

Flexible Fixtures: An Exploratory Study on the Emergence & Mobilization of the Flexible Streets Concept in Ontario Municipalities

by

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AUTHOR'S DECLARATION

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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Abstract

The most plentiful public space within Canadian cities are the streets; however, these spaces are overwhelmingly dominated by automobiles with much of the space designated for vehicular traffic flows. So often, the leftover space for other road users, like pedestrians and cyclists, is non-existent or inadequate. Roadway design practices have long allowed for – and exacerbated, this prioritization of transportation modes in public rights-of-way. Despite the auto centric planning and design approach common to roadways, the latter half of the 20th Century saw the origination of non-traditional design approaches that sought to reimagine streets as spaces where pedestrians and cyclists were equals. Recently, there have been a number of streetscape redesign projects implemented in Ontario referred to as flexible streets. This particular design concept was not well-known, nor had it been addressed in academic literature. The purpose of this study was to explore the flexible streets design concept and how such streetscape projects are being implemented across municipalities in Ontario, Canada. Through an exploratory qualitative research design, analysis of relevant planning and design policy documents, as well as public feedback was undertaken.

Considered against the backdrop of long-time automobile priority in roadway design, this research found that flexible streets are a unique streetscape design approach stemming from the Shared Streets concept most common in the United Kingdom. Flexible streets are a relatively new streetscape design approach compared with other non-traditional street design concepts. The distinguishing features of flexible streets uncovered through this research include the intention of facilitating a street that provides equitable space and safety for all types of users, including pedestrians of all abilities, cyclists, and automobiles. Flexible streets were evidenced to be implemented in the downtown areas of Ontario municipalities with the express intention of being more than simply a transportation conduit. It is a distinct design concept that endeavors to create modular streetscapes that can easily transition into expansive public spaces for uses such as community events or expanded patios for restaurants. Lastly, conducted in the midst of the COVID-19 pandemic and resurgence of the Black Lives Matter movement, this work is reflected upon given both public health and racial justice concerns as streets are public spaces where these issues have been particularly visible.

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Chapter 1: Introduction

1.1 Background

Renowned authority on transportation and urban transformation, Janette Sadik-Khan asks, “what is a city, if not its people and its streets? The two are inextricable, one meaningless without the other” (Sadik-Khan, 2016 p 281). From the mundanity of commuting to work or visiting a friend to extraordinary events like protesting injustices with thousands of other people, streets and public spaces are the backdrop of the human experience. Public space denotes the areas of a settlement that are intended as accessible to all without restriction (Kohn, 2004 ref in Nguyen, 2018). Public spaces, most commonly, are legally owned and controlled by a government organization – streets, sidewalks, urban parks, and plazas are owned by the respective municipal governments while highway systems, railways, and national parks are under the jurisdiction of provincial or federal governing bodies. Some public spaces; however, are not owned by a public body. Privately Owned Public Space (POPS) are spaces that are owned by private entities but allow for public access (Wood, 2018). The public spaces of an urban centre are reflective of the political, economic, and social priorities of a given point in time (Varna, 2014 ref in Nguyen, 2018). Public space is a critical component of all cities. It plays a key role in facilitating city life and affects the individual lives of those living in a city.

The most plentiful and obvious public spaces in a city are the streets. In total, streets must support the mobility of cars, bicycles, pedestrians, public transit, service vehicles, along with public utilities, and public realm elements like landscaping, signage, and street furniture (Nguyen, 2018). Streets are a culmination of transportation and public space – a blend that requires delicate attention to balance the range of uses and needs. However, a balance between users has been challenging to negotiate. Throughout history, roadways have been the site of significant changes while also the means that facilitated significant changes in society. From corduroy roads to high-speed multi-lane concrete monoliths, roadways have evolved as new technologies arose. These changes to roadways facilitated, in turn, the opportunity for more people to travel greater distances and for lasting changes in land uses.

This thesis is focused on an emergent street design approach called flexible streets. The term flexible street has been used in conjunction with projects that seek to alter the design of a traditional roadway and change how the space of the streetscape is used in order to equalize the street for all

types of users. Flexible streets represent a new phenomenon in which streets are redesigned as modular spaces that both continue to support the traffic flow of motor vehicles, pedestrians, and cyclists, while also allowing for the easy transition to spaces for surrounding businesses to use or for the entire streetscape to be the site of a community event. Both the design concept and how the guiding policies have mobilized across communities in Ontario will be explored through this study. Defining and investigating flexible streets will help to distinguish the concept amongst more established streetscape design concepts premised on changing the user hierarchy and purpose of public rights-of-way.

