with this statement, four of the seven

respondents (57 percent) agreed. The remaining three respondents were neutral on the response, because they considered finding space and finding funding equally important to urban agriculture. For example, one respondent said, “Both are equally hard: getting space inside city is hard as well as funding too. I have space out[side] of the city, but no regular funding.”

The respondents who thought that finding space was more important than finding funding said so for several reasons. One said, “Finding funding opportunities is normally just a google search and filling out of an application. Finding land takes more ‘digging’, building relationships with possible partners and emailing/calling around until you find a space.” Another respondent highlighted that this requirement of having “skills to convince landowners” poses significant challenges to starting new gardens, particularly if newcomers wanting to start a garden have limited English language abilities and community connections.

Currently, most Winnipeg non-profit organizations looking for spaces for urban agriculture are finding it through word of mouth rather than a systematic approach. For example, one focus group participant said that she talked to the Winnipeg Regional Health Authority (WRHA), who told her about several garden spaces they knew of in Winnipeg. The organization pursued one of the identified sites, which is located at the North Centennial Recreation and Leisure Centre (at the Old Exhibition Grounds).³

³ This site is one of the top sites identified in the Land Suitability Study conducted in this practicum. The participants were awaiting on approvals from the City to use this site on the day the focus group was taking place.

In some neighbourhoods, potential garden spaces are much easier to identify. One participant said that there are many vacant lots in the Inkster neighbourhood and that she would like to “see many more gardens here.” However, she noted that garden plots on private yards worked better in these neighbourhoods because there was a high incidence rate of vandalism on vacant-lot gardens.

For non-profit groups that run gardening programs, identifying land for future gardening space is an essential first step because, according to one respondent, “The proposal to get funding for gardening will have to include the space you are going to use. I think you would have to identify the space before you apply for funding.” The findings of this practicum may therefore be useful to helping non-profit organizations find suitable land.

3.3.2.4 Site-Specific Barriers: Soil Quality and Access to Water

Focus group participants were asked if there were any additional barriers that could affect the viability of a site for urban agriculture once land was identified. They highlighted access to water and soil quality as two main site-specific barriers. One respondent said, “Sometimes we have money to do program but [it is] not easy to find the space that [is] good for vegetable gardens due to water issues [...].”

Access to water is always a challenge, participants noted. One newcomer gardening program has had to shut down a community garden because water was not available. Participants noted that water tanks can be stored on site, but they must be filled somehow. Transporting water from off-site is a last resort, as it is very expensive to do (at around \$100 per tank).

There are certain ways to access water on a site. West Broadway community centre's garden hooks up water from a nearby splash-pad pool. Spirit Park (also in West Broadway) has a tap inside a locked box; in this case, the city covered the water fees for the garden. The South Osborne Community Orchard uses a pump and pipes to get water from the Red River into a large holding tank, which is then hooked up to drip irrigation. If none of these options are available, participants said that with good neighbours, you may be able to ask for hook-ups to a rain barrel from their eaves troughs. If this fails, gardening programs may have to offer to pay neighbours for access to their water.

The other key factor in identifying a viable site is soil quality. Participants noted that you can test the quality of soil with soil samples, but these are expensive. In general, they said, it is better to estimate soil quality by doing an assessment of an area's history. Using this method, one of the gardening programs was able to avoid using a site that could have been contaminated because they discovered that there used to be a factory at the location.

3.3.2.5 Site-Specific Barrier: Security

Focus group participants also stressed the importance of garden security and offered several suggestions for improvement in this area. Questionnaire respondents were asked to select up to three of the identified options that they would recommend as a means of deterring theft or vandalism on urban agriculture sites (while still encouraging proper use of the space). The answers are summarized in the graph below.

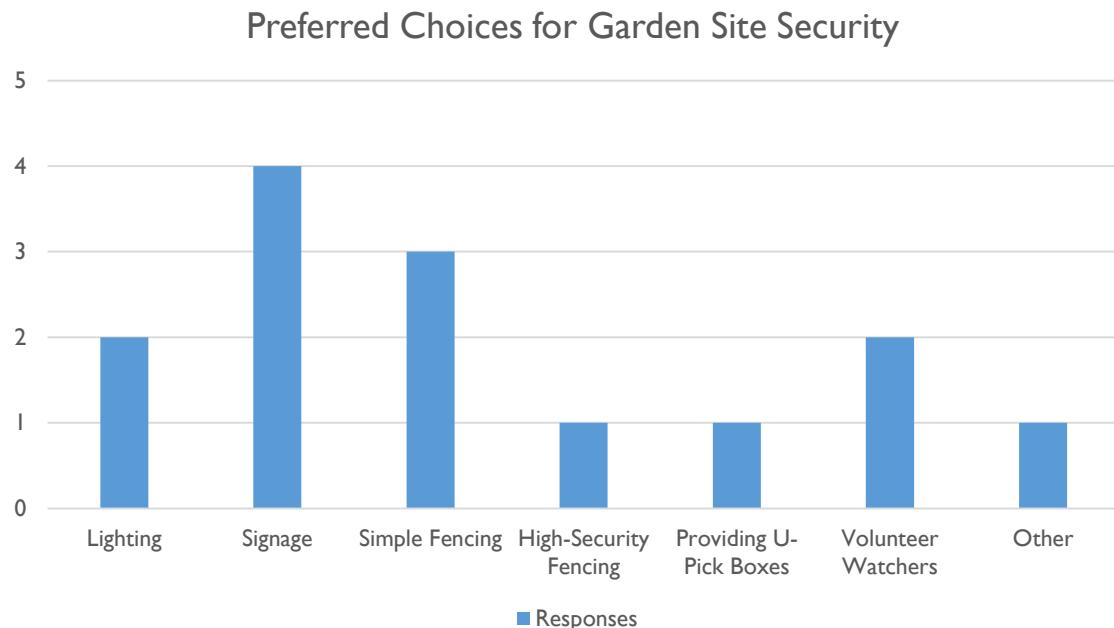


Figure 2: Garden Site Security Preferred Methods Top 3 Choices, 7 respondents (Questionnaire Responses, 2016)

Signage was identified as the most important item for site security (4 out of 7 respondents, or 57 percent, selected this item). Signs at an urban agriculture site help to identify what food is available for public use and what food is reserved for individual gardeners (for example, some gardens contain a few U-Pick boxes for public use to welcome people into the garden space in addition to private boxes where the produce grown is only for the gardeners). If these areas are not identified, gardens may be prone to theft and vandalism.

Several questionnaire respondents (3 out of 7, or 43 percent) thought that simple fencing was a good solution for security of an urban agriculture site. One respondent said, “Fencing might work. [It] does not need to be so high and topped with barbed wire. Just simple. [So that] children can see outside, see the beauty of the plants,

can learn from them, but [the garden is] not easy to get in.” Another respondent said, “Once the garden is fenced off, it would be protected.”

Two out of the seven questionnaire respondents said that lighting would be a helpful feature. Lighting would provide security of the crop and improve “gardener safety.”

Two questionnaire respondents also thought that finding volunteers to watch the garden might be a satisfactory solution: “Volunteers to watch will work: if they see people who are not gardeners and pick up or destroy other people plants, he or she can let them know [the food] just belongs to the gardeners.” During the focus group, one participant mentioned the possibility of having a senior’s volunteer garden watch for a garden near residential areas.

This highlights the fact that the most important security measure may be site location. The people living around the area may be the best deterrent of produce theft or the greatest contributors to garden vandalism. One questionnaire respondent said, “Site security is not about security. It is about building relationships with community and economies of scale.” Another respondent said, “There is not much to do about vandalism/theft; it all depends on gardening site location.” Participants at the focus group said that garden areas should not be built next to children’s play structures or schools, unless they are specifically for children’s gardening programs. They cited several instances where community gardens near schools or play structures had been trampled.

Focus group participants also mentioned that site security may be related to the types of produce that are grown in the gardens. They said that leafy plants are better

than fruit plants in terms of susceptibility to vandalism. In this case, newcomer gardening may fare well due to many newcomer's preferences for leaf crops or squash-like plants (which grow along the ground beneath a cover of leaves).

3.3.2.6 Regulatory Barriers

Focus group participants also highlighted several regulatory barriers that made urban agriculture a challenge in Winnipeg. These responses were then synthesized into key messages that were revisited in the online questionnaire. Questionnaire respondents were asked, "If the City of Winnipeg could make any of the following changes to its policies or regulations, which ones do you think would be the most beneficial in encouraging urban agriculture?" Their answers are summarized in the graph below.

Perceived Regulatory Barriers to Urban Agriculture in Winnipeg

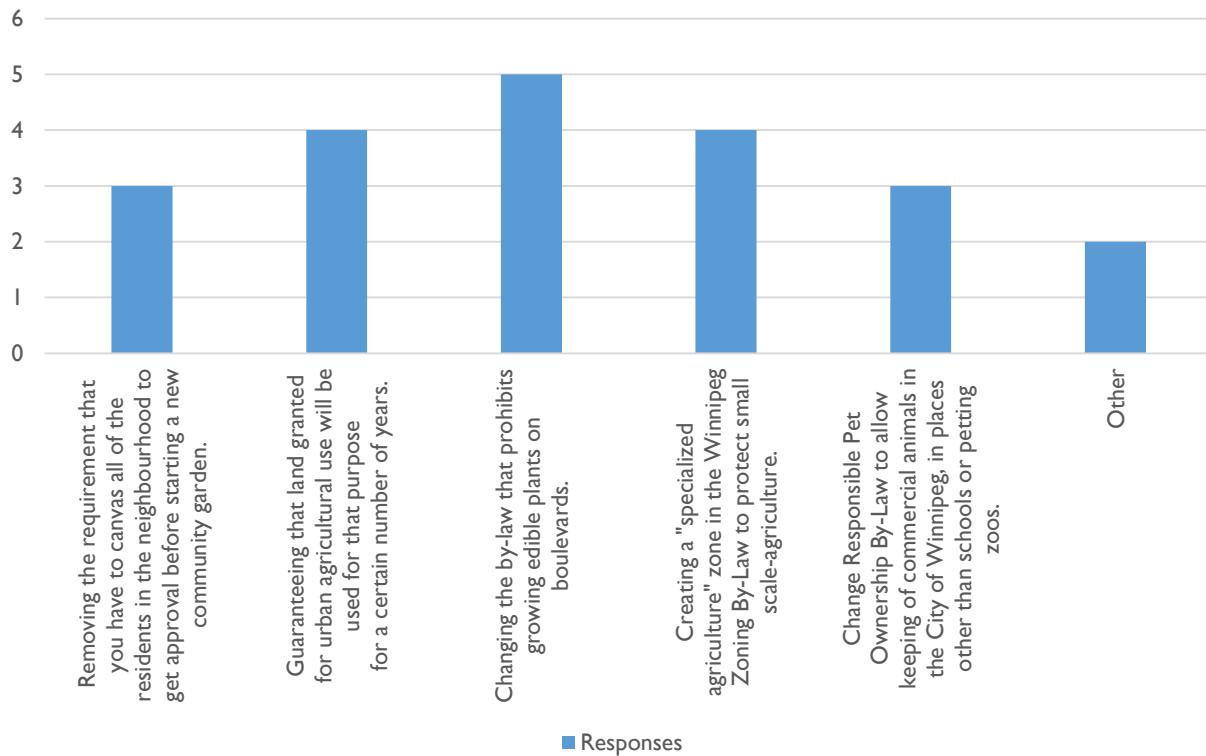


Figure 3: Regulatory Barriers to Urban Agriculture in Winnipeg, 7 Respondents selecting one or more responses (Questionnaire Responses, 2016)

Questionnaire respondents highlighted several regulatory barriers that, if removed, would be beneficial in encouraging urban agriculture in Winnipeg.

The top priority for encouraging urban agriculture, identified by 5 of the 7 respondents (71 percent), would be to for the City of Winnipeg to change the by-law that prohibits growing edible plants on boulevards. One respondent said, “Changing the boulevard garden by-law would allow many people and organizations with easily-accessible garden space at/near their residence.”

Another top priority (identified by four of the seven respondents (57 percent) was guaranteeing that land granted for urban agricultural use could be used for that

purpose for a certain number of years. Focus group participants noted that the City of Winnipeg has been willing to provide public land at little or no cost for urban agriculture, once a proper site has been identified and approved. However, many participants feared that this “gift” of land may only be temporary in some cases. Gardens in the Spence neighbourhood, one participant noted, are vulnerable because the City of Winnipeg does not guarantee that the garden spaces will be permanent. The lot could be sold and a building could be put on the property in the next year. One respondent said, “Many people will not be averse to having a garden in their community if only it is kept clean. Allowing people to be sure they have continuity will make them become very dedicated to making sure they do not lose the site.” Respondents (four out of seven) said that creating a "specialized agriculture" zone in the Winnipeg Zoning By-Law would help to protect land for small-scale agricultural purposes for long-term use.

Another regulatory barrier is related to the approval process for starting a community garden (or other urban agriculture operation). Focus group participants said that to start a community garden, the City of Winnipeg currently requires proponents to canvas all the residents in the neighbourhood to get their approval. Three of the seven respondents (43%) said the City should consider removing this requirement. One respondent said, “Canvassing is something that would scare many people away from starting a garden.” This requirement would be particularly difficult for newcomer gardeners to achieve without help, due to potential challenges with language and an unfamiliarity with Winnipeg’s regulatory processes.

To truly promote urban agriculture, participants noted, the City of Winnipeg should have a list of pre-approved garden spaces. Perhaps the City of Winnipeg can

utilize the research in this practicum to work towards developing this list of potential pre-approved garden spaces.

3.3.3 Perceived Opportunities for Urban Agriculture in Winnipeg

The focus group closed by asking participants to imagine their ideal larger urban agricultural site in Winnipeg's inner city. Participants identified several site elements to consider. These site elements were compiled and then sent out to the group to comment on and review during the online questionnaire. Respondents were asked to choose up to five items on the following list that they would prioritize in any new urban agriculture space for newcomers. The results are included on the following chart.

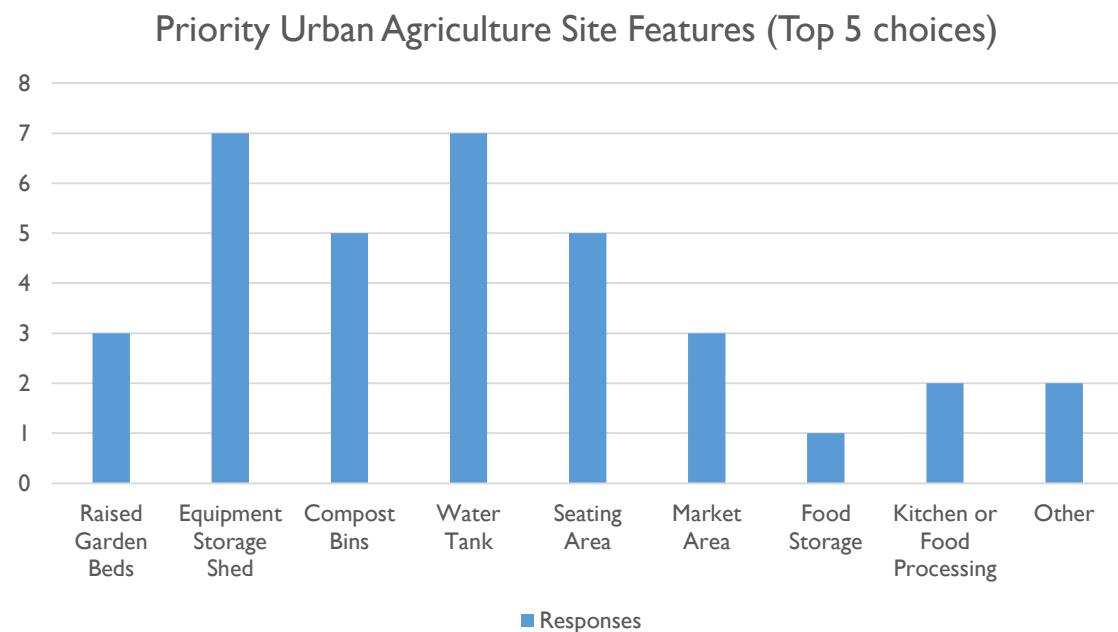


Figure 4: Priority Urban Agriculture Site Features, 7 responses (Questionnaire Responses, 2016)

An equipment storage area and a water tank were identified as the most essential features in an urban agriculture site; all seven respondents (100%) selected

these things as priorities. One of the respondents said, “these stuff [sic] are necessary to start gardening.”

A water tank, as described by another respondent, is required “to ensure consistent access to water.” Storage, such as a locked shed, is necessary for housing tools, wheelbarrows, and other gardening equipment. This is important because hauling tools from one location to another is difficult and inconvenient. One respondent said, “I don't want to carry around my equipment back and front. [I need] a place to store them.”

Larger urban agriculture operations may need a storage area big enough to store machinery and supplies. Participants stressed the importance of planning who has access to a key for the storage area. This will determine the level of oversight necessary for the urban agriculture operation.

Compost bins and seating areas were also recommended by most respondents (5 out of 7). Respondents realized the importance of compost bins to “dispose of garden waste and improve soil quality.” Focus group participants said that compost bins should ideally be made of wooden boxes so that they look nice. This helps to mitigate the risk of neighbours worrying that compost bins might smell or attract vermin (a well-maintained compost bin will do neither). It is important for compost bins to have lids that are easy to lift. Participants also noted that it is most helpful to have several compost bins in a row. One of the bins can be used for leaf storage (dry leaves are helpful for covering wetter organic matter in compost bins). Multiple compost bins also allow for several stages of composting to take place at the same time. This means that

one bin can contain compost that is almost finished, while another can contain compost that is fresh and just starting to break down.

For garden areas that are going to be used by more than one gardener, participants said that a shaded seating area was an important amenity. One respondent said a seating area “is ideal for resting and socializing.” A seating area helps an urban agriculture site to realize the other benefits of gardening, which include building a sense of community and improving mental health (see the literature review for more information).

Several respondents (3 out of 7) said that raised garden beds and a market area should be prioritized in an urban agriculture site. Market areas would help to sell the produce that was grown on site, which could help to realize the economic benefits of gardening for newcomers (see the literature review section). Raised beds help to make parts of a site more accessible to people with mobility issues and “elderly gardeners” (according to one respondent). Raised beds also help to mitigate the risk of flooding in low-lying areas. Focus group participants mentioned that people can build their own raised beds or get organizations to construct them for relatively little cost. A Winnipeg company called Urban Eatin’ Landscapes built raised beds for the Norwest Food Centre using recycled and treated CN Rail Shipping boxes. Participants noted that the wood costs about \$50 per 4-foot by 8-foot box.

Questionnaire respondents and focus group participants also identified several other elements that may be lower priorities for many urban agriculture sites. These

other amenities could include a kitchen to clean and process food, space to preserve food (like a cold storage unit), and other supplies like seed, manure, and tools.

3.4 Summary

This chapter reviewed the research methods and the findings of a focus group and a questionnaire that involved participants who are active in programs related to urban agriculture or newcomers in Winnipeg. The participants largely confirmed the findings of the literature review which explored newcomer urban agriculture around the world, while discussing the unique benefits and challenges of newcomer urban agriculture in a Winnipeg context. The findings of the focus group and questionnaire are instrumental in setting up the parameters involved in the land suitability analysis and preliminary design components that are presented in the following chapters.

4 Land Suitability Study

4.1 Introduction

This chapter includes a two-part land suitability study for urban agriculture in Winnipeg. The first part of this study is a vacant land inventory, which attempts to identify land within Winnipeg's city limits with the potential for urban agriculture. The second part of the study identifies potential land for urban agriculture in Winnipeg's inner city, which might particularly benefit newcomers with a farming background.

4.2 Research Methods

This section provides a detailed explanation of the research methods used in the two major components of the land suitability study. The goal of the research in this section is to map opportunities for urban agriculture in Winnipeg. In *Systems Thinking in Practice*, Paul de Graaf explains the importance of this practice. “By mapping opportunities for urban agriculture,” he writes, “the municipality can help urban farmers to locate the best spaces for themselves and for the city. Good maps reflect a way of thinking and enable stakeholders to look at the city with newly informed eyes” (De Graaf, 2013, p. 38).