This study is important as streets are vital public spaces. In the 1960s, Jane Jacobs articulated the importance of urban streets as places where people meet, mix, and mingle for the overall betterment of society (1961). Other popular voices in city-planning have conveyed the importance of urban streets. A well-referenced purveyor of city streets, Allan Jacobs in his seminal piece *Great Streets* (1993), details the design features that contribute to ideal urban thoroughfares. The key in Jacobs work is that a street great is a public space that is more than just a transportation conduit for automobiles (1993). Other popular books by urbanists have drawn attention to how city streets impact the lives of city-dwellers. The book *Streetfight* by Janette Sadik-Khan and Seth Solomonow detailed the challenges and triumphs of redesigning city streets in New York City, with the most celebrated project being the redesign of Times Square to be more pedestrian friendly while still facilitating automobile traffic (2016). Many applauded examples of streetscape redesign and re-purposing projects have cropped up across the globe. Despite the celebrated new uses and designs of roadways, these projects have not been achieved without significant challenges.

The innovation that single-handedly impacted roadways the most, along with almost all other faucets of life, was the invention of the automobile. In 1898, John Moodie brought a one-cylinder Winton 'Horseless Carriage' from the United States into Hamilton, Ontario (Gilchrist, 2015). Thus, began the proliferation of the automobile and auto-centric land use planning in Canada. By 1907 there were 2,131 automotive vehicles registered in Canada, and less than 10 years later, over 50,000 vehicles were registered (Gilchrist, 2015). As more people purchased automobiles, it significantly altered how cities developed and streetscapes were designed. Prior to the 20th Century, roadways were primarily for purposes of colonizing swaths of land and facilitating resource extraction (Gilchrist, 2015). After the introduction of the mass-produced automobile, the classification of roadways shifted more towards enabling access to adjacent lands and for supporting the mobility of vehicles (Shaheen, 2014).

Significant proponents of the roadway expansion across Canada were the three levels of government and an abundance of public funding. In 1958, the Diefenbaker government in Canada unveiled the cost-sharing 'Roads to Resources Program' (Gilchrist, 2015). The program, spanning eight years, saw 6,400 kilometres of new 'roads with future' built across the country (Gilchrist, 2015). As technology advanced, planners and engineers were able to design and implement roads that better accommodated automotive traffic. As more roadways were built and expanded, the public funds used to complete the projects increased. Nearing the middle of the 20th Century, the government expenditures for roadways was \$103.5 million and by 1966 had reached \$1.5 billion (Gilchrist, 2015). Public funds for roadway expansion continued to increase and fundamentally altered the landscape in Canada. By 1995, the public expenditures on roadways amounted to a total of 901,903 kilometres of public roadways built (Gilchrist, 2015). Auto-centric planning and design in Canada has continued to flourish with mesmerizing outcomes. The road transportation system across Canada now contains over 1.13 million kilometers of two-lane equivalent public roads (Statistics Canada, 2018). There are an additional 38,075 lane-kilometres that are part of the National Highway System (NHS) in Canada today (Statistics Canada, 2018).

Along with the expansion of roadways, car ownership has also increased. In 2019, the total number of vehicle registrations in Canada was 35.7 million (Statistics Canada, 2020a). For comparison, at the time of the last Census in Canada, the population was 35,151,728 (Statistics Canada, 2017). It is a stark comparison showing that there are as many – if not more, motor vehicles than people in Canada. Of those who are of 'driving age' in Canada, 87% own a vehicle – a statistic that has only increased over time (DesRosiers, 2018). Auto-centric land use decisions of the past have made it so that owning a car is still often a necessity for accessibility, or at least is the most convenient means of mobility for people. The 2016 Canadian Census revealed that approximately three-quarters (74%) of Canadians commuted to work by driving an automobile while another 6% were a passenger in a car (Yaropud, Gilmore & LaRochelle-Côté, 2019). Although the personal automobile has lent to personal mobility, allowing independence and ability to travel greater distances, the engrained auto-centric planning and car-culture has led to sinister externalities.

The safety of road users is of the utmost concern. In 2018, there were 1,922 fatalities from motor vehicle collisions in Canada (Statistics Canada, 2020b). While majority of fatalities were drivers and their passengers (67.6% combined total), other road users were also impacted (Statistics Canada, 2020b). Of the remaining fatalities, 17.3% were pedestrians, 2.3% were cyclists, 10.4% were motorcyclists or moped riders, and 2.4% were 'other' or not stated (Statistics Canada, 2020b). In

total, 622 road users were killed by one type of road user in public spaces that are intended for all to use without restriction. Many of these deaths are attributable to streetscape designs that prioritize the speed at which automobiles can travel, while considering other users afterwards or not at all (Vision Zero, n.d.).