4.2.1 Vacant Land Inventory

A vacant land inventory identifies underutilized sites in an area (e.g. a city) and calculates the total agricultural potential of that area (see section 2.4.3 above for a discussion on the definition of vacant and underutilized land). Similar studies have been completed in cities such as Oakland, Portland, Vancouver, Hanoi, and New York

(McClintock et. al, 2013; Mendes, 2008; Ackerman, 2011; Thapa, 2008). According to Mendes, a land inventory is often an essential first step towards the promotion of urban agriculture in planning documents and municipal policies (Mendes, 2008).⁴

To create a suitable vacant land inventory for Winnipeg, this practicum analyzed the steps taken in each of the five other cities with vacant land inventories mentioned above (see Table 2).⁵ The table shows the range of approaches taken by these cities.

City	Oakland	Portland	Vancouver	Hanoi	New York	Winnipeg
Date	2013	2008	2008	2008	2012	2017
Author(s)	McClintock	Mendes	Mendes	Thapa	Ackerman	Kroeker
Select Public Land						
Select Quasi-Private Land						
Clip Buildings & Pavement						
Factor Dense Vegetation						
Sum UA Potential Area						
Estimate Food Production						
Estimate Total Crop Value						

*Shaded squares indicate that the step in the left-hand column was completed as part of this study.

Table 2: Vacant Land Inventory approach comparison of six different studies (Kroeker, 2017)

⁴ Mendes notes the success of this strategy in cities like Portland, Oregon. However, he also notes that the vacant land inventory did not produce as much noticeable change in Vancouver, because, “unlike other North American cities, Vancouver has few vacant or abandoned properties in its central core, and is almost completely built out. [...] The low revenues UA produces cannot compete with the rents from other forms of development” (Mendes, 2008). Because Winnipeg has a large number of vacant properties in its inner city, combined with much more modest prices for other forms of development, the vacant land inventory was expected to be more successful in Winnipeg than it was in Vancouver.

⁵ The five cities identified in this study each have land inventories that have been completed and discussed in peer-reviewed academic journals. McClintock, Cooper, and Khandeshi (2013) look at similar studies done in Seattle, Cleveland, Detroit, Toronto, and Chicago. However, they note that few of these studies in other cities provided information about the potential agricultural productivity of the identified sites.

The approaches used in Oakland and New York were the most substantial of the five cities studied in previous vacant land inventories. The studies in both cities started by looking only at underutilized public land (that is, land owned by the City of Oakland and New York, respectively). The New York study also considered the potential space for gardening that would be available on private or quasi-private land, including rooftops and surface parking lots. From this total land area, these studies then removed space that was deemed unusable (for example, the space taken up by forested areas or by buildings that could not facilitate rooftop gardens). Both studies then summed up the remaining land to estimate a total potential area for urban agriculture within city limits. From this figure, the cities could estimate the amount of food that this land could produce, as well as the benefits converting such sites would provide to local food systems. The Oakland study, for example, estimated that “under ideal growing practices, even the Low land use scenario, which commits 100 acres (40.5 hectares) to vegetable production, could yield more than 5% of the city’s estimated vegetable consumption” (McClintock et al., 2013). The New York study went even further, estimating the total crop value that could be produced if the land was used for agricultural purposes. The studies in the other identified cities used some of these same methods to identify vacant land; however, they did not estimate the potential impact urban agriculture could have if the identified lands were used for that purpose.

This practicum’s methodology is based on the robust approach used in the Oakland and New York studies described above. The methods used are described in greater detail in the subsections below.

4.2.1.1 Selecting Public and Private Land

The first step in the vacant land inventory was to identify the range of land within the City of Winnipeg boundaries that could potentially be used for urban agriculture. This land suitability study utilized GIS data that was provided by the City of Winnipeg to the University of Manitoba's GIS Environmental Studies Library. This study covers both public land and certain types of private land.

In order to estimate the potential area for urban agriculture on public land in Winnipeg, three different sources were used: the City of Winnipeg's database of parks and open space, current land use classifications, and the City of Winnipeg zoning by-law. Using three different sources helps to cross-reference the information and expand the list of potential urban agriculture area that may have been missed if only one source of information was utilized. This follows the approach used in Oakland by McClintock et al. (2013), whose study included "any underutilized public land that could potentially be used for crop production, with the understanding that actual site selection would ultimately depend on additional criteria and community input" (McClintock et al., 2013). In Oakland, this list of potential urban agriculture sites included underutilized public parks, playing fields, and lawns. The three sources of information used to calculate potential public land that could be used for urban agriculture in the city of Winnipeg are described below in greater detail.

The first source of information used in the vacant land inventory is the City's database of parks and open space. This database includes all land currently being used as park space within city limits. Some of this land would be suitable for urban agriculture,

while some would be reserved for recreation space or park buildings. These considerations are factored into later stages of the site suitability study and are therefore not excluded at this time, even though they may later be determined as unsuitable for urban agriculture.

The second source of information is the City of Winnipeg's land use classifications. This source uses the city's GIS map information that includes a set of "property codes" that classify all current land use within city limits. This information was current as of 2014. Only a limited number of classifications were selected as potentially suitable for urban agriculture, including community centres (PIRCC), golf courses (PIRGC), recreational multi-use (PIRMU), and park with building (PIRPK). It also includes land currently classified as vacant: vacant agricultural (VAGRI), vacant agri split (VAGSP), vacant park (VAPRK), vacant airport (VARPT), vacant commercial (VCOMM), vacant industrial (VINDU), and vacant residential (VRES1 and VRES2).

The third source of information used in the vacant land inventory is the City of Winnipeg's zoning by-law (By-law 200/06). Once again, only a select number of zones were included in this land inventory: the Educational and Institutional zone (EI), the Parks and Recreation zones (PR1, PR2, and PR3), and the Agricultural zone (A). It is important to note that a zoning by-law shows the intended land use, which is not necessarily the same as the way the land is currently being used. For this stage of the vacant land inventory, it was assumed that land zoned for agriculture or park space is potentially suitable for gardening or farming.

In order to get a general estimate of the total amount of public land that could be used for urban agriculture, these three sources were combined using ArcGIS's Merge tool (see Figure 5). Merging these three sources combined any duplicate sites into one combined land area. For example, a site zoned PRI may have also been found in the Parks and Open Space information as well as been classified as a PIRPK in the current land use source; in this case, the Merge tool combined these three sources into one (a new feature called "AllWinnipegLand").

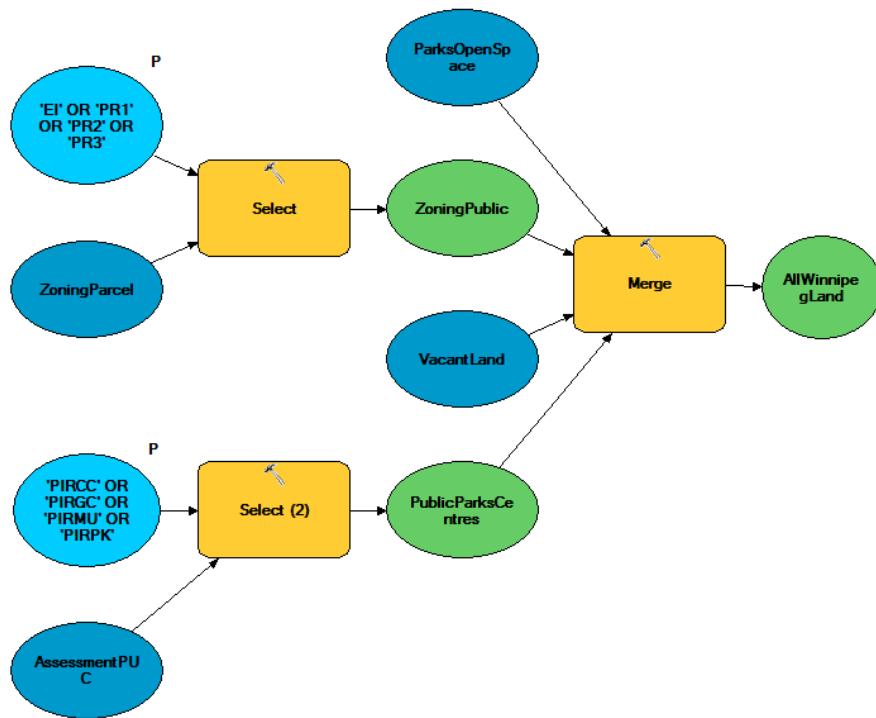


Figure 5: Combining three sources to estimate total public land in Winnipeg having the potential for urban agriculture

As discussed above, the sites identified here—such as active golf courses and community centre sites—may later be determined to be put to their best possible use as-is, therefore making them unsuitable for an urban agriculture site. However, this practicum follows the method of including as many sites as possible during the initial

stages of the process and leaving considerations of whether a site is underutilized to the end of the process, after the pool of viable sites has been reduced based on other criteria.

Furthermore, it is important to consider that some of the space on an identified site might be suitable for urban agriculture, while another part of the same site may be unsuitable; for example, land that is zoned institutional may include buildings and land that is zoned as public parks may include parking lots. Therefore, to get a more accurate estimate of the total potential urban agriculture area on the identified sites, buildings and parking lots were removed from the earlier calculation (the “AllWinnipegLand” feature becomes the “LandMinusAll” feature) (see Figure 6).⁶

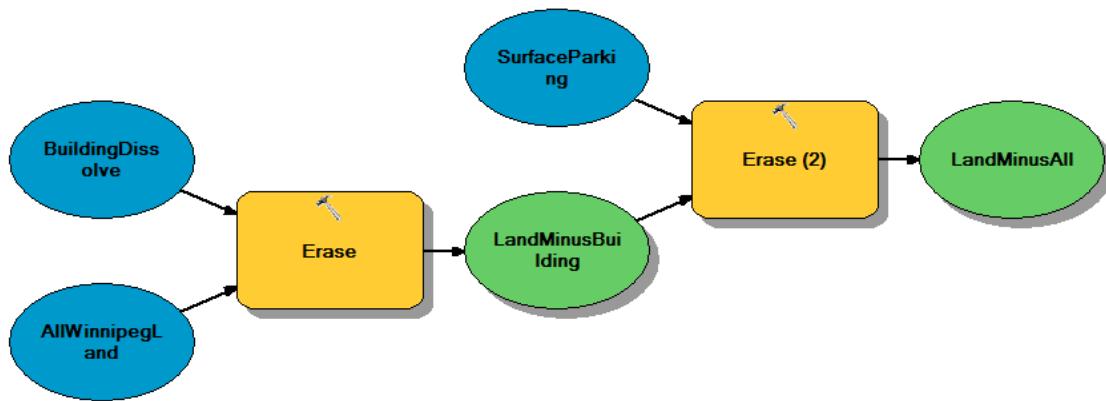


Figure 6: Removing buildings and parking lots

⁶ The total surface area of buildings and parking lots removed in this step is 17.8 square kilometres (or 4398 acres). Note that there may be potential to place garden boxes on surface parking lots or to add rooftop gardens on some of these buildings. This number can be added to the estimated total potential agriculture area below to include this potential space.

It was now possible to establish an updated estimate of the total potential urban agriculture area in Winnipeg (by examining the “LandMinusAll” feature). The remaining “LandMinusAll” polygon, after it has been cleaned up using ArcGIS’s Dissolve tool, has a total area of 171,855,361 square metres (which is 171.85 square kilometres or 42,466 acres) (see Figure 7). For comparison, the total land area of Winnipeg is 464.08 square kilometres (or 114,676 acres) (Statistics Canada, 2014), making the estimated total potential space for urban agriculture 37% of Winnipeg’s total land area. Note that this estimate does not include the land available on residential or commercial properties, which could be considerable. However, also note that this estimation does not factor in the quality of the land for urban agriculture purposes (for example, it may be forested); this factor is addressed later in the site suitability analysis.

Description				
OBJECTID *	Shape *	SUM_Shape_Area	Shape_Length	Shape_Area
1	Polygon	234431681.92067	2572284.639605	171855361.093494

Figure 7: Total Estimated Potential for Ground Urban Agriculture in Winnipeg (“AllWinnipegLand”)

This total area includes sites of all sizes (see Table 3: Sizes of Potential Sites for Urban Agriculture). More than 1,500 potential urban agriculture sites are smaller than 5,000 square feet (464.5 square metres). An additional 585 sites are between 5,000 square feet and $\frac{1}{4}$ acre. Winnipeg also includes a significant amount of land over $\frac{1}{4}$ acre in size with the potential for larger-scale urban agriculture. 681 sites are between 1 and 5 acres (0.4 to 2 hectares) and 449 sites are between 5 acres and 25 acres (2 hectares to 10.1 hectares). There are also more than 200 sites that are larger than 25 acres in size; many of these sites are large agricultural sites at the periphery of the city. The

feasibility of each of these sites for urban agriculture is examined in more detail in the Site Suitability Analysis in the following section.

Surface Area (ft./ac)	Surface Area (metric)	Potential Agricultural Use	# of Sites	Total Area of Sites
< 5,000 sq. ft	< 464.5 sq. m	Home gardens, pocket gardens	1513	77.6 acres (31.4 ha)
5000 sq. ft. to $\frac{1}{4}$ acre	464.5 sq. m. to 0.1 hectares	Community gardens	585	101.2 acres (40.9 ha)
$\frac{1}{4}$ acre to 1 acre	0.1 hectares to 0.4 hectares	Larger-scale community or individual gardens	797	419.4 acres (169.7 ha)
1 acre to 5 acres	0.4 hectares to 2 hectares	Small urban farms, orchards	681	1612.8 acres (652.7 ha)
5 acres - 25 acres	2 hectares to 10.1 hectares	CSA farm, nursery, livestock	449	4811.4 acres (1947.1 ha)
> 25 acres	> 10.1 hectares	All types of agriculture	218	35969.6 acres (14556.4 ha)

Table 3: Sizes of Potential Sites for Urban Agriculture. Potential use based on Mendes, 2008.

4.2.2 Site Suitability Analysis

The next step in the research further examines the identified potential urban agriculture land for sites that would be suitable to meet the needs of this study. This will help to address the third major research question, “Is there land in Winnipeg’s inner city that could fulfill the identified urban agriculture needs?”

Table 4 shows the various factors that were included in site suitability analyses for the five cities examined in the literature review. Three of these studies did not include any detailed analysis of site suitability. Oakland and Hanoi, the other two studies, assessed multiple factors including site slope, soil quality, access to roads, access to bus stops, proximity to water and proximity to schools.

City	Oakland	Portland	Vancouver	Hanoi	New York	Winnipeg
Date	2013	2008	2008	2008	2012	2017
Author(s)	McClintock	Mendes	Mendes	Thapa	Ackerman	Kroeker
Site Size						
Site Slope						
Land Quality						
Access to Roads						
Proximity to Transit Stops						
Access to Water						
Proximity to Schools						
Proximity to Newcomers						
Potential Land Cost						

*Shaded squares indicate that the step in the left-hand column was completed as part of this study.

Table 4: Site suitability factors in five urban agriculture studies.

The focus group that was a part of this study emphasized the importance of some of these factors, including access to water, proximity to public transit stops, and land quality. Focus group participants also noted several additional factors that would be necessary to consider when identifying urban agriculture land for newcomers, including the size of the site, proximity to newcomer residences and potential land cost. This research tries to accommodate all of the key factors identified by the focus group. It ignores some of the factors used in other studies because they are not necessary due to the local context (like site slope, due to Winnipeg's flat topography) or due to the scope of this study (like proximity to schools).

The following sections elaborate upon the methods used to analyze each of the five key site suitability factors in this study: site size, proximity to newcomer residences, proximity to transit stops, land quality, and proximity to water sources.

4.2.2.1 Site Size

A key goal of this practicum is to identify sites in Winnipeg's inner city that would be large enough to support the identified urban agriculture needs for newcomers with a farming background. It is important to rank sites according to size because, in theory, a five-acre site should have more value as an urban agriculture site for newcomers than a one-acre site would.

The focus group supported this hypothesis, noting that many of these newcomer families already have access to garden boxes and community gardens, yet have expressed the desire for significantly more space. In the studies of urban agriculture in Portland and Vancouver, Mendes (2008) says that larger-scale growing operations should consider a minimum size of 10,890 square feet, or $\frac{1}{4}$ of an acre (Table 5: Urban Agriculture Area Requirements (Mendes, 2008)).

Category	Pervious Surface Area	Agricultural Uses
Small-Scale Growing Operations	< 10,890 sq. ft. ($\frac{1}{4}$ acre)	Farm stands, educational gardening programs, composting, vermiculture, food bank gardening, herb growing, beekeeping, pocket gardens, floriculture, market gardens
Large-Scale Growing Operations	> 10,890 sq. ft ($\frac{1}{4}$ acre)	CSAs, other urban farms, urban orchards, animal husbandry, immigrant farmer apprenticeship program, horticulture, native plant production, nursery, beekeeping

Table 5: Urban Agriculture Area Requirements (Mendes, 2008)

For comparison, the smallest community supported agriculture (CSA) farm in Winnipeg—The Landless Farmers Collectives Urban Farm (currently on hiatus)—

utilized approximately $\frac{1}{2}$ acre (0.2 hectares) of land tended by two to three laborers.⁷

For the purposes of this practicum, it is therefore assumed that a useful site for newcomer urban agriculture will have an area of at least this size.

Therefore, the list of potential sites for urban agriculture in Winnipeg identified in the Vacant Land Inventory (Section 3.2.1) must be condensed in order to factor in only the sites that meet the criteria of this study. There are several steps required to condense this list. First, all sites that are not located in Winnipeg's inner city (using the standard boundaries of the inner city, as identified in the literature review section) are removed from the list of potential sites by using ArcGIS's Clip tool. Second, only sites over 0.2 hectares in size were included in the list of potential sites (using ArcGIS's Select by Attributes tool). These steps reduce the number of potential sites to 433.⁸

After reducing the number of potential urban agriculture sites, it is easy to rank the sites according to their size (see Figure 8). To do this, a field (SizeScore) for each site must first be added to the data tables. This field contains a score from 0 to 100. The largest site (out of the 433) receives the perfect 100 score; the other sites receive a score based on their size in relation to this largest site. Sorting the sites by size, it is evident that the largest site (the Lagimodiere–Gaboury Park) is 169,336 square metres in size (16.9 hectares or 41.8 acres). This site receives a SizeScore value of 100. The

⁷ The Landless Farmers Collective site was located on a previously underutilized parcel of land around the Pan Am Pool in Grant Park. According to the group, “The site started out as a public field of grass and trees 4 years ago. We proposed to the City to create garden beds that would fit in with the landscape, not disturb the natural pedestrian paths that had already existed, and enhance the experience of the site” (Food Matters Manitoba, 2013).

⁸ Reducing the number of potential sites is required at this point due to the intensive calculation processes required for the following steps.

SizeScore value for all other potential sites can then be calculated by dividing their total area by 169,336 and multiplying this value by 100.



Figure 8: Ranking sites by size

4.2.2.2 Proximity to Newcomer Residences

Of course, a large site becomes less helpful if it is located far from where newcomers live. This is the challenge with a large site like the University of Manitoba's Rainbow Gardens. As the literature review has shown, refugees have challenges accessing gardening space when it is not within walking distance of their homes (Food Matters Manitoba, 2012). The focus group participants agreed with this statement and indicated that a preferred urban agriculture site should be in close proximity to the residences of newcomers who want to use the site. Therefore, *proximity to newcomer residences* is a critical factor in the site selection process.

The *proximity to newcomer residences* score can be calculated by overlaying the map of potential urban agriculture site with Statistics Canada census data according to dissemination area (using ArcGIS' Spatial Join tool).⁹ To calculate a site's score in this

⁹ Unfortunately, statistically significant census data for newcomers is not available after the year 2006. This study uses 2006 numbers for newcomers, acknowledging that population demographics may have shifted during this time. However, the study can easily be updated using new census data once it becomes available.

category, a 500-metre buffer is created around each potential site using ArcGIS' Buffer tool; it takes an adult an estimated ten minutes to walk this distance.