Public health concerns have also arisen from auto-centric planning, which has led to lower levels of physical activity. It has been found that the built environment and travel mode choice impact an individual's health across both gender and ethnicity (Frank, Andresen, & Schmid, 2004). In combination, dispersed built environments as well as using a car as a travel mode was associated with poorer health outcomes (Frank, Andresen, & Schmid, 2004). The easy and efficient use of an automobile has precluded many people from engaging in regular physical activity, which is important for health. Environmental problems are also linked to automobiles. The concerns center on a number of environmental issues stemming from the expansion in the use of cars as well as the planning and design of cities for automobiles. Throughout the world, the use of automobiles "has led to higher levels of air pollution, greater degree of congestion, and the promotion of urban sprawl" (Kaplan, 2020). Automobiles have been a major contributor towards environmental degradation, which is a pressing concern given the Intergovernmental Panel on Climate Change's (IPCC) 2018 report cautioning against rising global temperature (IPCC, 2018). The IPCC (2018) calls for the rapid and extensive changes when it comes to land use, energy, industry, buildings, transportation, and city planning to reverse further damage to the environment and ecosystems. In addition to troubling environmental impacts, the urban sprawl facilitated by automobiles has led to a culture in North America lacking in social interactions (Janushewski, 2014). Auto-centric urban sprawl has created a culture of loneliness, with many people isolated in their suburban homes and tepid towards social interaction happening in the streets (Morris, 2005 qtd in Janushewski, 2014). As a result, there is a lack of engagement with the surrounding city, instead cities have simply become obstacle courses that one must drive through to get to a desired destination (Janushewski, 2014).

The proliferation of the automobile has significantly changed the landscapes of cities. In order to support the use of automobiles, there is now a considerable amount of space in cities across North America dedicated solely to cars. In the United States, for every car there are four parking spaces – amounting to over a billion parking spots (Plumer, 2016). New York City is the only city in the United States with more households than parking spots, while places like Jackson, Wyoming have 27.1 parking spaces for every household (Anzilotti, 2018). Between parking spaces and public rights-of-way, cities are dedicating 30-40% of land area to cars (Diaz,

2020). In the downtown areas of major cities, it is even more pronounced, with 50-60% of the land area devoted to the use of automobiles (Gardner, 2011 ref in Plumer, 2016). As a result, a lot of space in towns and cities today is publicly funded space, but primarily only ‘for’ a select group of users.

Along with growing use and ownership of automobiles, there has long been growing reactions against auto-centric planning practices and street design. In more recent history, there has been growing interest in redesigning urban streets to support additional public space (Kent, 2015). For years, urban sustainability advocates and some planners have championed car-free streets as a means to reduce carbon emissions, vehicle congestion, and traffic fatalities (Bliss, 2020). Many cities across the globe began to realize that streets had the potential to be public places for people and that all users should feel comfortable using the space. One such example is Paris, France where the mayor, Anne Hidalgo, is often cited in the news for her ambitious policies aimed at removing automobiles from central urban streets to make space for pedestrians and cyclists (Peters, 2017). Hidalgo maintains that the car-free street policies are based on the “urgency of both the health crisis and the climate crisis we are facing” (Peters, 2017). As well, the global proliferation of Open Streets projects since the late 1970s demonstrates a shift away from viewing – and using, streets as only spaces for automotive vehicles (Hernández, 2008). This move towards more streets used as public spaces has been championed by mainstream planning and urbanists everywhere. Although some streetscape projects aim to completely remove automobiles from urban thoroughfares, the major streetscape design concepts – Complete Streets, Woonerven, Shared Street Spaces, and Open Streets, are premised on a street design and programming that ensures all users can access and use the roadway. The streetscape redesign concepts, of which flexible streets is part of, are not necessarily about creating car-less streets, but rather championing city streets that support all users.

1.2 Objectives & Purpose of Study

As an endeavour driven by the desire to create more public space while also supporting most transportation modes equally, flexible street projects are now of pertinent concern as the year 2020 winds to a close. With a global pandemic and social movements on-going, both the landscapes and the ideas about the built environment are changing even more. In fact, all types of streets and public spaces have become areas of interrogation over how and who they support. Urban planners and designers are tasked with creating streets that strike a balance between supporting a host of uses and users. How a street is designed is a complex matter as, while vital for the at grade uses, streets also

must support functions above and below grade. Namely, public utilities like water, sewers, and electricity. This research seeks to explore an emergent streetscape design concept in Canada that endeavors to create streets for all users. The approach re-imagines streetscapes as urban fixtures that are not ‘fixed’ in place at all. The guiding research question of this study was: how did flexible streets emerge as a planning practice in Ontario? In addition, the following objectives guided this study: i) understand how flexible streets are defined, ii) explore the policy and planning processes from which flexible street projects have emerged, iii) identify the historical roots of this emergent planning and design practice, and iv) assess public feedback regarding the flexible streets projects.