As in the site size step, each potential urban agriculture site is then given a score for their proximity to newcomer residences.¹⁰ The site that has the highest newcomer population within the dissemination areas in its 500-metre buffer zone is given a score (ProxScoreNew) of 100. Four sites are tied for this maximum score, with a population of 170 newcomers within their buffer areas: the North Winnipeg Parkway, Fort Douglas Park, Valour Community Centre-Orioles Site, and a surface parking lot at 160 Donald Street. Other sites are given a score (ProxScoreNew) by dividing their total newcomer populations by 170 and then multiplying this value by 100 (see Figure 9: Weighting by Proximity to Newcomer Residences).¹¹



Figure 9: Weighting by Proximity to Newcomer Residences

4.2.2.3 Proximity to Transit Stops

Sites that are not within close proximity of newcomer residences may still be accessible to newcomers if they are located near convenient public transit stops. The

¹⁰ For this step, the definition of “newcomers” is equivalent to the definition of Statistics Canada’s “recent immigrants,” referring to people who arrived in Canada within the last five years (in this case, “between January 1, 2001 and Census Day, May 16, 2006”) (Statistics Canada, 2006).

¹¹ One drawback of this approach is that it does not factor in the country of origin of the refugee population. Refugees from Burma, for example, will likely have a higher percentage of people with a farming background among their population than refugees from sub-Saharan Africa. For the sake of equality and simplicity, I have decided not to factor in country of origin.

proximity to transit stops score (ProxBusScore) is calculated in a manner similar to the *proximity to newcomer residences score*. To do this, data layers showing points where bus stops are located (as per McClintock et al.) are overlayed on top of the potential urban agriculture sites layer. As in the previous step, a 500 metre buffer is created around each of the potential sites. ArcGIS's Spatial Join tool is then used to create a new feature class (*ProximityBus*), which includes a sum of the number of bus stops within each site's buffer area. The site with the highest number of bus stops within 500 metres is Winnipeg's Central Park (88 bus stops). This site receives a *ProxBusScore* value of 100. For all other sites, the *ProxBusScore* value is calculating by dividing the number of bus stops within the buffer areas by 88 and then multiplying that number by 100 (see Figure 10: Calculating proximity to transit stops). Limitations to the methodology for this calculation are discussed in section 3.3.

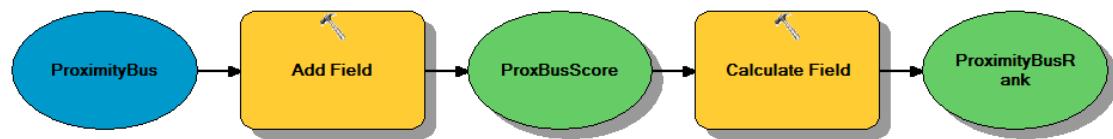


Figure 10: Calculating proximity to transit stops

4.2.2.4 Land Quality

The fourth key factor in assessing a site's suitability for urban agriculture for newcomers is *land quality*. To analyze land quality, this project utilizes a technique called raster image analysis.¹² The base raster image used for this analysis is a 2014

¹² Originally, I planned to rate *Land Quality* based on the Canada Land Inventory's maps of soil capability for agriculture. These maps classify soils into seven classes. Class 1 soils are suitable to produce all kinds of climate-tolerant field crops, while Class 7 soils—often rocky—have no agriculture potential. This data

Orthographic Photo from the City of Winnipeg provided by the GIS Library at the University of Manitoba.

Next, ArcGIS' Majority Filter tool was used to give each pixel in the orthographic photo a value, based on its color. Due to the complexity of this calculation, the photo had to be divided into two parts (RasterNorth and RasterSouth).

The next step was to get statistics for the pixel values found on each potential urban agriculture site. This was done by using ArcGIS' Zonal Statistics as Table tool for both raster image halves. These statistics tables were then merged into one table (RasterValuesMerge). The information from these statistics tables was then joined back to the data for the potential sites (AllSitesNew) using the Join tool.

Following the process outlined by McClintock et al. (in Oakland), I then “used visual interpretation to [identify] parcels containing potentially arable land, including parcels that appeared vacant or that contained lawns, fields, and other open spaces within a park...” (McClintock et al, 2013). Through a process of trial and error, the visual interpretation suggested that the potential sites could be roughly classified into 5 categories based on the MEAN values of their raster image statistics:

- a. Sites with a mean value less than 99.999 were classified as Dense Vegetation
- b. Sites with a mean value between 100 and 111.999 were classified as Mixed Surface (usually a combination of dense vegetation and soil/grass)
- c. Sites with a mean value between 112 and 126.999 were classified as Soil/Grass

covers the majority of land in the province of Manitoba. However, soil data does not extend into Winnipeg's inner city. Therefore, a raster image analysis technique was necessary to classify land quality.

- d. Sites with a mean value between 127 and 144.999 were classified as Mixed Surface (usually a combination of soil/grass and hard surface)
- e. Sites with a mean value over 145 were classified as Hard Surface (see Table 6: Classifying Land Quality)

This estimation method may result in errors when sites are unusual. For example, site 182 is a building currently a construction site in downtown Winnipeg. The girders on site are similar in color to soil, so the site is estimated as Soil/Grass. The estimation method can also be challenged on sites where there is a mix of extremes (dense vegetation and hard surface), as in site 80, Dumoulin Park. The MEAN between the extremes is in the Soil/Grass range, causing an estimation error. However, for the majority of the more than 400 potential sites for urban agriculture in Winnipeg's inner city sites, these categories provide a reasonable estimate of the land quality. This method then helps to narrow down sites that can be further inspected in greater detail.

Land Quality	Criterion (Mean raster value range)
Dense Vegetation	< 99.999
Mixed Surface	100 to 111.999
Soil/Grass	112 to 126.999
Mixed Surface	127 to 144.999
Hard Surface	> 145

Table 6: Classifying Land Quality

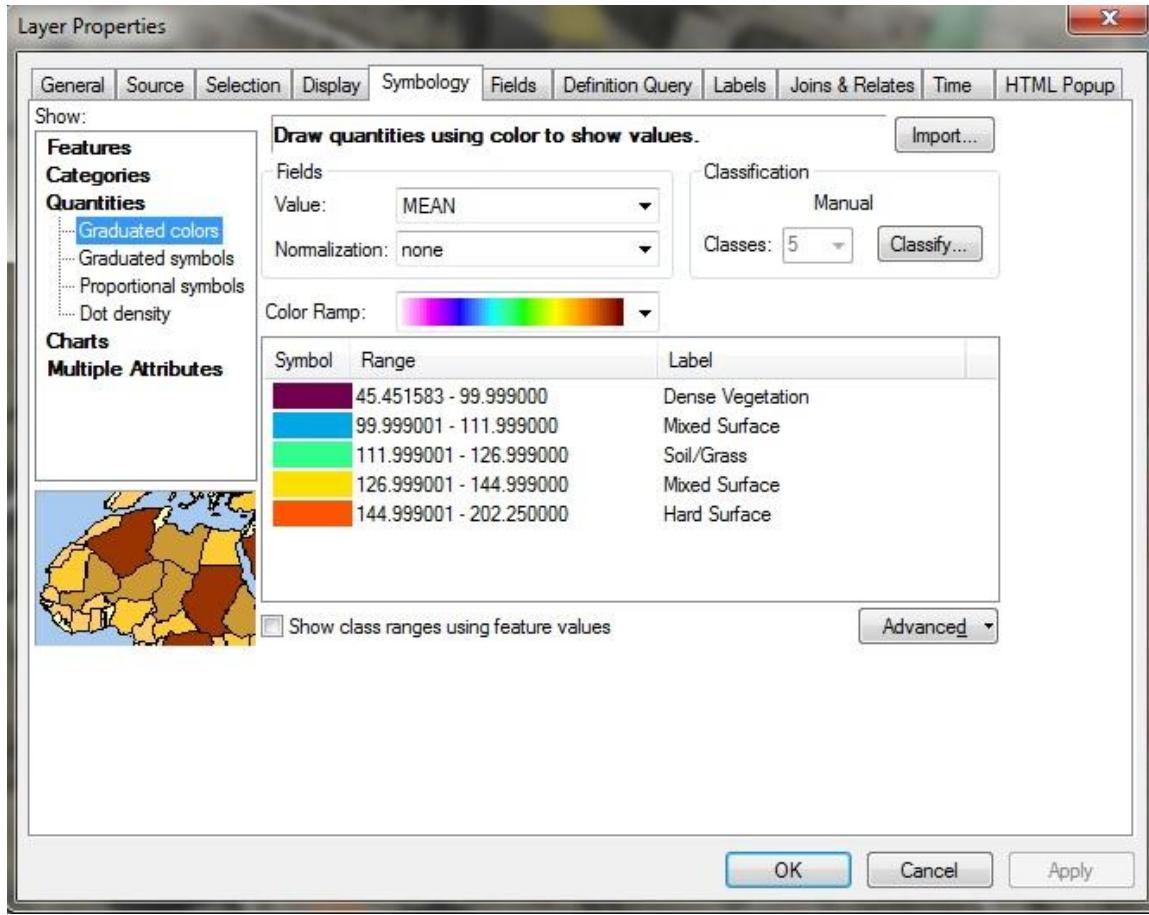


Figure 11: Classifying Land Quality

The next step is to assign a score value (GroundScore) to each of the sites based on their estimated land quality. For the purposes of this stage in the project, it is assumed that soil/grass sites will be the easiest areas to convert to agricultural use; therefore, they would receive the highest *land quality* scores. All sites classified as soil/grass received a GroundScore of 100 (GroundAnalysisSoil in Figure 12: Calculating Land Value).

All hard surface and dense vegetation sites would be the most difficult and costly to convert to agricultural use and would receive a lower score in this category. Sites with a raster value mean less than 111.999 (dense vegetation and mixed surface) were

given a GroundScore of their site's mean raster value divided by 111.999, multiplied by 100 (GroundAnalysisVeg in Figure 12). GroundScore values for sites with a raster value mean greater than 126.999 (GroundAnalysisHard) were calculated using the expression shown in Figure 13.

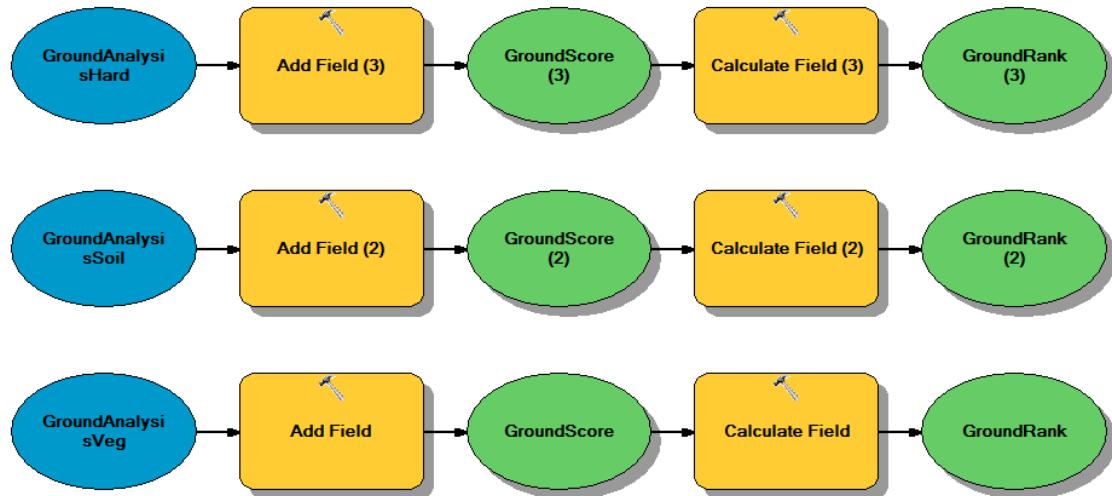


Figure 12: Calculating Land Value



Figure 13: Calculating GroundScore for mean values above 127

All three of the GroundScore values were then merged (using ArcGIS' Merge tool) into one shape file called GroundAnalysisNew.

4.2.2.5 Access to Water

The fifth key factor being considered in identifying viable sites for urban agriculture in Winnipeg's inner city is access to water. Focus group participants stressed the importance of water access on a site and the fact that without water, even a site with the best soil will be unsuitable. Access to water on a site can be achieved in several ways: hooking up to the city's piped water services; collecting water from adjacent buildings in a rain barrel; or pumping water from a nearby water body (which could be stored in a holding tank and hooked up to a drip irrigation system, like the one utilized in the South Osborne orchard near the Riverview Health Centre). The City of Winnipeg does not supply GIS information for the location of its water pipe, so the calculation does not factor in this infrastructure. It does factor proximity to other water sources (like lakes and retention ponds), as well as nearby buildings (of course, this is no guarantee that a neighbouring property owner would let an urban agriculture site take some of their water runoff). However, the calculation should serve to provide a reasonable estimate of water access.

Each site was given a score for access to water (WaterRank) by using ArgGIS' Near tool (see Figure 14). This tool gives a value, in metres, for each site based on the distance to the nearest identified water source. Sites with access to water directly on their site (a building or a pond) were given a WaterRank of 100. A site would lose one point for every metre of distance it had between the next closest water source (e.g. a site 20 metres away from the nearest water source would receive a WaterRank of 80). Sites with the nearest water more than 100 metres away received a WaterRank of 0.

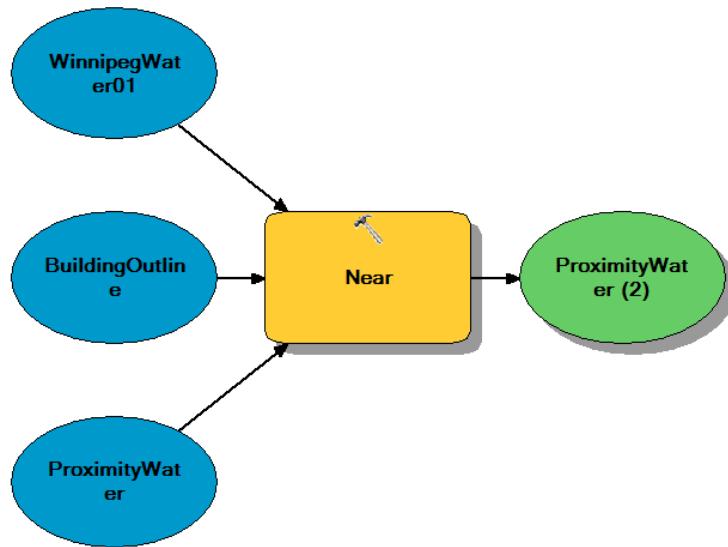


Figure 14: Proximity to Water

4.2.2.6 Ranking the Top Sites

At this point, each of the potential urban agriculture sites in Winnipeg's inner city has been given a score (out of 100) in each of the five categories above. These sites can now be ranked to determine the most suitable locations to pursue when looking for agricultural or gardening space for newcomers. To consider the suitability of each potential site, I will use a weighted rating system to identify the top 25 sites (see Table 7: Weighting of Site Selection Factors). Each factor will be weighted equally for this study, based on the recommendation of the focus group. The weighting given to each category can be easily adjusted for examining the suitability of potential urban agriculture sites for other purposes in the future.

Factor	Weighting
Site Size	20%
Proximity to Newcomers	20%
Proximity to Transit Stops	20%

Land Quality	20%
Access to Water	20%

Table 7: Weighting of Site Selection Factors

For this study, the sites are given a final rank using a basic averaging calculation; all of the scores for each of the five categories are summed and then divided by five (using ArcGIS' Calculate Field tool). This final rank score for each site is placed in a new data field (FinalScoreNew) (see Figure 15).

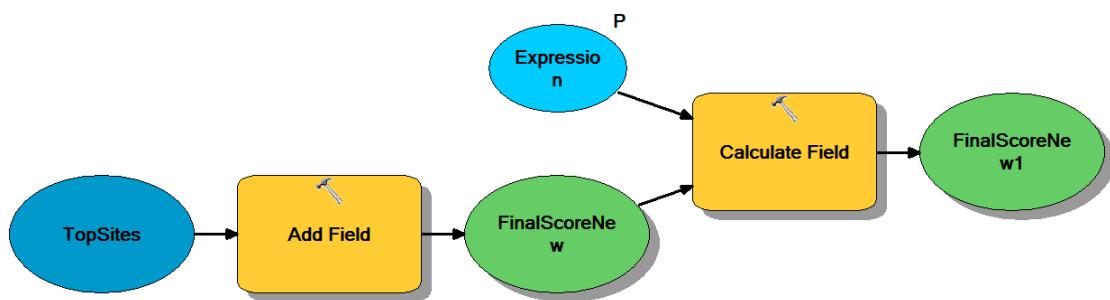


Figure 15: Calculating a Final Rank for Each Site

The list of top 25 sites can now be created by sorting the data table for the potential sites from the highest to lowest values of their final rank (FinalScoreNew). There are some unanticipated results in the top 25 sites on this list (see Table 8). Places like Old Market Square, City Hall, and the Goldeyes Stadium ranked high on the list because of their proximity to major transit routes and a newcomer population that has a reasonably high density in the residential enclaves around these locations.

Rank	Site	Address	FinalScore New
1	Old Market Square	275 Bannatyne Avenue	71
2	Civic Centre	510 Main Street	69
3	Winnipeg Fire Station No.1	65 Ellen Street	68
4	Lagimodier - Gaboury Park	363 Notre Dame Street	68
5	Whittier Park	836 St. Joseph Street	67

6	Vimy Ridge Memorial Park	821 Preston Avenue	66
7	Valour CC Orioles	448 Burnell Street	66
8	Goldeyes Stadium	1 Portage Avenue East	65
9	Old Exhibition Grounds	80 Sinclair Street	65
10	Central CC Freighthouse	200 Isabel Street	64
11	Central Park	400 Cumberland Avenue	64
12	St. John's Park	1 Fowler Street	64
13	160 Donald Street	160 Donald Street	64
14	North Winnipeg Parkway	North Winnipeg Parkway	64
15	Stephen Juba Park	65 Bannatyne Avenue	62
16	La Verendrye Park	426 Tache Avenue	62
17	252 Fort Street Parking Lot	252 Fort Street	62
18	The Forks	The Forks	62
19	Waterfront Drive Park	Waterfront Drive Park	61
20	Roosevelt Playground	534 Elgin Avenue	61
21	Omand Park	1430 Portage Avenue	61
22	Michaelle Jean Park	65 Granville Street	61
23	0 Fort Street Surface Parking	0 Fort Street	61
24	Lot off North Winnipeg Parkway	South Point Douglas	60
25	Markian Shashkevitch Park	164 Hallet Street	60

Table 8: The Top 25 Potential Sites for Urban Agriculture for Newcomers

However, despite their convenience for newcomers, these spaces are not likely viable for urban agriculture. The thing that prevents a place like the Goldeyes Stadium from being a viable location for urban agriculture is not necessarily poor soil, poor water, or poor sunlight; the site meets these criteria, plus the other criteria this study has considered. The real reason why the Stadium will not become an urban agriculture site is that the potential revenue generated from urban agriculture on the site would not be enough to surpass the revenue generated from the site as a baseball stadium. Therefore, an additional factor is necessary to examine the viability of sites for urban agriculture: value.

4.2.2.7 Value

The value of a site must be examined to determine its viability for urban agriculture. Interestingly, none of the urban agriculture site suitability analyses from other cities reviewed in this study factored site value into their assessment of urban agriculture land.

Perhaps the difficulty lies in deciding how to place a value on a site. Intuitively, one could estimate that the closer a site is to the downtown core of a city, the more value it would have (that is, the value of a site at Portage and Main would be more expensive than a site in the North End). A more accurate approach to assessing the value of a site would be to research the past (or current, in the case of some sites) sale price of the land. However, this approach is not feasible because most of potential urban agriculture sites are on publicly owned land that has never been put up for sale.

As an alternative to these calculation measures, there is one relatively straightforward way to assign value to both public and private land: tax assessment values. In the case of potential urban agriculture sites in Winnipeg's inner city, these assessment values are published online by the City of Winnipeg. The assessment information was gathered by searching the City of Winnipeg's online assessment database for each of the top 25 sites. Unfortunately, publicly available GIS data for these assessments was not available when the study methods were established and was only available online on a site-by-site basis. Since this time, this data has become available through the University of Manitoba's GIS Environmental Studies Library. If the study was run again, site value would be included as one of the first factors used in this analysis.

Using the method described above, each site's tax assessment value and acreage for the site were recorded in a table.¹³ The tax assessment \$/acre for each of the top 25 sites was then calculated by dividing the assessment dollar value by the site area using ArcGIS' Calculate Field tool.

¹³ This acreage value does not always coincide with the GIS shapefile's area for the site because buildings have been clipped from the useable site areas in the GIS database.

Site	Address	Assessed \$	Acres	\$/Acre
Old Market Square	275 Bannatyne Avenue	\$721,000	0.9	\$783,355.06
Civic Centre	510 Main Street	\$19,267,000	2.6	\$7,410,384.62
Winnipeg Fire Station No. I	65 Ellen Street	\$1,740,710	1.5	\$1,160,473.33
Lagimodier - Gaboury Park	363 Notre Dame Street	\$4,055,000	23.8	\$170,378.15
Whittier Park	836 St. Joseph Street	\$5,832,700	35.1	\$166,173.79
Vimy Ridge Memorial Park	821 Preston Avenue	\$3,479,450	6.0	\$579,908.33
Valour CC Orioles	448 Burnell Street	\$2,111,200	2.4	\$879,666.67
Goldeyes Stadium	1 Portage Avenue East	\$5,634,000	7.5	\$751,200.00
Old Exhibition Grounds	80 Sinclair Street	\$6,779,230	36.5	\$185,732.33
Central CC Freighthouse	200 Isabel Street	\$1,483,000	8.8	\$168,522.73
Central Park	400 Cumberland Avenue	\$10,555,850	4.7	\$2,245,925.53
St. John's Park	1 Fowler Street	\$845,730	14.9	\$56,760.40
160 Donald Street	160 Donald Street	\$1,970,000	0.6	\$3,529,201.00
North Winnipeg Parkway	North Winnipeg Parkway	\$61,800	2.4	\$25,750.00
Stephen Juba Park	65 Bannatyne Avenue	\$2,315,000	6.2	\$373,387.10
La Verendrye Park	426 Tache Avenue	\$1,079,500	3.9	\$276,794.87
252 Fort Street Parking Lot	252 Fort Street	\$3,421,000	1.1	\$3,110,000.00
The Forks	The Forks	\$1,399,000	9.0	\$155,444.44
Waterfront Drive Park	Waterfront Drive Park	\$41,000	0.4	\$99,732.43
Roosevelt Playground	534 Elgin Avenue	\$453,610	1.4	\$324,007.14
Omand Park	1430 Portage Avenue	\$1,443,600	11.2	\$128,892.86
Michaelle Jean Park	65 Granville Street	\$1,034,070	8.6	\$120,240.70
0 Fort Street Surface Parking	0 Fort Street	\$3,434,000	0.9	\$3,529,653.61
Lot off North Winnipeg Parkway	South Point Douglas	\$1,171,000	2.5	\$468,400.00
Markian Shashkevitch Park	164 Hallet Street	\$52,400	0.3	\$175,368.14

Table 9: Top 25 Sites with Assessment Values per Acre

This calculation gives a reasonable estimation of the perceived value of the land.¹⁴ It is assumed that the lower the assessed value of a site per acre, the greater the likelihood that urban agriculture would be encouraged on the site (because there would likely be less potential to sell or use the land for other types of development). Therefore, the sites can be ranked according to their assessment \$/acre. The site with the lowest

¹⁴ However, see Chapter 6 for directions for future research to improve the estimation of site value.

\$/acre value is the North Winnipeg Parkway, which has an assessment value of \$25,750/acre. This site will be given a score of 100. All the other top 25 sites can be ranked in comparison to this site by taking a score of 100 and subtracting from it the site's \$/acre value divided by the \$/acre value of the North Winnipeg Parkway. This value is recorded in a new table field for these sites (called MoneyScore) (see Figure 16). Using this calculation, the bottom four scores (that is, the four most expensive sites/acre) receive scores less than 0. The Civic Centre, for example, received a score of -188, due to its property value of more than \$7 million an acre. To simplify calculations, all scores below 0 are given a score of 0.



Figure 16: Calculating MoneyScore

4.2.2.8 Revising the Top Sites

The top 25 sites can now be reevaluated using information about their assessed value. As in the step above, the sites are given a final rank using a basic averaging calculation. However, six categories are now used (including the newly-created MoneyScoreFinal) to evaluate the sites, instead of the previous five. All of the scores for each of the six categories are now summed and then divided by six (using ArcGIS' Calculate Field tool). This final rank score for each site is placed in a new data field called FinalScoreNewM (see Figure 17: Calculating a Revised Final Score).

Factor	Weighting
Site Size	16.6%
Proximity to Newcomers	16.6%
Proximity to Transit Stops	16.6%
Land Quality	16.6%
Access to Water	16.6%
Assessed Value Per Acre	16.6%

Table 10: Weighting of Site Selection Factors, First Revision

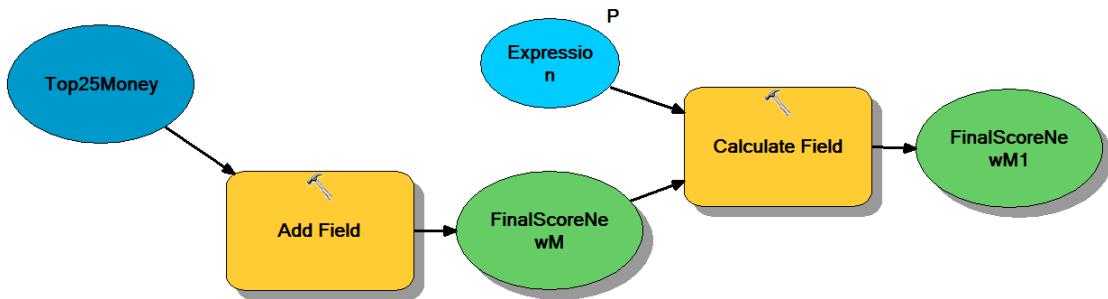


Figure 17: Calculating a Revised Final Score

By sorting this field from highest to lowest, a new ranking emerges. In this first attempt, the top site is Old Market Square (see Table 11). The fact that this site, which is clearly unsuitable for urban agriculture is still ranked the highest suggests that a further refinement of the weighting system is needed.

New Ranking	Site	Address	Money Score Final	Final Score NewM
1	Old Market Square	275 Bannatyne Avenue	70	71
2	St. John's Park	1 Fowler Street	98	70
3	Old Exhibition Grounds	80 Sinclair Street	93	70
4	North Winnipeg Parkway	North Winnipeg	100	69
5	Central CC Freighthouse	200 Isabel Street	93	69

Table 11: Top 5 Sites Rankings First Revision

To provide a better estimate of the feasibility of various sites for urban agriculture, the assessed value per acre must be weighted heavily. To refine the

approach above, the weighting of the assessed value per acre factor is increased from 16.6% to 50.0% (see Table 12). It is therefore considered to be as important as site size, proximity to newcomers, proximity to transit stops, land quality and access to water combined. Although this may appear high, the rationale makes sense; if the land is too expensive to purchase, urban agriculture will be impossible on the site, no matter how good the soil quality or the access to water.

Factor	Weighting
Site Size, Proximity to Newcomers, Proximity to Transit Stops, Land Quality, and Access to Water	50.0%
Assessed Value Per Acre	50.0 %

Table 12: Weighting of Site Selection Factors, Second Revision

With the new weighting system in place, the top 25 sites can be recalculated. The results are significantly different (see Table 13). The most expensive sites per acre, including the Civic Centre, the identified surface parking lots, Old Market Square and the Goldeyes Stadium, now appear near the bottom of the list. The best sites are now those that balance low cost per acre of land with the features sought after regarding urban agriculture for newcomers.

The top five sites now include the North Winnipeg Parkway, St. John's Park, Lagimodier-Gaboury Park, Whittier Park and the Old Exhibition Grounds. The potential barriers or opportunities to utilizing these spots for urban agriculture will be examined in Section 4, which will include a preliminary site design at one of these potential locations.

New Ranking	Site	Address	Money Score Final	Other Factor Total Score	New Avg.
1	North Winnipeg Parkway	North Winnipeg	100	64	82
2	St. John's Park	1 Fowler Street	98	64	81
3	Lagimodier - Gaboury Park	363 Notre Dame Street	93	68	80.5
4	Whittier Park	836 St. Joseph Street	94	67	80.5
5	Old Exhibition Grounds	80 Sinclair Street	93	65	79
6	Central CC Freighthouse	200 Isabel Street	93	64	78.5
7	Waterfront Drive Park	Waterfront Drive Park	96	61	78.5
8	The Forks	The Forks	94	62	78
9	Michaelle Jean Park	65 Granville Street	95	61	78
10	Omand Park	1430 Portage Avenue	95	61	78
11	Markian Shashkevitch Park	164 Hallet Street	93	60	76.5
12	La Verendrye Park	426 Tache Avenue	89	62	75.5
13	Roosevelt Playground	534 Elgin Avenue	87	61	74
14	Stephen Juba Park	65 Bannatyne Avenue	85	62	73.5
15	Vimy Ridge Memorial Park	821 Preston Avenue	77	66	71.5
16	Lot off North Winnipeg Parkway	South Point Douglas	82	60	71
17	Old Market Square	275 Bannatyne Avenue	70	71	70.5
18	Goldeyes Stadium	1 Portage Avenue East	71	65	68
19	Valour CC Orioles	448 Burnell Street	66	66	66
20	Winnipeg Fire Station No. 1	65 Ellen Street	55	69	62
21	Central Park	400 Cumberland Avenue	13	64	38.5
22	Civic Centre	510 Main Street	0	69	34.5
23	160 Donald Street	160 Donald Street	0	64	32
24	252 Fort Street Parking Lot	252 Fort Street	0	62	31
25	0 Fort Street Surface Parking	0 Fort Street	0	61	30.5

Table 13: Top 25 Sites Rankings Second Revision

4.3 Limitations to the Methodology

There are several limitations to the methodology employed in this section.

Before elaborating upon these limitations, it is important to remember that the goal of this GIS site identification process was to provide, in the words of McClintock, “a rough, ‘back of the envelope’ estimate of urban agriculture’s potential. . .” (McClintock et. al, 2013, p. 54).

As McClintock also acknowledges, the biggest challenge to using a GIS analysis is obtaining quality data. For this research, I was fortunate to have access to City of Winnipeg spatial data that was less than 1-year old at the start of the project. Of course, new development is always occurring around a city; undoubtedly, some of the agricultural land identified in this project's land inventory (section 3.2.1) has been converted into non-agricultural use since the data was obtained.¹⁵ However, the same quality of data was not available for the location of newcomer residences or for the location of piped water services. These limitations have already been discussed in the corresponding sections above.

Other limitations to the methodology occurred based on the choices that were necessary to make to analyze the data. To process the data, for example, it was necessary to reduce the number of sites to those that were larger than a certain size (0.5 acres). However, this approach may have eliminated small sites that might have ranked high in all the other main weighted categories. Furthermore, the weighting of a site's size also has implications on some of the other categories. When calculating a score for proximity to transit stops, a 500-foot buffer was added around the perimeter of each site. This means that the larger the site, the larger the buffer area around the site. This could give large sites a double advantage (because they would also receive a higher score for their size).¹⁶ Fortunately, there is a range of site sizes included in the

¹⁵ If anything, the rate of urban expansion into ex-urban agricultural areas should highlight the importance of converting underutilized inner-city land to agricultural use.

¹⁶ However, the alternative (creating the 500m buffer from the centrepoint of the site) would also cause problems, because there would be fewer bus stops within 500m of the site because part of the 500m would be taken up with land on the site itself (which obviously could not contain bus stops).

top 25 sites identified, which indicates that the potential effects of this “size multiplier” were limited.

The method for calculating proximity to transit stops is another limitation to the calculations, as it is difficult to determine the best way to measure the quality of transit service for an area. The method used in this study simply counts the number of stops within 500 metres of a site. However, not all bus stops are created equal; some stops service many different routes, while others service only one. Some busses arrive at stops every five minutes, while others only arrive at half hour intervals. The challenges of refining this calculation are outside the scope of this report.

Perhaps the most significant limitation in this research is the analysis technique used to examine land quality. Some of the limitations of these techniques are discussed in the section on land quality, above. Admittedly, this method is not as accurate as visual interpretation of each site (that is, reviewing the aerial photography of each site and assigning a score based on the estimated land quality that is visible from the image). However, the significant limitations of visual interpretation are identified by McClintock et. al, who acknowledge that “visual assessment of each parcel was incredibly time consuming. . . The HOPE mini-grant funded 140 hours of GIS work, but we easily spent twice this amount inventorying the publicly owned land” (McClintock et al., 2013, p. 55). Furthermore, the McClintock team found that even the visual assessment produced errors. “Even with the 1-m resolution,” they write, “what appears to be arable in an

aerial or satellite photo may not hold up to ground-truthing. The annual grasses of the Bay Area turn a golden-brown color during the dry season, making it difficult to distinguish them from bare dirt or concrete at some sites” (McClintock et al., 2013, p. 55). In fact, McClintock’s team recommends using “software to process aerial imagery” over the visual assessment process they used, while recognizing the same limits to this approach that have already been discussed (McClintock et al., 2013, p. 55). The software processing approach used for this practicum has the benefit of being able to provide a rapid estimate for the land quality of potential sites while allowing “ground-truthing” to correct some of the miscalculations at a later stage. As such, this process may serve as a model to follow for future urban agriculture land inventories and site suitability studies.

4.4 Summary

This chapter showed how a Geographic Information System (GIS) could be used to provide an estimate of potential agricultural land, along with an assessment of inner city sites that would best be suited to meet the needs of newcomers looking for larger growing spaces. This assessment found that there is indeed land in Winnipeg’s inner city that could fulfill the identified urban agriculture needs of the newcomer population. The following chapter provides a conceptual site design to explore other planning and design considerations that may be necessary to implement and maintain a successful urban agricultural site in the context of one of the top sites identified in this chapter.

5 Conceptual Site Design

5.1 Introduction

This section presents a conceptual design for what an urban agriculture operation for newcomers might look like on one of the sites in Winnipeg's inner city identified in the previous section. The purpose of this exercise is to explore a site design that addresses some of the barriers identified in the literature review, while incorporating some of the key features of an urban agriculture site identified in the focus group.

5.1.1 The Sites

One critical element is necessary before a conceptual site design can be created: a site. The previous section identified several potential sites for newcomer urban agriculture in Winnipeg's inner city. The top five sites identified in the site selection study are repeated in the table below.

New Ranking	Site	Address
1	North Winnipeg Parkway	North Winnipeg Parkway
2	St. John's Park	1 Fowler Street
3	Lagimodier - Gaboury Park	363 Notre Dame Street
4	Whittier Park	836 St. Joseph Street
5	Old Exhibition Grounds	80 Sinclair Street

Table 14: Top 5 Sites

Looking at these top five sites, it appears that each of them might make a suitable candidate for urban agriculture, based on the factors examined in the previous section.

However, this site design section will look at one of the most intriguing of the top five sites, the Old Exhibition Grounds at 80 Sinclair Street, based on its history and the existing infrastructure on the site. Currently, the Old Exhibition Grounds site features a recreation centre (with potential for water supply) and a large open space without trees, which is currently used for sports.

The site was the former location of the Canadian Industrial Exhibition, which, despite the name, was more of an agricultural fair. Jim Blanchard describes the exhibition grounds in *Winnipeg 1912*. He writes, “The exhibition grounds were bounded by McPhillips on the west, Sinclair on the east, Jarvis on the south, and Selkirk on the north. They had been in use for over twenty years [prior to 1912] and the Winnipeg fair had grown to completely fill them” (Blanchard, 2005, p. 140). At first glance, no heavy industrial development appears to have taken place on the site, leaving the risk of soil contamination low. Among the top five locations discussed in this section, the Old Exhibition Grounds look to be the most promising for an urban agriculture site. Therefore, it will serve as the location for the conceptual site design component of this practicum.

5.2 Research Methods

The Old Exhibition Grounds is the location for the site design component of this practicum. The site design will help to answer the fourth research question, namely, “What planning and design considerations are necessary to implement and maintain a successful urban agricultural site in the context of Winnipeg's inner city?”

The research methods for this component of the practicum will begin with the steps proposed by Hanna and Culpepper in GIS in Site Design. “The design process begins with goals and objectives,” they write. “Usually the client has established the goals and has most of the objectives fixed in his or her mind. It is our job to evaluate and suggest revisions or expansions” (1998, p. 115). This study uses the findings from the literature review and focus group to develop the goals and objectives that would be established by a typical “client.” In this case, the goal is to establish an urban agricultural operation in Winnipeg’s inner city that could be used by newcomers with a farming background. To accomplish this, the space must be productive (e.g. it should have access to sunlight and have quality soil, which could be improved with compost or fertilizer). It needs to consider storage for water and tools. It ought to consider measures to reduce the potential for theft or vandalism. Lastly, it should be a space that is pleasant to work in and encourages social interaction. These goals and objectives directly inform the site program.

The site program is also developed according to the methods used by Hanna and Culpepper. They say there are two common methods to undertake a program analysis for a site: decision matrices and bubble diagrams (1998, p. 115).

5.2.1 Decision Matrix

The site plan begins with the creation of a decision matrix that will inform the elements that should be included in the plan. According to Hanna and Culpepper, “The purpose of the matrix is to summarize the results of the research or the basis for decisions made during program definition. The proposed use (and/or facility) will always

make up one axis. The other axis may be one or more of the items listed earlier: desirable conditions, user groups, costs, and the like. In this case the matrix becomes the list of ground rules to be used later in the design process. The list of rules tells the client, and/or the public, the assumptions under which you were working when preparing the site analysis and area relationship study" (1998, p. 117). There are five different decision criteria used in the program analysis for this project: a) desirability to gardeners, b) desirability to neighbours, c) cost effectiveness to implement, d) cost effectiveness to maintain, and e) contribution to production / revenue. These five criteria make up the horizontal axis of the matrix. The other axis is made up of the potential site elements identified in the literature review and focus groups.

With the items identified on each axis, the matrix becomes a selection tool to identify the essential elements on the site. This becomes important if, as Hanna and Culpepper mention, the site is too small to include all the elements or if there is a limited budget to implement the elements on the site (1998, p. 118). They write, "The matrix can be used to record scores or rankings for one or several criteria. The various sources may assign different scores to each criterion. Thus, you may have an evaluation of each use from the point of view of the owner, the reviewing agency, the neighbours, and the lending institution. (You may record these scores in the matrix based on comments made at meetings or in interviews, correspondence, or reports). The total scores or rankings can then be used to eliminate the less desirable activities" (Hanna and Culpepper, 1998, p. 118). In this study, each site element is ranked with a score between 0 and 3 for each of the five criteria. A score of zero means that the site element does not meet the criteria or performs poorly in comparison to the other site

elements (e.g. a score of zero in the desirability to neighbours category means that neighbours could be opposed to this element on the site). A score of three means that the site element strongly meets the criteria, particularly in comparison to other potential site elements (e.g. a score of three in the cost effectiveness to implement means that there is a minimal cost to the client for this site item compared to other potential site elements).

The decision matrix for this site is included in the table below.