1.3 Outline of Thesis

This thesis is comprised of six distinct chapters. In Chapter 2, a variety of literature about streetscape design concepts, planning practices around roadways, and the mobilization of policies is reviewed. This helps to establish an understanding of the evolution of roadway design practices and the contemporary streetscape design concepts that seek to change the user priority of roadways away from motor vehicles. It provides the basis for exploration into the flexible streets concept using existing knowledge about street designs and the impacts that street design can have on individuals and the larger community. The methods used for this study are outlined in Chapter 3. The research is based on an exploratory qualitative study that uses policy analysis to garner data found through public documents. These methods allowed for the exploration into how the flexible street projects were conceptualized, what the guiding strategies and project objectives of the streetscape redesign project were, and why the street design was proposed for implementation. In addition, details like project’s scope and the design features employed could also be assessed.

In Chapter 4 the results of this study are detailed at length. The research objectives were explored, and findings were made about flexible streets. The chapter explores the influences for flexible streets, public support for the projects, an overview of flexible street projects, the justifications for the projects, and the design features used to operationalize the concept. The findings from this study are discussed in Chapter 5 along with limitations of the study and ideas for future research. Further, the findings about flexible street projects are considered in conjunction with existing research on aspects of street design that have impacts beyond only the transportation capacity. Flexible Streets – and more generally, public space projects, are also pondered through the lens of 2020 and the impacts that a global pandemic and the reckoning against anti-Black racism have for the planning practice moving forward. This thesis concludes in Chapter 6 with recommendations

for practitioners and concluding remarks about the study. Through this study, the findings highlighted important takeaways about this emergent streetscape design concept for those who work in an urban planning capacity. The recommendations are aimed at individual planners in order to support the continued implementation of flexible streets in an equity-based manner. This thesis ends with a summary of the study and overall conclusions drawn from the findings about flexible streets.

Chapter 2: Literature Review

2.1 Introduction

The following literature review provides historical and contemporary knowledge about street design, issues stemming from roadway designs and auto-dominance, and an understanding of how policies mobilize – leading to the proliferation, in this case, of streetscape design concepts. The term ‘flexible street’ is currently being used to describe various roadway infrastructure projects across Canada. These projects involve the redesign of the streetscape to make it equally viable for motorized vehicles, pedestrians, and cyclists in addition to a space that can be used for larger-scale community events or for surrounding businesses to utilize. Currently, the flexible streets design concept is at a peculiar juncture in time as academic studies regarding these projects have not yet been published. As a result, there is no research to review that is directly about flexible streets. Thus, this chapter endeavours to focus on implementation and the various non-traditional street design concepts to better situate flexible streets within the growing movement of redesigning and redesignating public street space.

This chapter is divided into sections addressing different aspects of streetscape design. It begins with a history of roadways and street design approaches spanning from pre-colonization Canada into contemporary times is detailed. This will lay the groundwork to better understand the emergence of newer concepts of street design as reactions against traditional design. The next sections will explore concerns about the safety of road users and evolving ideas around streets and public space are also articulated through the literature. This is followed by details about popular non-traditional street design concepts along with a commonly referenced evaluative framework for identifying successful streets. This is then all supported by research about policy mobility, which can help garner an understanding of the origin and processes of implementing flexible street projects. Lastly, thoughts about how flexible streets fit into the idea-landscape around transforming urban streetscapes will be addressed, as well as the current gaps in the literature and general understanding of flexible streets.

2.2 History of Roadway Networks in Canada

The history of street networks, roadways, and highways spans the entirety of human history. Humans have always created and used travel routes in order to effectively move themselves and goods around. Prior to colonization, rivers and lakes were used by Indigenous people for travel by

canoe, as well as, networks of footpaths in areas of the land without abundant waterways (Gilchrist, 2015). Once European colonizers began to establish settlements, they also created roadways across the land for easier inland transportation, reduced the cost of transportation, and as a means to reach new areas for colonial settlement (Gilchrist, 2015). In 1606, the first graded road in New France (now Canada) was built by Samuel de Champlain for military purposes, which extended 16 kilometres between Port Royal and Digby Cape in Nova Scotia (Gilchrist, 2015). Continuing into the 18th Century, road construction in early British North America was primarily for military purposes (Gilchrist, 2015). The design of these early roads was essentially cleared pathways with some being planked (also referred to as ‘corduroy’) which entailed logs laid side-by-side (Gilchrist, 2015). The state of these early roads was dismal. As time progressed, and new technologies emerged, the design and use of roadways changed too.