Proposed Element	A. Desirability to Newcomer Gardeners	B. Desirability to Neighbours	C. Cost Effectiveness to Implement	D. Cost Effectiveness to Maintain	E. Contribution to Production / Revenue	TOTAL
1. Garden (in Ground)	3	1	3	3	3	13
2. Raised Beds	3	3	2	3	2	13
3. Storage Shed	3	3	0	2	1	9
4. Compost Bins	3	1	2	2	3	11
5. Water Tank	3	2	1	2	3	11
6. Seating Area	3	1	2	2	1	9
7. Market Area	2	1	1	1	3	8
8. Cold Storage	2	1	0	1	3	7
9. Kitchen / Processing	2	1	0	1	3	7
10. Signage	3	1	2	2	3	11

Table 15: Site Decision Matrix

5.2.2 Bubble Diagrams

The potential site elements identified in the decision matrix above come in a range of sizes. The amount of area taken up on a site by each of these elements is important to consider for site planning. Before examining how each of these elements might fit on the identified site at the Old Exhibition Grounds, the site elements will be arranged and sized abstractly using bubble diagrams. This project uses the definition of “bubble diagram” provided by Hanna and Culpepper, who say that a bubble diagram, “refers to the idealized arrangement of uses that are generated *without* regard to any particular site. The purpose of the programmatic bubble diagram is to examine the ideal spatial relationships between the various uses and their associated program linkages. For instance: Should one use be close to another or separated by a distance or by a physical barrier? Proportionally, what are the size relationships of the various uses to one another? How many types of circulation routes are there?” (Hanna and Culpepper, 1998, p. 118).

Several examples of possible bubble diagrams for an urban agriculture site for newcomers are provided in this section. There are some general principles that inform these diagrams. First, that the amount of space used for growing food (that is either directly in the earth or in raised beds) should be maximized to fill the identified site. Second, that compost areas should be located where they are convenient for gardeners and separated from neighbours. Third, that a water tank or water source be located at the most convenient location on the site. Fourth, that treed areas should be used for a seating location or picnic area. Fifth, that signs be located along major circulation routes.

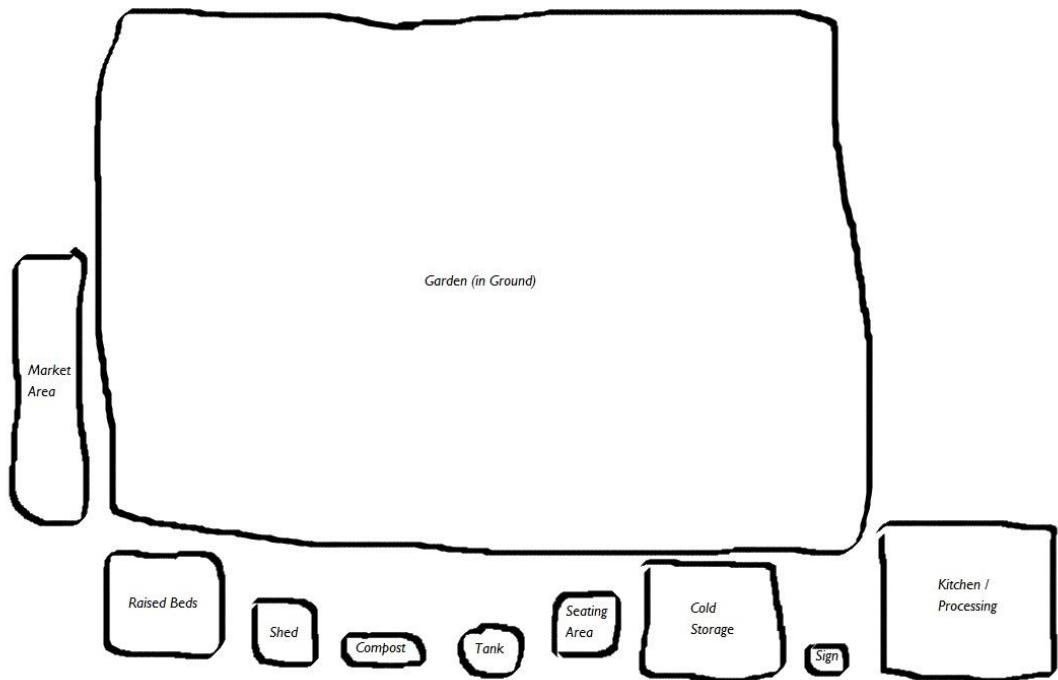


Figure 18: Bubble Diagram 1: General Size Comparison of Elements (Kroeker, 2016)

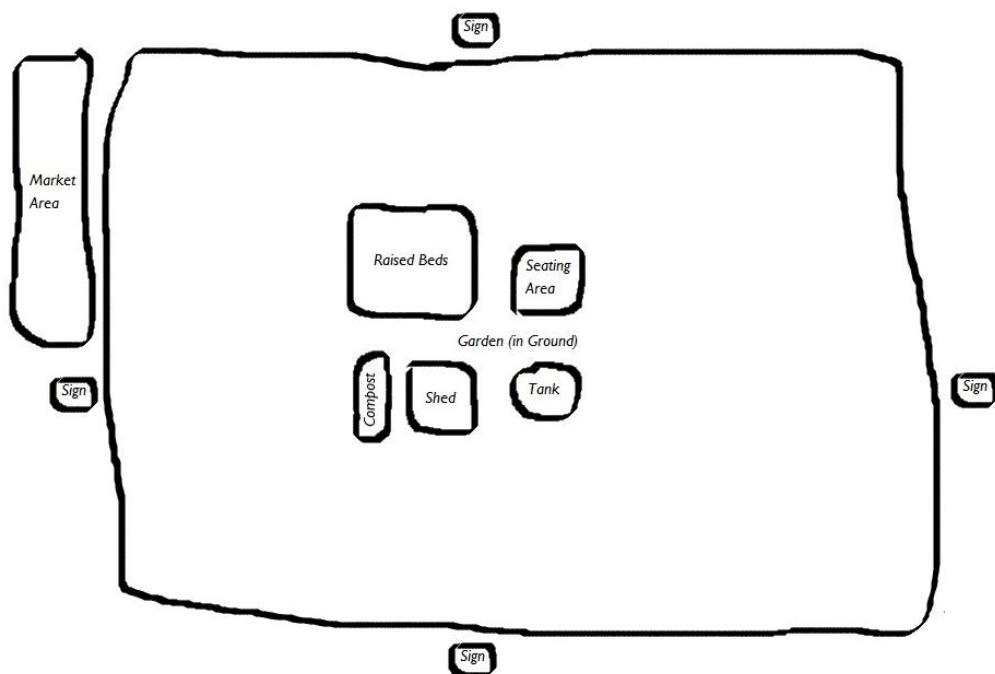


Figure 19: Bubble Diagram 2: Nested elements around a central area (Kroeker, 2016)

5.3 Inventory & Analysis

The third step of the site design involves an inventory and analysis of the site. Hanna and Culpepper describe the site inventory as “the collection of maps and information related to the site, as needed to analyze this project” (Hanna and Culpepper, 1998, p. 1). The purpose of the site inventory, according to Hanna and Culpepper, is to identify “the constraints and opportunities that exist because of the physical and cultural components” of the site (Hanna and Culpepper, 1998, p. 125). For this project, the site inventory includes an analysis of historical information and a landscape analysis of the Old Exhibition Ground.

5.3.1 Historical Information

The Old Exhibition Ground played a key role in the first few decades of Winnipeg’s history. As the name suggests, the site was home to the Canadian Industrial Exhibition, which showcased the natural resources of the prairies and the ingenuity of its inhabitants. Historian Jim Blanchard (2005, p. 139) writes, “The exhibition was a trade fair where manufactured goods, farm produce, and livestock could be displayed and find buyers. During the Victorian era, fairs had also taken on the higher purpose of educating the public by showcasing the amazing advances of modern industry: the progress of modern civilization.”

The grounds themselves contained barns, display buildings (displaying arts and manufacturing), and a grandstand overlooking a racetrack and a field, which served as a runway for early aircraft demonstrations in 1912. Its location made it ideal for this kind of use. In *Making a Place: A History of Landscape Architects and Landscape Architecture in*

Manitoba, Catherine Macdonald writes, “Winnipeg’s exhibition ground was established north of the CPR tracks on what was then the western fringe of the city in the early 1880s. Its large barns and exhibit halls were served by a spur line, which made it easy to transport the cattle and horses that would be shown to admiring crowds and judged according to their breeding and quality” (Macdonald, 2005, p. 24). “Pure fun was not neglected,” Macdonald continues, “as the spacious grounds housed a race track and space for a midway” (Macdonald, 2005, p. 24).

Newspaper clippings from 1912 show that the Canadian Industrial Exhibition was a major event for its time. Jim Blanchard writes, “As visitors climbed down from their cars on Sinclair, the first thing that struck them was the noise. If one of the twice-daily grandstand shows was in progress, they heard the ‘distant rumble of many voices,’ as the *Free Press* reporter described it. As fair goers stepped up to the ticket booths at the entrance, the sounds of the midway, the calliope of the merry-go round, the shouts of the pitch men, and the rattle of the amusement rides and the screams of their riders washed over them” (Blanchard, 2005, p. 142). The midway contained attractions that appealed to fairgoers looking for entertainment that went beyond livestock and horse racing. Blanchard says, “In one tent you could see Princess Victoria, the smallest woman in the West, who played tiny musical instruments and sang. In another, a deep-sea diver in suit and helmet demonstrated in a well-lighted tank” (Blanchard, 2005, p. 150).

However, even as the Canadian Industrial Exhibition enjoyed success in the years around 1912, Winnipeg City Planners were talking about finding a different location for the event. The City of Winnipeg even passed a bylaw later in that year to move the exhibition to a site near Kildonan Park, which city officials deemed a “more beautiful

location" (Blanchard, 2005, p. 140). At this time, other plans were made for the exhibition site. Planners wrote, "There being a need for good cottage building and designing in the City, part of the Old Exhibition site should be utilized for a Model Housing Scheme for workmen. [...] There being a need for convenient 'apparent factories' in which small manufacturing firms can find accommodation with all the facilities the City offers, provision should be made for such factories on this site" (Winnipeg City Planning Commission, 1911, p. 267). However, none of these plans came to fruition. The exhibition was held on the old site near the Weston Shops for years to follow. The site stood vacant until it slowly transitioned to its modern use as a park and recreation facility. Evidence of this long-time recreational use can be seen on the maps below, dating from 1960 and 1987, respectively.

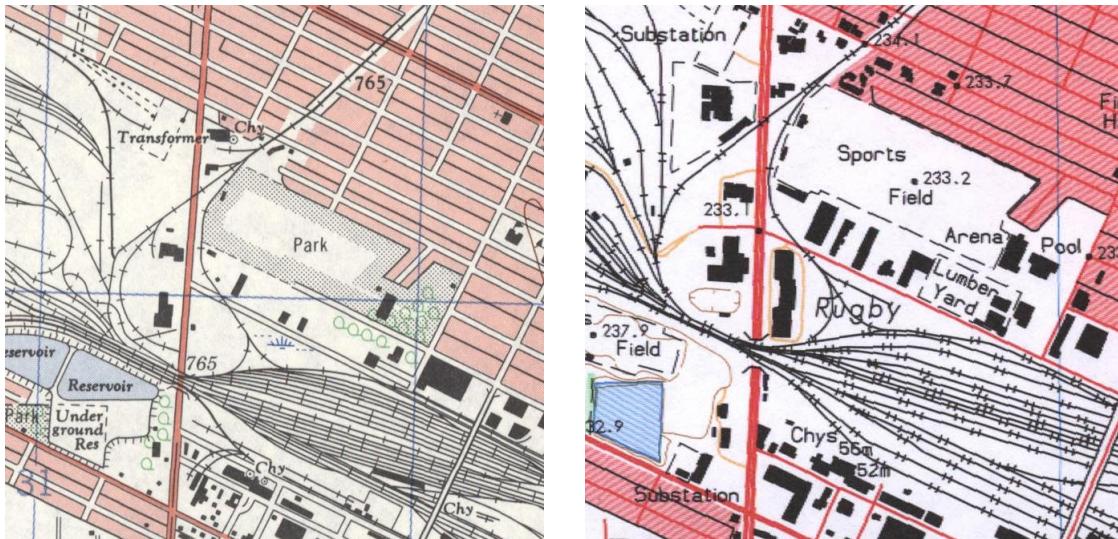


Figure 20: Old Exhibition Grounds, University of Manitoba Libraries Map Collection, 1960 and Province of Manitoba, 1987 - AL37 North End Topographic (Creative Commons)

5.3.2 Landscape Analysis

In addition to historical information, a site inventory should include an analysis of physical landscape. This physical landscape analysis may cover conditions such as “terrain, drainage patterns, vegetation, soils, existing structures, microclimate, views, access, wildlife, existing circulation patterns, and so forth” (Hanna and Culpepper, 1998, p. 1).

The first important landscape factor to consider for an urban agriculture site is the availability of sun: a requirement for growing food. This site features a large open area that now contains several baseball diamonds, which would be an ideal area for growing foods that require sunlight. This open area extends all the way to the roadway on the southern edge of the property.

However, there are other places on the site where shadows could be an issue. The north edge of the site is bounded by a treed area, which is separated from the open area with the baseball diamonds via a low chain-link fence (see Figure 21). Nevertheless, shadows cast by these trees should be considered in plans for the site. Parts of the east and west sides of the site may also have to contend with shadows; there are treed areas here as well as buildings (see Figure 22 for an example of how the shadow from a building would affect the ability to grow plants on this site).



Figure 21: A chain-link fence separates the treed area on the north edge of the site from the open area (Kroeker, 2015).

To accurately estimate the potential effects of shadow on the site, a shadow calculator was used to calculate the length of shadow cast by a 7.5-meter-tall object on July 1 at around 6:00pm in the evening.¹⁷ The calculation used the precise latitude and longitude of the Old Exhibition Ground site. Based on this calculation, a 12.5-metre buffer was placed around all trees and residential buildings around the site to indicate potential shadowed areas. A 16.75-metre buffer was placed around the other buildings

¹⁷ Of course, the shadows on the ground will be shorter or longer than this at certain times of the growing season; however, the calculation should provide general guidance on where these shadows might be regular enough to affect plant growth significantly.

on the site, based on the same calculation run for a 10-metre structure. The buffered areas are indicated as “Potential Shadows” on the Sun and Shadow map in the appendices. These areas become constraints for urban agriculture development in the area relationship study (ARS) in the next subsection.



Figure 22: Shadows from a building fall onto the old tennis courts (Kroeker, 2015).

Slope and topography are also important landscape factors to consider in site planning. Maps are provided in the appendices displaying elevation in and around the Old Exhibition Ground site. The first map, entitled “Minimum Elevation: Area Surrounding Site” shows that the site is located in a large plain with little elevation change (a minimum elevation between 232.5 and 235.0). There are a few areas with higher or

lower ground shown on the map, but these are all located to the southwest across McPhillips Street or to the southeast along the rail tracks.

A second map shows detailed elevation levels for just the Old Exhibition Grounds. This map confirms that the elevation change on the site is minimal. However, it should be noted that the western edge of the site is slightly higher than the eastern edge of the site (234.0 metres compared to 232.0 metres). This is important to note when considering irrigation and water storage on the site.

The third key factor to consider is the movement around the site. A map in the appendices (entitled “Movement Around Site: Old Exhibition Grounds”) shows parking areas and bus stops.

Many newcomers would access the Old Exhibition Grounds using the public bus system. The map shows that the major bus stop (connected to five different routes) is located at the intersection of McPhillips street and Selkirk Avenue at the top left corner of the map. Presumably, people getting off the bus here would walk east along Selkirk Avenue to access the site. Passengers arriving on the 16 bus would also access this north entrance. Passengers arriving on the 71, the other bus that travels past the site on the residential roads, would access the site from the south (either off Sinclair Street on the southeast corner or via the McPhillips Street parking lot on the southwest corner of the site).

Newcomers with access to a personal automobile could access the site directly off this McPhillips Street parking lot on the southwest corner of the site. There are also some additional turnaround areas and parking spaces along the west side of the site near

the present football field. Newcomers could also use the recreation centre's main parking lot on the southeast corner of the site or parallel park at available spaces along Dufferin Avenue. Street parking may also be available along Selkirk Avenue. The main parking areas are also identified on the Movement map.

Movement lines based on travel to and from the site (originating at bus stops or parking areas) are indicated on the map using blue arrows. Currently, a tall chain link fence with only a few openings restricts pedestrian foot traffic into the open middle area of the site. This chain link fence could be kept as-is or modified to direct pedestrian movement through an urban agriculture area in a redesigned site plan. These opportunities are explored in the next section, the Area Relationship Study (ARS).



Figure 23: A path through a chain link fence leads to the baseball diamonds, coming from the south edge of the site (Kroeker, 2015)

5.4 Area Relationship Study (ARS)

An area relationship study (ARS), is, according to Hanna and Culpepper, “a drawing that fits the uses (shown as bubbles) on the site analysis. At the ARS stage, the spatial arrangement of the bubbles must be adjusted to fit the site, and they may no longer be “idealized”; they may not retain the perfect symmetry (or the perfect nesting, etc.) they had at the earlier stage” (Hanna & Culpepper, 1998, p. 119). The ARS places the elements identified in the bubble diagram onto the site at the most suitable locations based on the site inventory.

The area relationship study is the most complete stage of design in this practicum; this project does not include detailed renderings, a study of materials, or construction drawings. These things are outside the scope of this study and would not add much value to the study of urban agriculture for newcomers in Winnipeg. According to Paul De Graaf, planners and landscape architects should not be overly concerned with providing a fixed design for urban agricultural spaces. He writes, “Urban agriculture is opportunistic by nature. [...] It is driven by bottom-up initiatives and the key designers are urban farmers themselves. Traditional top-down planning and design is not appropriate here” (De Graaf, 2013, p. 38). De Graaf continues, “Too many architectural renderings can stand in the way of a viable business model. The basic elements of urban agriculture (soil, plants, water, supporting structures) already have the intrinsic potential to make beautiful spaces” (De Graaf, 2013, p. 38).

However, there are still several important considerations that need to be made for every urban agriculture site. An ARS can help with the visualization of some of these

considerations. The ARS for this practicum involves several steps. Hanna and Culpepper write, “In order to begin the ARS, the site designer brings the site analysis and several of the workable bubble diagrams together, as well as any site condition matrices that were prepared earlier. [...] Thus, the three previous work products (program matrices, bubble diagrams, and site analysis) are pulled together to prepare the ARS” (Hanna & Culpepper, 1998, p. 127).

The ARS for an urban agriculture development on the Old Exhibition Grounds site begins with the goal of maximizing the space for growing food. The opportunities map identified several locations in the middle of the open area that are free from shade and pedestrian movement (which could lead to trampling or vandalism). These opportunity areas are numbered one through five on the opportunities map (see the appendices).

The next major consideration is water. 1000-liter water tanks (or totes) are standard for community garden sites. These tanks can be filled with rainwater collection from nearby buildings, by trucks, or by pumps from a water source. On this site, water should be obtainable from the water source at the community centre. The buildings on the west side of the property may also have available water hookups that could be used to fill a tank for urban agricultural use. To store and distribute this water, the main water tanks should be placed at the southwest corner of the site. This location allows for filling by a water truck. This point is also the highest ground on the site. A water irrigation line could be run from water tanks in this location to the garden areas around the site (the line could have spouts or a drip irrigation system that would slowly water

plants along the line). Extra flow, if required, could be obtained with the help of a solar pump.

In the ARS, storage sheds and compost boxes have been located in a central area. In this location, they are easily accessible to the garden plots. Following the recommendations in the focus group, the compost bins have been hidden from foot traffic by the careful arrangement of the storage sheds. Another 1000-liter water tank is also installed in this location to capture rain from the roofs of the storage sheds and to take advantage of this central location.

Vertical gardens are installed along the location of the current baseball backstops on the other three corners of the crossroads at this central location. The vertical gardens provide a small area of shade for a seating area at this location. They also provide a growing place for the climbing plants and vines favored by newcomers (which, according to the focus group, include beans, cucumbers, and squash).

There are two places where raised beds are concentrated in the ARS. The first place is along the pathway near the vertical gardens. The second place is in opportunity area number six, south of the outdoor skating rink. These raised beds are close to the road and would be accessible for older newcomers or people with mobility issues.

A cold storage area, a kitchen, and a food processing location are site elements that would allow newcomers to do more with the food they grow in the gardens. The main restrictive factor to including these elements on the site is cost. For this reason, new facilities are unlikely without a major funder. However, the existing buildings on the Old Exhibition Ground site have the potential to be adapted for these uses. An urban

agriculture coordinator for the site could explore the possibility of installing a cold storage area within part of the indoor arena or using the community centre's facilities for a kitchen or food processing area.

Fencing and signage make up the two main security features on the site. Signs are installed at every major entrance to the urban agriculture site indicating which food belongs to individuals and which food, if any, is available to be picked by the public. The current chain-link fencing around the site would also serve to deter vandalism and theft because it demarcates areas with certain ownership restrictions (in the same way as a white picket fence in a front yard deters intrusion, even though it could be climbed, simply because it demarcates the yard as private property). This area relationship study does include one new entranceway onto the site directly to the south of the planned seating area near the trees. This entrance would be a continuation of the pedestrian thoroughfare running south off Selkirk Avenue and should be added for the ease of newcomers who would enter the site this way.

The last site element to consider is a market area. A market area would give the newcomers who grow food on the site a place to sell their extra produce. This potential revenue source would promote food security and would allow newcomers to view urban farming as a job, not just a means of supplementing their diet. A market area would work on the southeast corner of the site near the community centre; this location would utilize the traffic that already comes to the site. However, an even better market area is in the southwest corner of the site. This area has direct access off McPhillips Street and a large surface parking lot directly to the south. A market in this location could also entice visitors to the McPhillips Street Casino across the street to

pick up some fresh produce before they head home. This market area would not need permanent structures; tents would serve the purpose of sheltering sellers and would recall the feel of the old midway at the industrial exhibition.

Of course, the site plan provided in this area relationship study shows one of an infinite number of ways to arrange the elements on a site. This area relationship study is meant only to provide a means of visualizing the potential aspects of an urban agriculture site for newcomers in Winnipeg's inner city.

6 Summary, Reflections & Recommendations

This practicum set out to answer four research questions related to urban agriculture and newcomer populations. The literature review, focus group and questionnaire found that urban agriculture can address some of the barriers to settlement faced by newcomer populations. For example, there is compelling evidence that urban agriculture supports the physical and mental health of newcomers and provides opportunities for socialization and improved nutrition. The focus group and questionnaire also provided important insight in what is required to improve urban agriculture for newcomers in Winnipeg's inner city by highlighting barriers currently faced by newcomer gardening programs as well as several opportunities for improvement. The practicum then used a Geographic Information System (GIS) to confirm that there is land in Winnipeg's inner city that can potentially fulfill the needs of newcomers. This study also provided a high-level analysis to identify sites that might be most suitable to meeting these needs. A conceptual site design then examined additional planning and design considerations that would be necessary to implement and maintain a successful urban agricultural site in the context of Winnipeg's inner city.

6.1 Reflections

Ultimately, this practicum achieved the goal of answering the four research questions set out in the first chapter. Upon reflection, however, there were notable shortcomings encountered in each of the major areas of research. Initially, the literature review specifically aimed to focus on the question of how urban agriculture could address food security issues for newcomers, with less of a focus on the other barriers

to settlement. In fact, it was initially hoped that the practicum would provide a “solution” to the problem of newcomer food insecurity in Winnipeg’s inner city. The literature review did not provide the anticipated findings. First, it showed that urban agriculture, though important in many ways, often has only a minimal impact on food security. Furthermore, it showed the challenges in making urban agriculture operations financially viable as businesses (which was going to be one of the key “problem-solving” strategies of this practicum). In the end, the literature review questioned the very nature of treating newcomers as “problems to be solved.” This is a valid criticism that shifted the perspective of the research during the writing process.

There were additional shortcomings with the focus group and questionnaire. Most obviously, the number of attendees at the focus group was disappointing. The participants who were there did provide valuable detailed feedback, but additional viewpoints may have been missing. Furthermore, the approach of the focus group had to be adjusted based on feedback during the discussion. The original intent of the focus group was to get much more detailed feedback about the weighting system used in the GIS analysis as well as the various elements in the conceptual site design, but during the conversation it became clear that these things were much less important than the other barriers and opportunities that were addressed. By the time the questionnaire was sent out, the importance of some of the elements of the GIS land analysis and the conceptual site design component of the practicum seemed negligible.

Limitations in the GIS site suitability analysis have already been discussed within that chapter. Most importantly, it was determined that the value of the site should be

considered as early as possible in the process of identifying viable sites for urban agriculture. However, methods to calculate the value of public land remain a challenge.

The conceptual site design component of this practicum changed the most from its original intent to final product. Initially, the site design was going to include detailed drawings and renderings of what such a space would look like. As research progressed, however, it became clear that such an approach would be unprincipled. The proper process necessary to design a site was not feasible in this practicum; such design would need to be created in dialogue with the actual users of the site from the very start. Even the “conceptual” level of site design that is included in this document may go too far.

The Old Exhibition Grounds was chosen as the conceptual design site based on its interesting history and location; however, it is hard to make the case that the site is currently “under-utilized” and therefore ready to be turned into an urban farm. This is a decision that would and should only be made following detailed studies of its existing recreational users and consultation with community members to understand how the site is or is not meeting their needs. In reality, it may be the case that neighbours would only welcome a small fraction of the area of the sites identified in the suitability study as urban agriculture sites. This may be the most notable limitation of this practicum; in the end, there is no substitute for ground-truthing the quality of a site or getting out and talking to community members.

6.2 Directions for Future Studies or Actions

Despite the limitations described above, the practicum did provide some findings that may be useful to urban agriculture and newcomer programs in Winnipeg. The practicum also points to several directions for future studies or actions.

First, the site suitability analysis in this report could be further developed into an “official” city map of available and suitable urban agriculture sites in Winnipeg that could be provided to organizations like the ones identified in this practicum. Ideally, this map would be hosted publicly online and updated regularly. To be most helpful, this map would identify parts of public land that the City of Winnipeg would “pre-approve” for development of urban agriculture spaces. The City could take a more active approach to encouraging urban agriculture by identifying these sites (perhaps in conjunction with its review and update of its development plan, OurWinnipeg, which includes an extensive public engagement process). This would help to address the barrier newcomer gardening programs face by first having to seek out a site and then having to canvass the neighbourhood for support.

Another direction for future studies would be to refine the method of calculating the value of public land. For reasons described above, this practicum used the City of Winnipeg’s assessed value of land to estimate the value of the sites. However, the accuracy of these assessments is unclear when measuring the value of public spaces. For example, would \$720,000 be a realistic asking price for Old Market Square? If so, why is this valued so much less than the \$10,000,000+ assessment of Central Park? It appears that the City’s assessed values may not reflect the “true” value of the sites if they would

ever become available for purchase. Furthermore, even if a monetary value for a park or other public land could be refined, this number may still not reflect the total worth of a site put on it by community members (in terms of its recreational benefits, for example).

Likewise, future research could continue to refine the calculation of the “true” value of urban agriculture spaces, especially for certain demographics like newcomers. Future research could investigate the minimum amount of land that would be necessary to sustain a newcomer family throughout the year. At the most basic, this could be a calculation of land needed to provide essential food security.¹⁸ More complicated calculations could also refine the calculation of the amount of land and systems necessary to support a successful urban agriculture operation or to provide other benefits such as mental health and socialization. These calculations could help to provide a better understanding of the “demand” for agricultural land in an urban area, which could be compared against the existing supply. Identifying the amount of land necessary to address any shortfalls between supply and demand would be an effective tool to lobby municipalities to designate more space for future urban agricultural use.

Another area for future action is to investigate ways to better inform newcomers and organizations that work with newcomers about the urban agriculture opportunities that are already available to them regarding funding or available land. A report on urban agriculture for newcomers in Ontario says, “A lack of available

¹⁸ In the 1920s, German landscape architect Leberecht Migge based his designs on calculations for the size of land needed for individual families to garden in urban environments. But these numbers would have to be revisited, particularly for a North American context, based on climate and modern practices to increase productivity (e.g. intensive planting methods, vertical gardening, seed genetics, etc.).

information regarding existing agricultural opportunities can be a barrier against newcomers to Canada entering the farming sector. Specifically, several interviewees noted that they knew of medical education programs and construction-training opportunities offered to immigrants; however, they were generally unaware of available opportunities specific to agricultural careers” (Janz, Dietrich-O'Connor, & Stewin, 2012, p. 11). Therefore, organizations that assist newcomers must work together with community centres, municipal government, and newcomers themselves to identify ways to improve communication about urban agriculture opportunities.

6.3 Conclusion

Ultimately, political will and community support would be necessary to realize an urban agriculture site like the ones presented in this practicum. To do this, urban agriculture for newcomers would need to be considered as a higher priority than the uses that take place on a site now. However, this is not an impossibility. Urban agriculture projects as explored in this practicum have already been successfully operating in other cities around the world (James, 2013; Newman & Jennings, 2008), including many in North America (Shumate, 2012; Hall, 2000).

Despite these success stories, there are still many barriers to urban agriculture in North American cities, where policies and land prices may actively work against the success of farming in an urban environment. Critic Samantha Irvine cautions against designers who “create dazzling spectacles without considering systemic barriers—such as funding, crop yields and regulation—to urban agriculture” (Irvine, 2012). The chapters

above highlight strategies that could be used to address the systemic barriers faced by newcomers interested in pursuing urban agriculture.

There are already positive steps and innovative approaches to urban agriculture for newcomers taking place in Winnipeg. Winnipeg charities and capacity-building organizations working with low-income communities and newcomers regularly support initiatives like urban agriculture projects. Winnipeg households are also taking their own initiative to help newcomer farming. A 2013 Food Matters Manitoba report says, “There are now some downtown homeowners who are providing their backyards to newcomer families for the purposes of growing food” (Food Matters Manitoba, 2013, p. 32). In fact, as research for this practicum concluded, Winnipeggers had contributed \$5000 through an online fundraising campaign to build a project called “The North End Garden of Nations,” which provided fifteen different families with two four feet by eight feet raised garden beds each (Food Matters Manitoba, 2016). These raised garden beds were installed at a location that has good access to bus stops, water, and is not far from where newcomers live: The Old Exhibition Grounds.

These thirty garden boxes, along with the research findings in this practicum, may provide a starting point that helps to highlight the opportunities for urban agriculture for newcomers in Winnipeg. One thing is clear: there is an abundance of land that could be used for urban agriculture. One question remains: who is willing to help newcomers find their new land?

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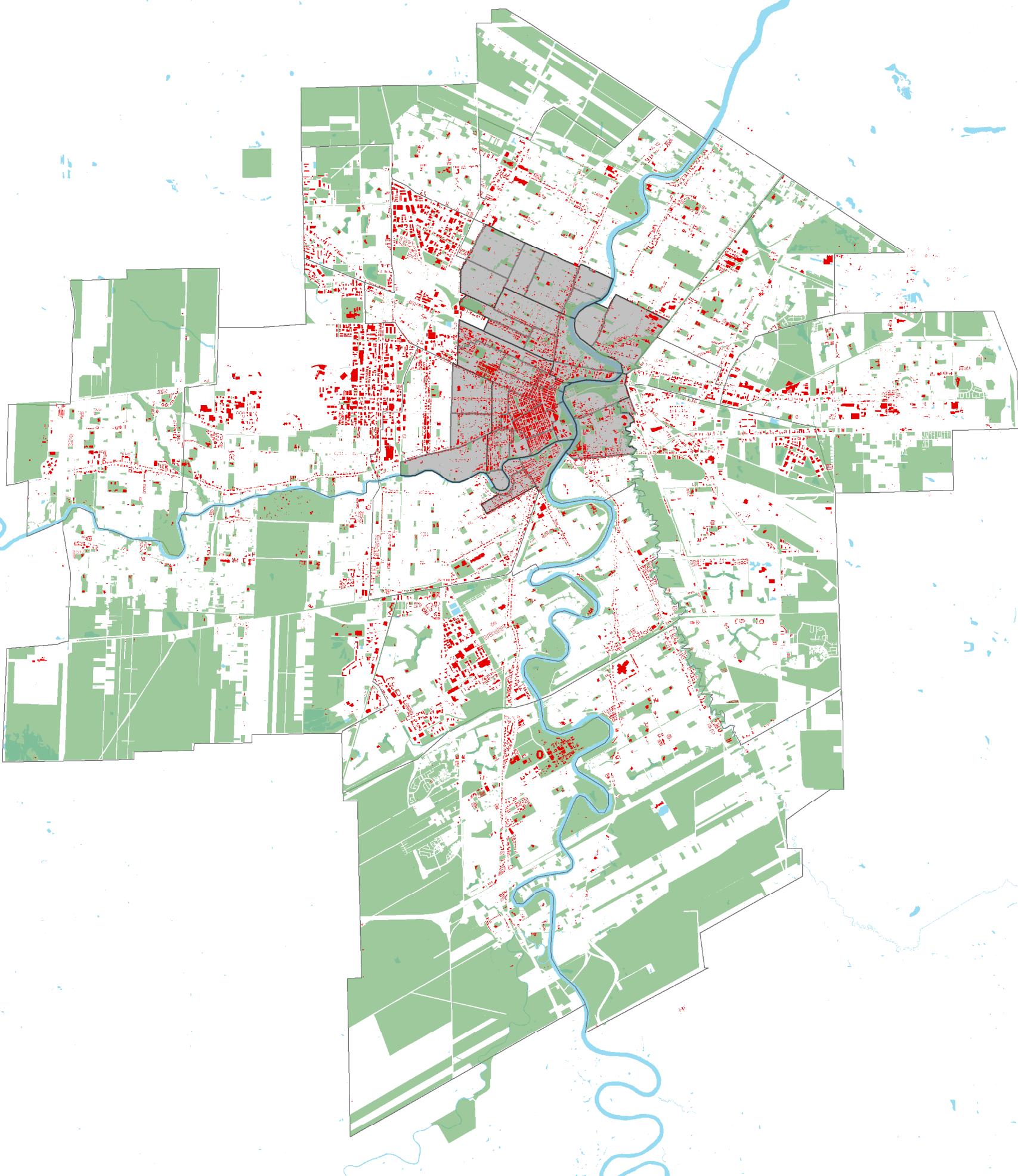
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APPENDICES

APPENDIX A: Site Selection Maps

Potential Agricultural Land in Winnipeg



LEGEND

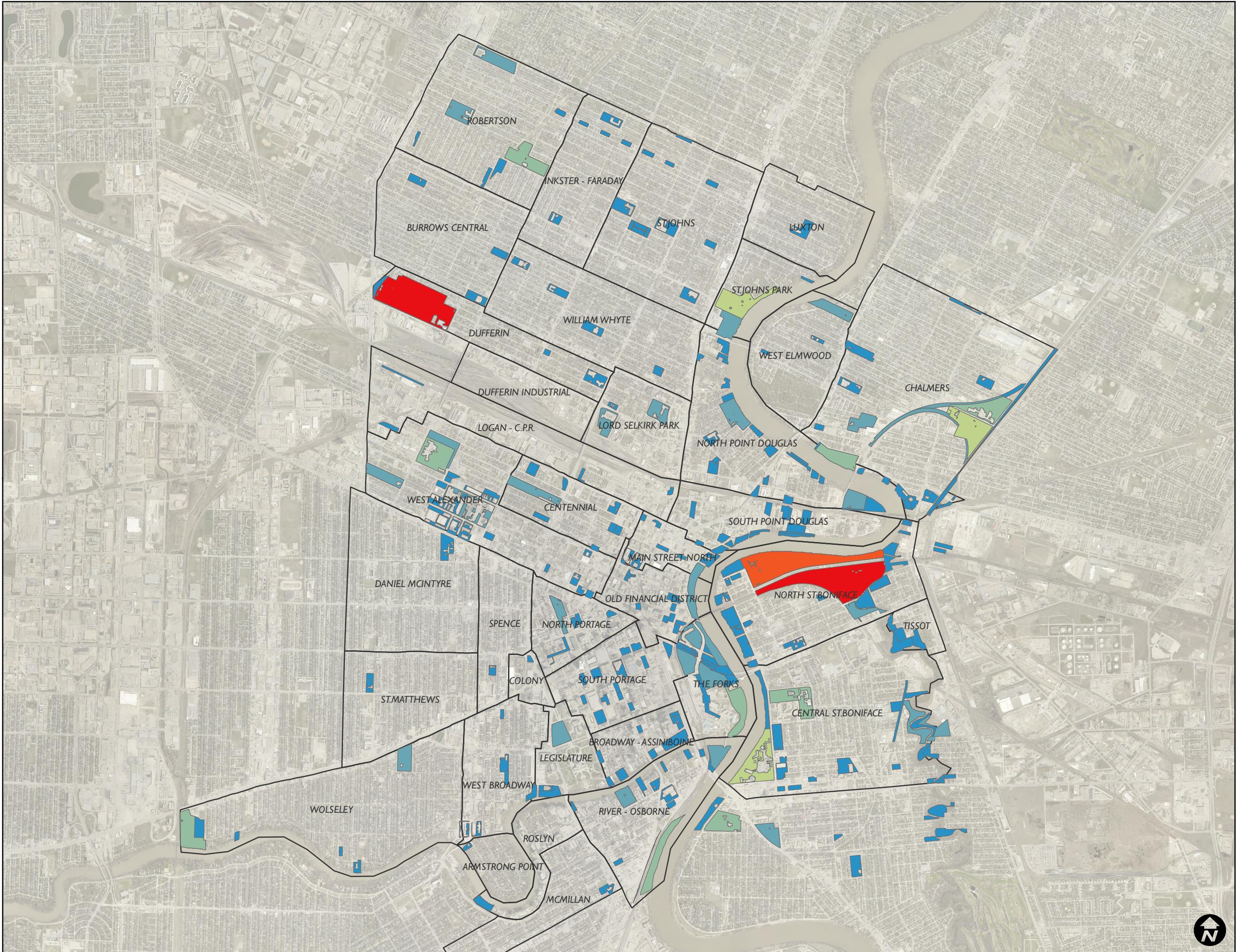
- Ag Land Hard Surface
- Ag Land Ground
- Inner City Neighbourhoods
- Winnipeg Boundary

Sources
Basemap: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Site Information: Derived from City of Winnipeg, 2014-2017
Analysis: Adam Kroeker



0 0.5 1 2 3 4 Km

Potential UA Sites in Winnipeg's Inner City: Ranked By Size



LEGEND

Inner City NBHDs

Sites Ranked By Size

SizeScore

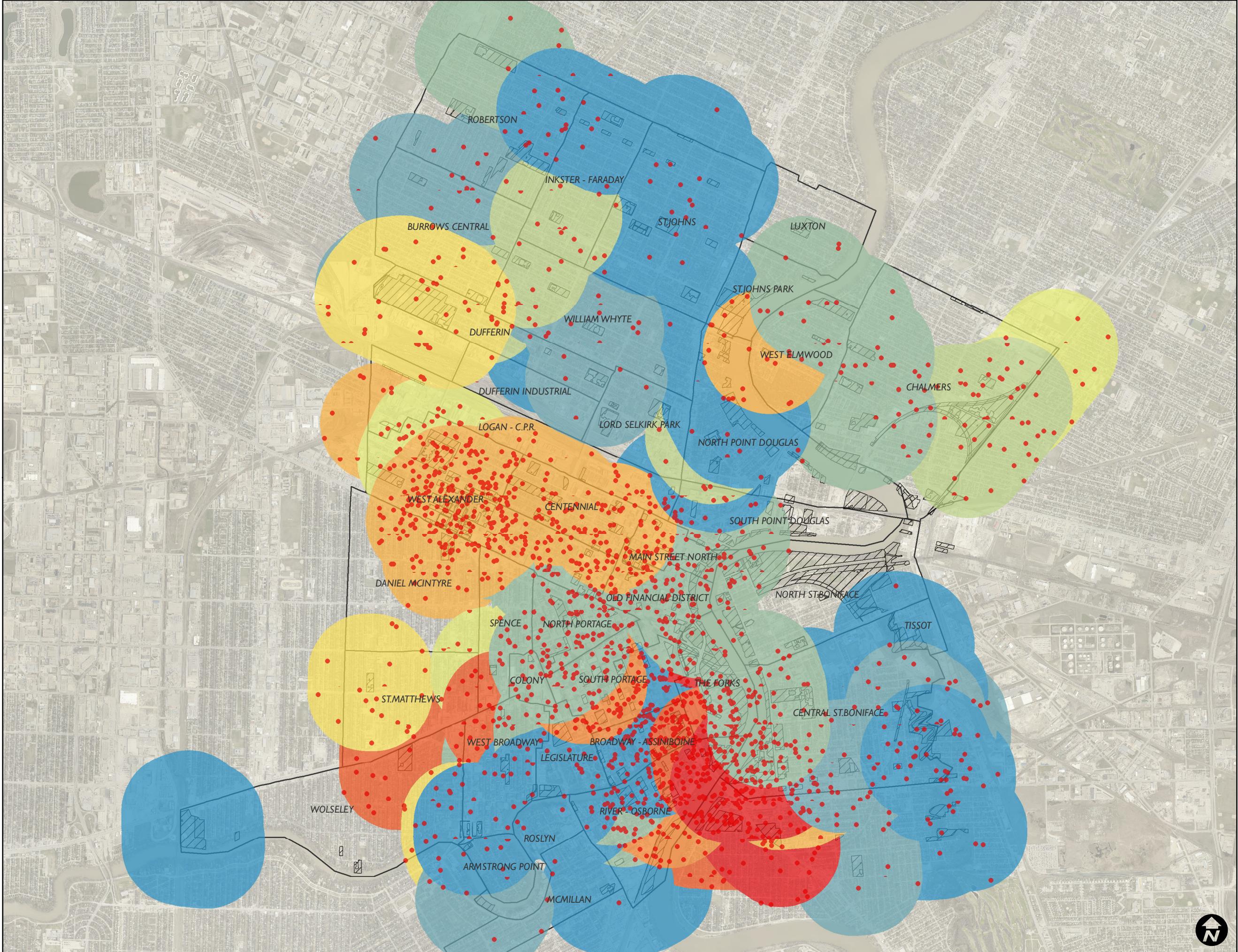
1 - 11
12 - 21
22 - 31
32 - 41
42 - 51
52 - 60
61 - 70
71 - 80
81 - 90
91 - 100

Sources

Basemap: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Site Information: Derived from City of Winnipeg, 2014-2017
Analysis: Adam Kroeker

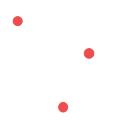
0 0.25 0.5 1 1.5 Km

Potential UA Sites in Winnipeg's Inner City: Ranked By Proximity to Newcomer Residences



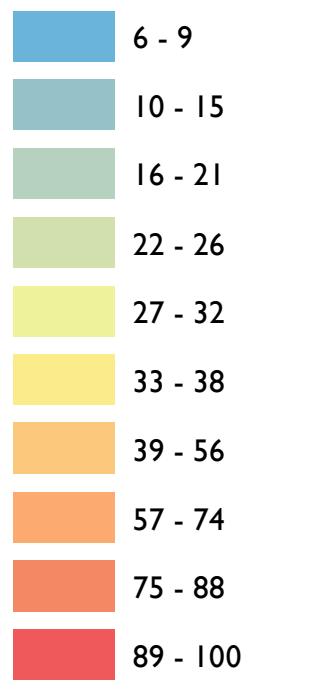
LEGEND

1 Dot = 5 Newcomers



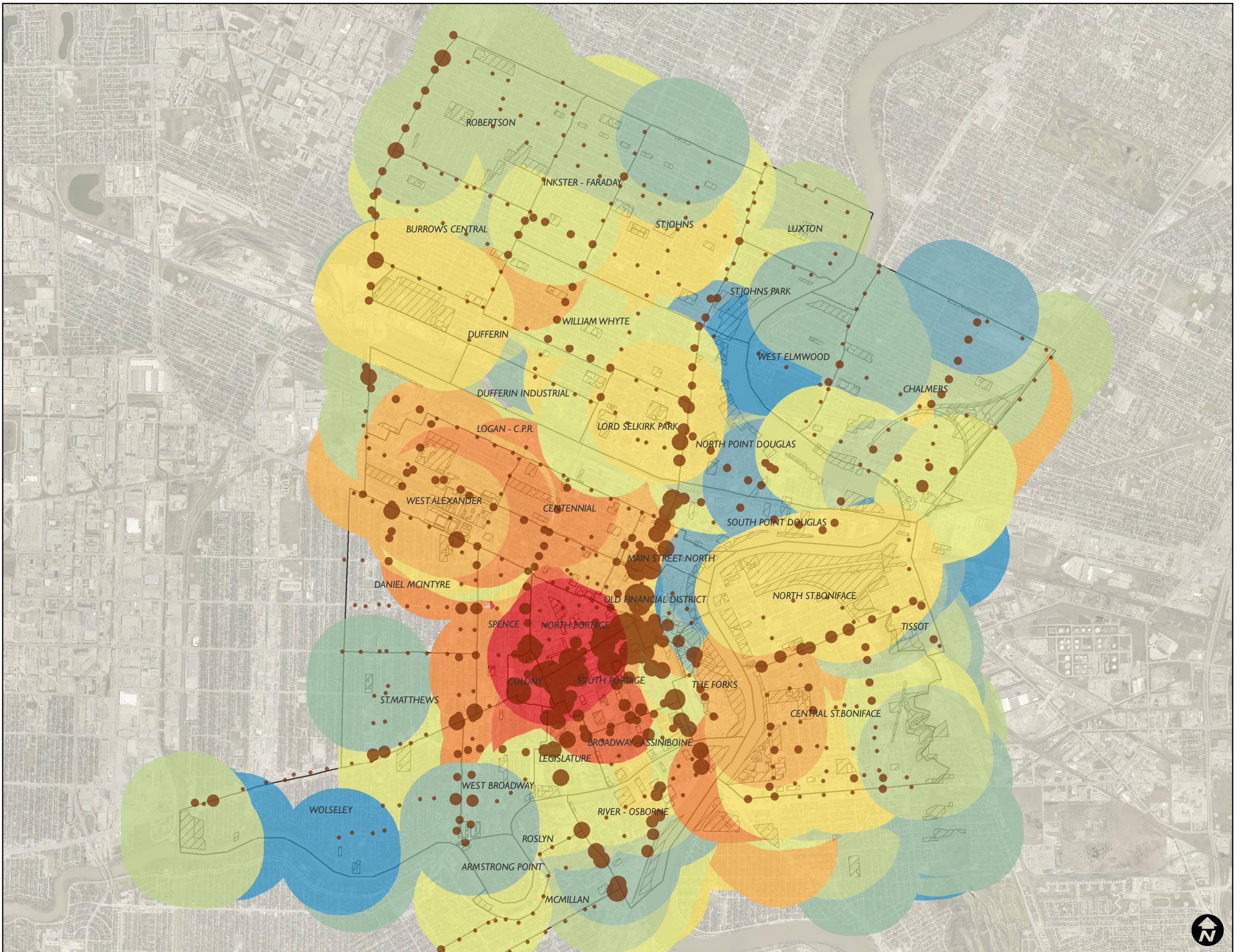
Sites Ranked by Proximity

ProxScoreNew



Potential UA Sites
Inner City NBHDs

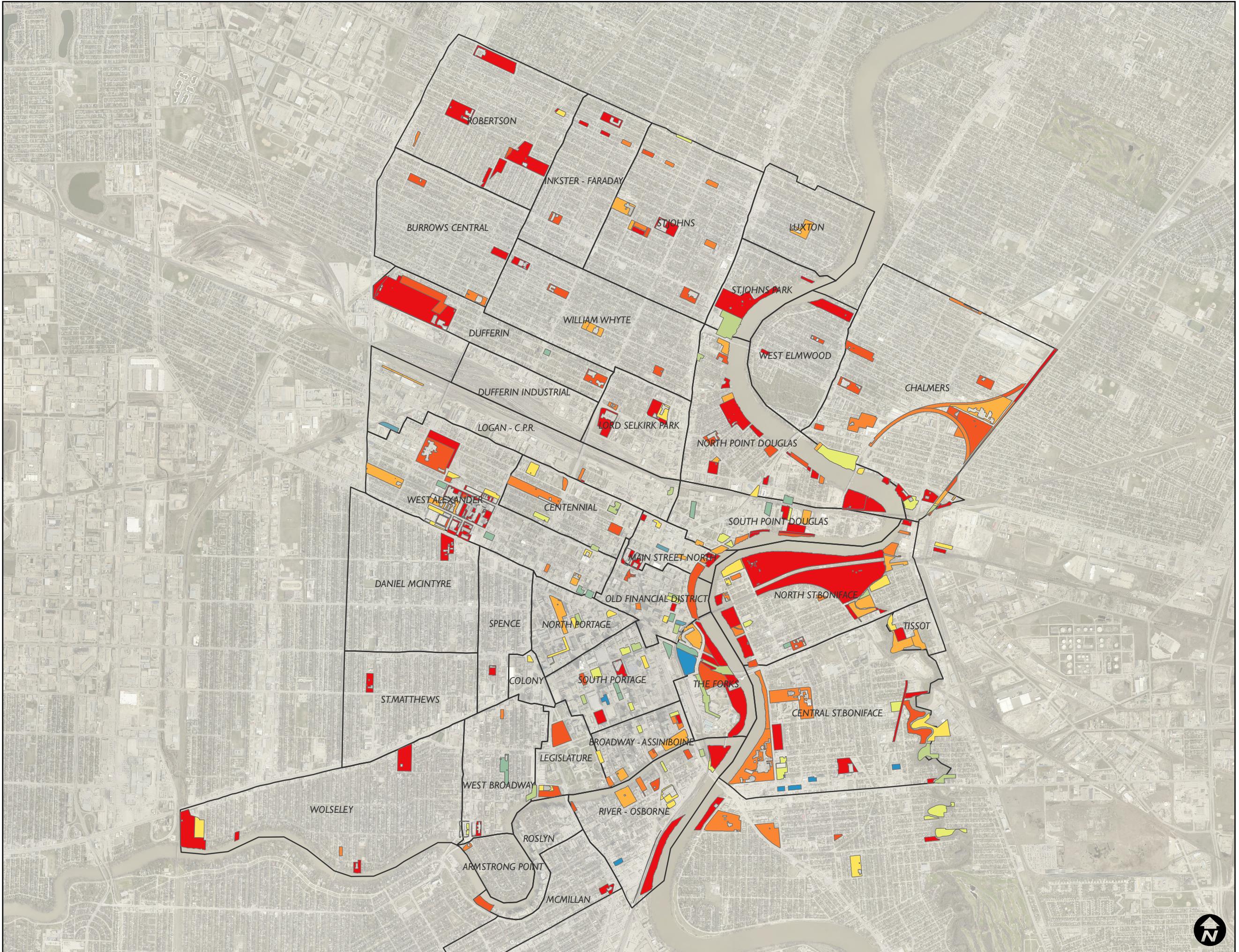
Potential UA Sites in Winnipeg's Inner City: Ranked By Proximity to Transit Stops



Sources
 Basemap: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
 Site Information: Derived from City of Winnipeg, 2014-2017
 Analysis: Adam Kroeker

N

Potential UA Sites in Winnipeg's Inner City: Ranked By Land Quality



LEGEND

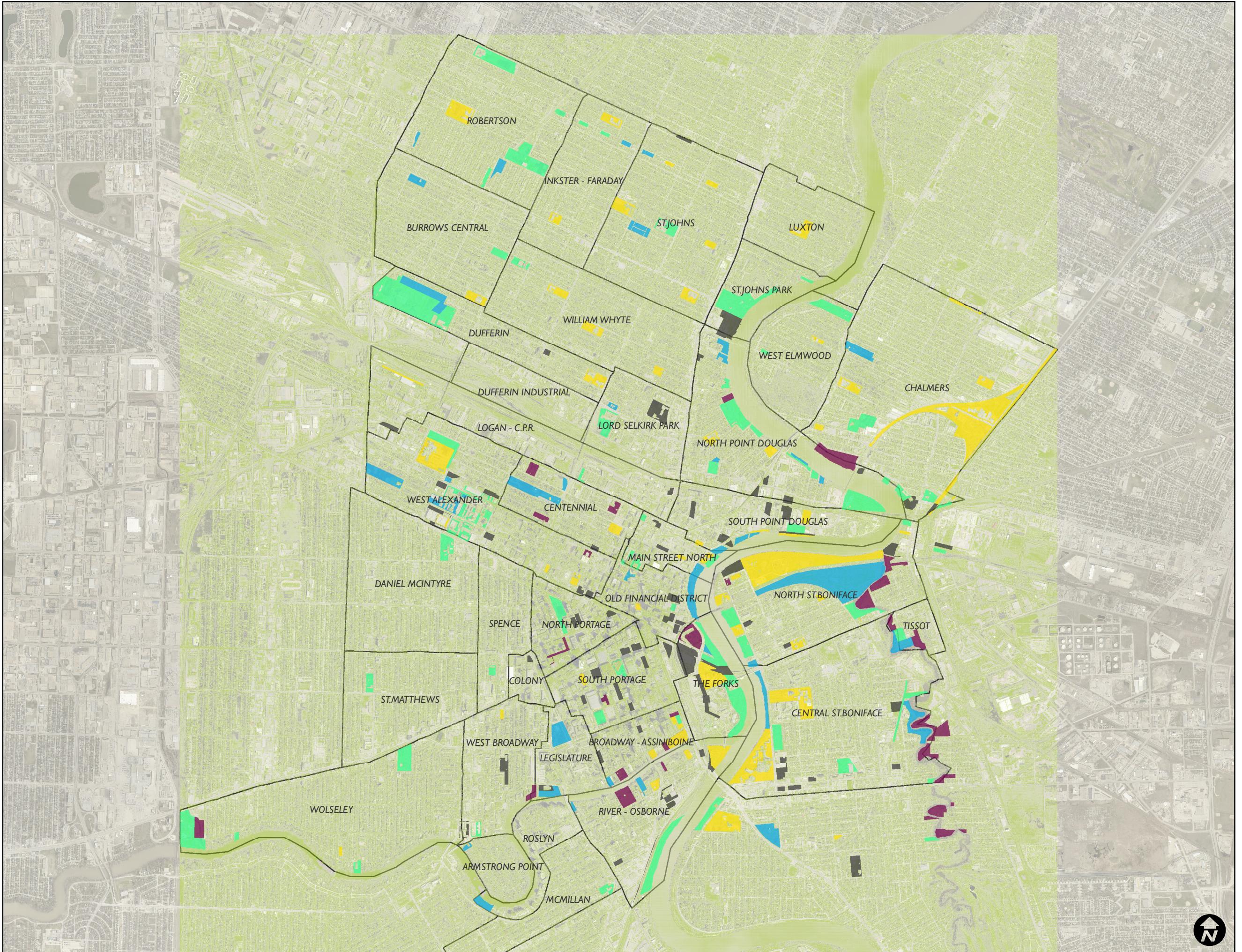
	Inner City NBHDs
Sites Ranked by Land Quality	
GroundScore / none	
41 - 60	
60 - 65	
65 - 70	
70 - 75	
75 - 80	
80 - 85	
85 - 90	
90 - 95	
95 - 99	
99 - 100	

Sources

Basemap: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Site Information: Derived from City of Winnipeg, 2014-2017
Analysis: Adam Kroeker

0 0.25 0.5 1 1.5 Km

Potential UA Sites in Winnipeg's Inner City: Ground Type Analysis



LEGEND

Inner City NBHDs

Ground Type Analysis

MEAN

Dense Vegetation

Mixed Surface

Soil/Grass

Mixed Surface

Hard Surface

RasterNorthNew

Value

- High : 140

- Low : 110

RasterSouthNew

Value

- High : 140

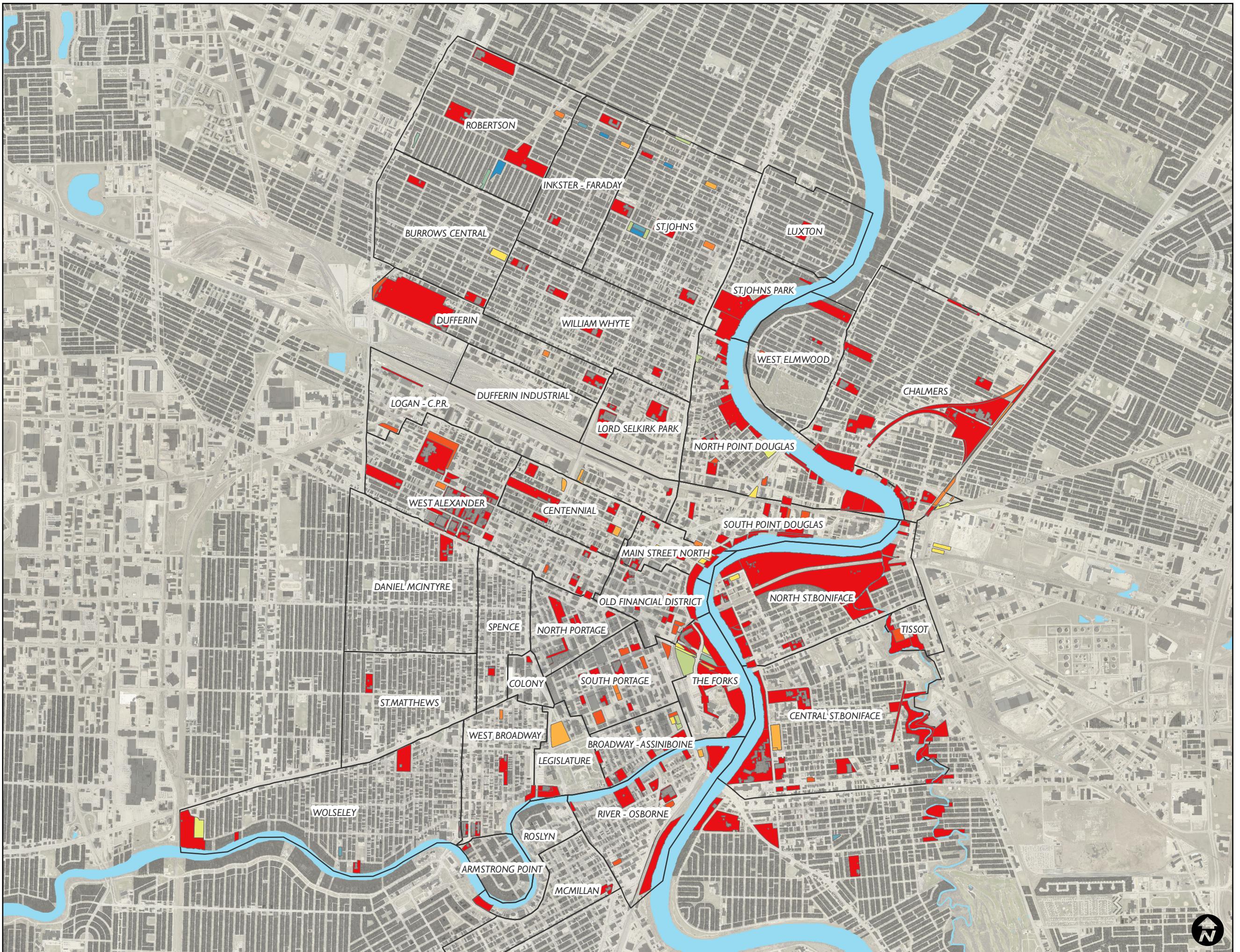
- Low : 110

Sources

Basemap: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Site Information: Derived from City of Winnipeg, 2014-2017
Analysis: Adam Kroeker

0 0.25 0.5 1 1.5 Km

**Potential UA Sites in
Winnipeg's Inner City:
Ranked By Proximity
to Water**

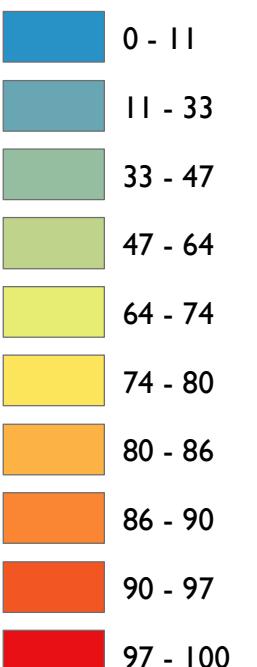


LEGEND

	Buildings
	Waterbodies
	Inner City NBHDs

Sites Ranked by Water Prox.

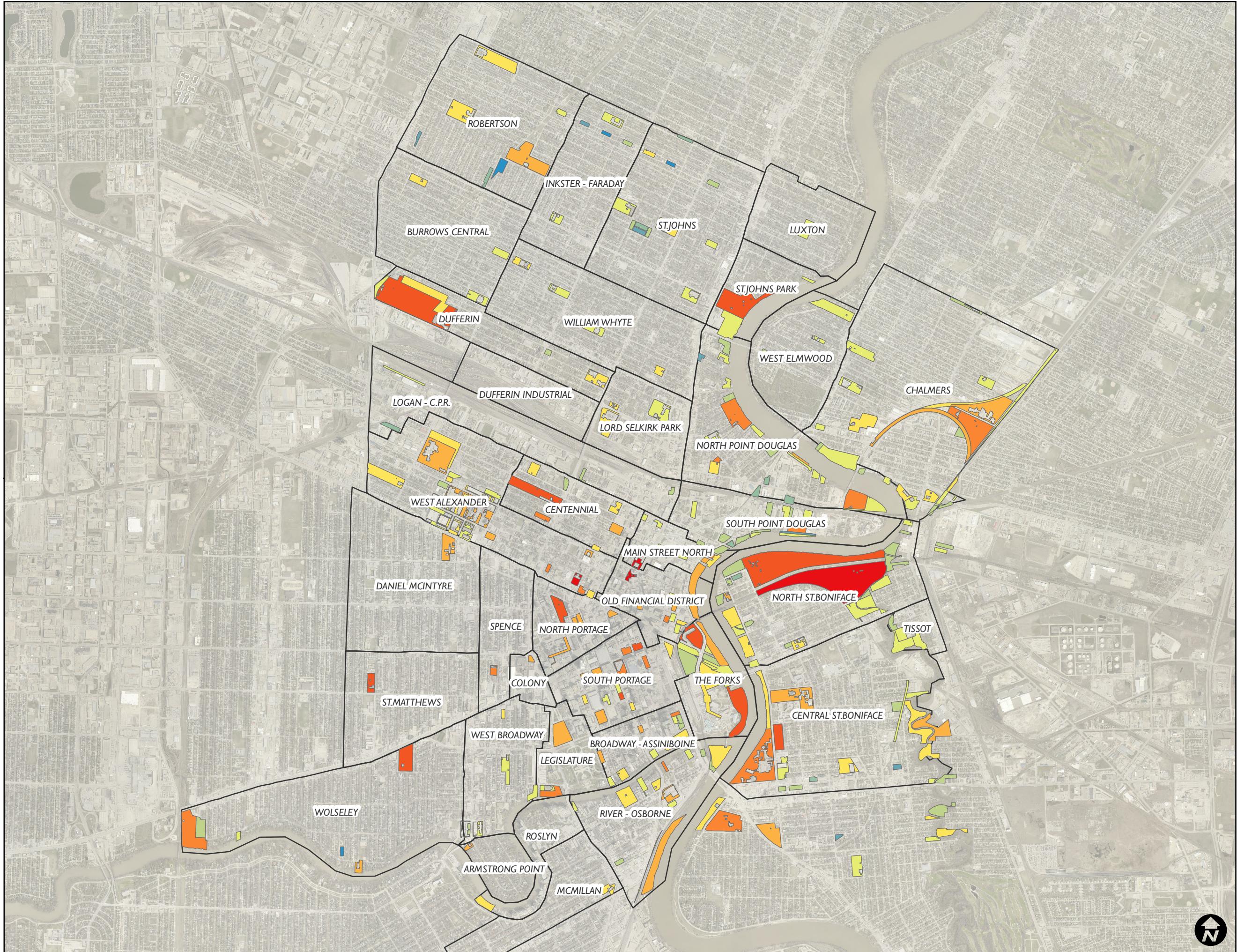
WaterRank



Sources
 Basemap: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
 Site Information: Derived from City of Winnipeg, 2014-2017
 Analysis: Adam Kroeker

0 0.25 0.5 1 1.5 Km

Potential UA Sites in Winnipeg's Inner City: Weighted by 5 Categories



LEGEND

	Inner City NBHDs
Weighted by 5 Categories	
FinalScoreNew	
	25 - 29
	29 - 34
	34 - 38
	38 - 43
	43 - 48
	48 - 52
	52 - 57
	57 - 61
	61 - 66
	66 - 71

Sources

Basemap: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Site Information: Derived from City of Winnipeg, 2014-2017
Analysis: Adam Kroeker

0 0.25 0.5 1 1.5 Km

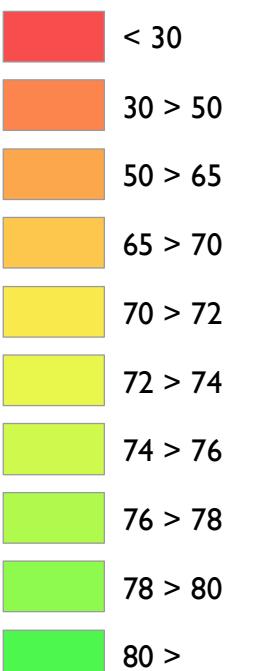
Top 25 Sites: Factoring Value



LEGEND

Top 25 Sites with Value

Score



Sources
 Basemap: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
 Site Information: Derived from City of Winnipeg, 2014-2017
 Analysis: Adam Kroeker

0 0.175 0.35 0.7
Kilometers

APPENDIX B: Site Design Maps

Old Exhibition Grounds: Historical Buildings

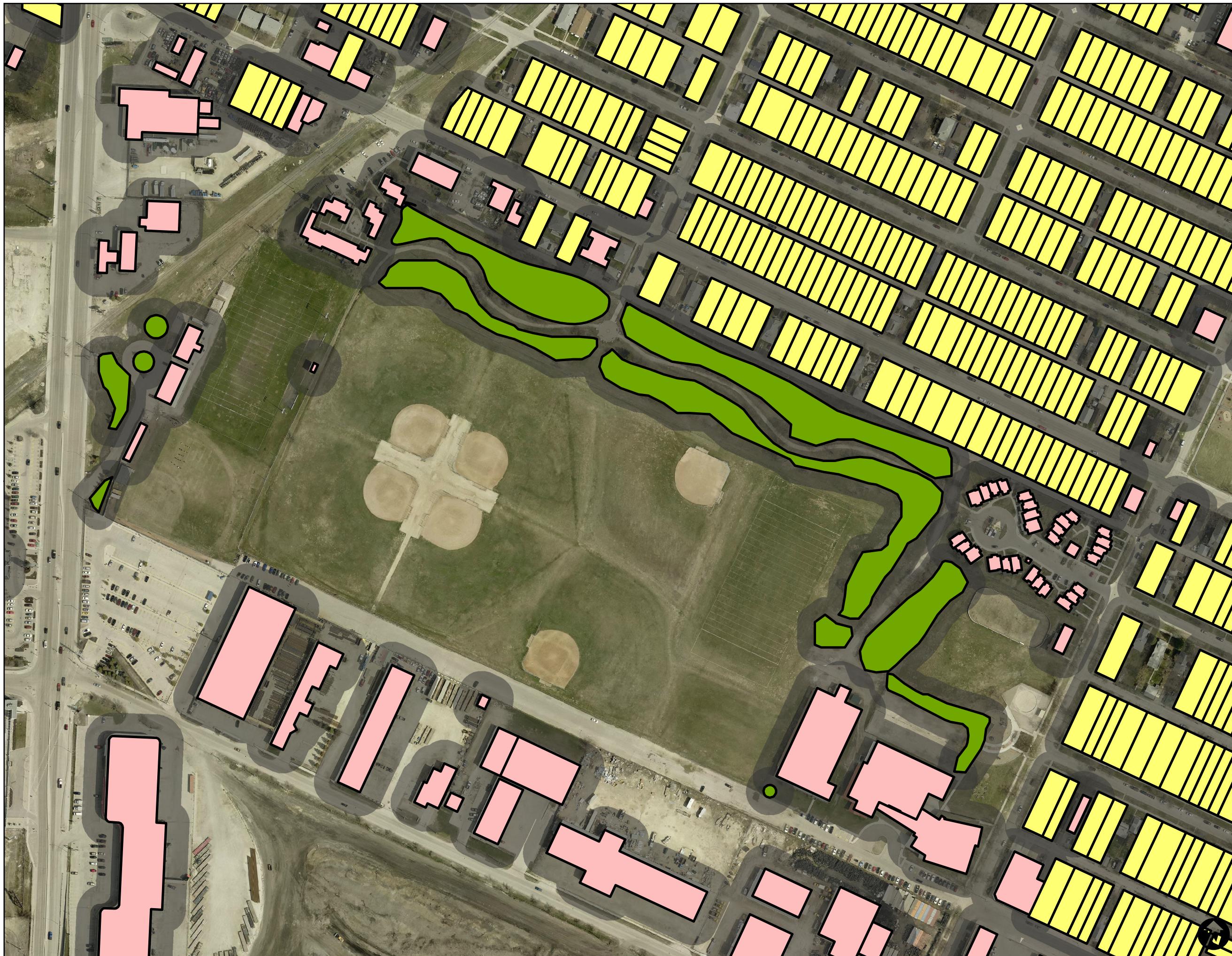


Sources

Basemap: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Information: Stephen Gaunt, 2005 / McPhillips Brothers City Atlas of Winnipeg
Analysis: Adam Kroeker

0 15 30 60 90 Meters

Old Exhibition Grounds: Sun and Shadow



LEGEND

- Residential Units
- Other Buildings
- Treed Area
- Potential Shadows

Sources
Basemap: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Gommapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Site Information: Derived from City of Winnipeg, 2014-2017
Analysis: Adam Kroeker

0 15 30 60 90 Meters

**Minimum Elevation:
Area Surrounding Site**

LEGEND

Minimum Elevation

MINHEIGHT

215.000000 - 220.000000
220.000001 - 225.000000
225.000001 - 230.000000
230.000001 - 232.500000
232.500001 - 235.000000
235.000001 - 237.500000
237.500001 - 242.500000
242.500001 - 247.500000
247.500001 - 252.500000
252.500001 - 257.500000
257.500001 - 262.500000
262.500001 - 267.500000
267.500001 - 270.000000
270.000001 - 272.500000
272.500001 - 280.000000



Sources

Basemap: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Topographic Information: Derived from Manitoba Land Initiative Analysis: Adam Kroeker

0 37.5 75 150 225 Meters

Detailed Elevations: Old Exhibition Grounds



Movement Around Site: Old Exhibition Grounds



Sources
Basemap: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Gomapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Analysis: Adam Kroeker

0 15 30 60 90 Meters

Old Exhibition Grounds: Opportunities for Urban Agriculture



LEGEND

- UA Opportunity (Yellow)
- Potential Shadows (Grey)
- Movement (Blue Arrows)

Sources
Basemap: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Analysis: Adam Kroeker

0 15 30 60 90 Meters

Old Exhibition Grounds: Area Relationship Study



LEGEND

—	Signage
—	Water Line
■	Water Tank
—	Vertical Gardens
■	Garden
■	Cold Storage
■	Raised Beds
■	Compost
■	Shed
■	Seating Area
■	Market
■	UA Opportunity

Sources
 Basemap: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
 Analysis: Adam Kroeker

0 15 30 60 90 Meters

APPENDIX C: Focus Group Letter of Introduction

Hello,

I am a graduate student in the Department of City Planning at the University of Manitoba. I am conducting my thesis research on urban agriculture for newcomers and refugees who have a farming background. This work is being supervised by Dr. David Van Vliet (David.VanVliet@umanitoba.ca).

As part of this research, I am facilitating a focus group that will discuss the future of urban agriculture in Winnipeg. This invitation is open to program directors or project managers of Winnipeg non-profit organizations, including your own, who work with food security, urban farming, and/or immigration in Winnipeg.

During the focus group, we will discuss what factors are necessary to consider when identifying garden spaces and urban agriculture sites for newcomers, as well as the challenges and opportunities for implementing urban agriculture in Winnipeg's inner city. You will also be invited to reflect on the work that you have done as a professional with inner-city gardening or immigration services. Lastly, I will be looking for feedback on the urban agriculture potential for specific sites that my research has identified using GIS (Geographical Information System) mapping software. Please let me know if you are interested in being a participant in this focus group.

The focus group take place at:

**Food Matters Manitoba
Unit 4, 640 Broadway Ave.
3:00 – 4:30PM
Friday, November 27**

The results of this research will contribute to a final published practicum project that will include your valuable feedback. You are in no way obligated to participate. Your name will not appear anywhere in the document. You will be given the opportunity to withdraw from the focus group at any time.

Please let me know if you are able to attend.

Sincerely,

Adam Kroeker,
Master of City Planning (Candidate),
University of Manitoba

P.S. I have included a copy of the consent form that participants will be required to fill out before or during the focus group session. If you have any questions about this project, please contact Adam Kroeker, the principal researcher"

APPENDIX D: Focus Group Script

Welcome

Hello and welcome here. My name is Adam Kroeker. I am a graduate student at the University of Manitoba in the Department of City Planning. Thank you for your willingness to participate in this focus group about urban agriculture for newcomers to Canada. The discussions in this focus group will be used to inform the research for my Masters of City Planning practicum entitled: Finding Their New Land: Site Selection and Design for an Urban Farm for Newcomers in Winnipeg's Inner City.

Overview of the Project

Before we begin, I would like to give you a brief overview of this project.

This practicum examines urban agriculture as a means to addressing food security situations experienced by refugees in Winnipeg's Inner City. The research will examine the potential for a large-scale urban agriculture site to provide income and address food security issues for refugees with previous farming experience.

The project will use GIS (Geographic Information System) mapping to identify under-utilized parcels of land in Winnipeg's Inner City with the potential to be developed into suitable urban agriculture farm sites. The latter part of the project will develop a conceptual site plan for one of the recommended sites, which will address questions of how such a site could be implemented in a Canadian context.

The focus group you are a part of will provide essential input into this project. During the focus group, I will ask a series of questions on your experience with urban agriculture and newcomers in Winnipeg's inner city. I will then ask for your feedback on the GIS site selection methods and the potential challenges to implement an urban agriculture site in the identified potential locations.

Rules for the Focus Group

There are a few basic rules for the focus group that I will go over before we begin.

First, we want to hear from each of you. Everyone is encouraged to participate in the discussion. We may call on you individually to get your opinion if we haven't heard it.

Please know that there are no "right or wrong" answers in this focus group. Please feel free to provide your own opinions on the topic, even when they may not agree with the perspective of other people in the group. The report will not identify anyone by name.

We will keep all of your comments anonymous. We want to people to feel safe to share and want to encourage honest answers. Know that you may opt out of the focus group at any time if you choose to do so for any reason.

We will be recording the audio from this focus group only to make sure we record your comments correctly. No audio recordings from this focus group will be

shared externally. The recordings will be destroyed following the completion of the practicum.

Lastly, once the meeting is over, we ask that you do not share the names or opinions of anyone within this focus group. This will help to ensure confidentiality for all participants in this focus group.

If you agree with these rules, please fill out the consent form in front of you. By signing this form, you will acknowledge that you understand these rules and that you consent to participating in this focus group.

APPENDIX E: Focus Group Questions

“During the focus group, I will ask several open-ended questions about the four main components of this research project: the project background, the site selection method, the site design, and the plan for implementation.”

Introductory Questions

- a) What is your name?
- b) How have you been involved in working with immigration, food security, and/or urban agriculture?

Strengths & Opportunities Analysis Exercise

Think back over your past work in immigration, food security, and/or urban agriculture.

- a) What are the strengths about the current state of urban agriculture for immigrants in Winnipeg?
- b) What are the opportunities for future improvements to urban agriculture for immigrants in Winnipeg?
- c) Do you think urban agriculture contributes to food security for newcomer families?
- d) How have you seen urban agriculture being used to address food insecurity in Winnipeg?
- e) What methods have people used for urban agriculture in Winnipeg to mitigate the effects of the cold climate?

Site Selection Method Questions

Consider the potential urban agriculture sites identified in Winnipeg’s inner city using the GIS analysis.

- a) What do you think are the most important factors in selecting urban agriculture sites for a refugee population (e.g. site size, access, land quality, amenities, etc.)?
- b) How viable for urban agriculture do you think these sites would actually be?
- c) Are there any other GIS considerations that should be taken into account when identifying potential urban agriculture sites?
- d) Are there any factors that should be looked for during an in-person site assessment that could affect the viability of the site for urban agriculture?

Site Design Questions

Imagine an ideal site in Winnipeg’s inner city for urban agriculture. What particular elements would be included on this site?

The researcher will write the names of the site elements down on a whiteboard.

- Consider each of the site elements on this list. Which site elements...
- a) Are the most important to consider for urban agriculture sites in Winnipeg's inner city?
 - b) Are the most important to consider for sites operated by refugees with a farming background?
 - c) Would take up the most amount of space?
 - d) Would take up the least amount of space?
 - e) Should be located in close proximity to other particular site elements?
 - f) Should be located away from other particular site elements?

Closing Questions

The researcher (or the focus group assistant) will provide a brief summary of the discussion.

- a) Have we missed anything?
- b) Of all the things we discussed today, what do you think is the most important?

APPENDIX F: Online Questionnaire

Q: During a focus group on newcomer urban agriculture in Winnipeg held in November 2015 (part of this research), one participant said, "In Winnipeg, it is easier to find funding to start a garden than to find space to get a garden." Do you agree with this statement?

Q: The image above shows potential urban agriculture sites in downtown Winnipeg over 1/2 acre in size that were identified using 5 criteria that the focus group and literature review identified as being important to urban agriculture for newcomers: 1) Site Size, 2) Proximity to newcomer residences, 3) Proximity to transit stops, 4) Proximity to water sources, and 5) Land quality (estimated based on aerial imagery). A number of the sites that averaged the highest scores in the 5 criteria are highlighted in red. Which of these sites do you think would be best suited for a larger urban agriculture site (note: some of these locations may already have garden boxes, etc.). Check the top 5 (at most).

Q: Which of the highlighted sites above do you think would be the LEAST suited for a larger urban agriculture site. Check the 5 poorest options (at most).

Q: If you had a limited budget, which of the following items would you consider to be priorities for an urban agriculture site for newcomers? Choose the top 5.

Q: Focus group participants also stressed the importance of garden security and offered several suggestions for improvement in this area. Which of the following options would you recommend as a means of deterring theft or vandalism on urban agriculture sites (while still encouraging proper use of the space)?

Q: If the City of Winnipeg could make any of the following changes to its policies or regulations, which ones do you think would be the most beneficial in encouraging urban agriculture? (select one or more):

- Removing the requirement that you have to canvas all of the residents in the neighbourhood to get approval before starting a new community garden.
- Guaranteeing that land granted for urban agricultural use will be used for that purpose for a certain number of years.
- Changing the by-law that prohibits growing edible plants on boulevards.
- Creating a "specialized agriculture" zone in the Winnipeg Zoning By-Law to protect small scale-agriculture.
- Change Responsible Pet Ownership By-Law to allow keeping of commercial animals in the City of Winnipeg, in places other than schools or petting zoos.

Q: Are there any other comments you would like to share regarding newcomer gardening or urban agriculture in Winnipeg's inner city neighbourhoods?