The expansion of roadways was reignited by the prospect of development of natural resources and was spurred further by the 1858 Gold Rush in interior British Columbia along the shores of the Fraser River (Couturier, 2015). Perhaps the most significant and oft cited source of roadway network and design change in Canada (and most other countries in the world) came at the turn of the 20th Century. The invention of the automobile and sheer volume of vehicle ownership in Canada led to widespread changes in all facets of life and land use. Widespread road construction projects were spurred by provincial and national ‘good roads associations’ that advocated for improved road travel (Gilchrist, 2015). As new roads were built, the classification system for traditional roadways was “centered on the premise that roads exist to perform two functions in various degrees: enable vehicular mobility and enable access to adjacent land” (Shaheen, 2014 p 7). These roadway expansion projects have fundamentally altered the land in Canada.

2.3 The Urban Planning Profession & Roadway Design

Urban planners and transportation planners are involved in the process of placing and designing roadways in a myriad of ways. For example, the classification of a roadway in a particular municipality is designated by the municipal planners. Then, planners are involved in creating land use policies that are related to the roadway classification. Other planners work to ensure such policies are upheld through development. The design of roadways is a planning matter as, in addition to approving design plans for streets, planners are also involved in establishing design standards for roadways.

At the turn of the 20th Century, new government departments were established with a specific focus on the state of roadways across Canada. Overall, North American roadway design, as a formalized practice, stems from the American Association of State Highway Officials (AASHO), which formed in 1914 (Shaheen, 2014). Today, this department is called the American Association of State Highway and Transportation Officials (AASHTO), a name which intentionally encapsulated a wider variety of transportation modes (Shaheen, 2014). The AASHTO is an authority on roadway design, having published numerous reference books for practitioners. The most well-known and widely referenced is *A Policy on Geometric Design of Highways and Streets*, which is more commonly referred to as “the Green Book” (Shaheen, 2014; Garrett & Cusack, 2014). This book is used by design practitioners as it provides specifications on how certain classifications of roadways ought to be designed (Garrett & Cusack, 2014)

In Canada, the practice of roadway design stems from the Canadian Good Roads Association (CGRA), which formed in 1914 (Shaheen, 2014). Due to the expanding scope of transportation modes considered and issues addressed beyond rural highway design, the CGRA was renamed to the Roads and Transportation Association of Canada (RTAC) in 1970 (Shaheen, 2014). Shortly thereafter the name was minimized to the Transportation Association of Canada (TAC) (Shaheen, 2014). The TAC has published a variety of guidelines on transportation design and operations practices in Canada. In 1963, the *Manual of Geometric Design Standards for Canadian Roads and Streets* was published – which, from the mid 1990s onwards, has been known simply as the *Geometric Design Guide for Canadian Roads* (Shaheen, 2014). Both the AASHTO and TAC initially published design guidelines for roadways that were based in the design of rural highways, roadways intended for higher vehicular speeds, travelling longer distances, and in rural environments (Shaheen, 2014). At the outset, these publications were regarded as ‘manuals’ or ‘standards’ by practitioners and contained numerical values to which practitioners rigorously adhered (Shaheen, 2014). Deviation from what is included in these documents was and continues to be difficult and is generally avoided by practitioners (Shaheen, 2014).

A number of other organizations have formed and have a significant authority on how roadway design takes place in North America. Notable organizations include: the Transportation Research Board (TRB), Institute of Transportation Engineers (ITE), Transit Cooperative Research Program, and the National Association of City Transportation Officials (NACTO) (Shaheen, 2014). As research and technology have evolved, these other organizations have contributed to the larger understanding of roadway design. Notably, NACTO published the *Urban Street Design Guide*

(USDG) in 2013 based on input from a range of practitioners across different disciplines (Shaheen, 2014). The Guide “is reflective of the reality that roadways are not only conduits for conveyance of vehicles and goods, but also places of social and economic interaction” (Shaheen, 2014 p 4). The USDG differs from the traditional road design approach by instead championing a context-based design approach (Shaheen, 2014).

2.4 Evolution of Roadway Design Practices

In North America, the traditional practice of designing a roadway is based on the functional classification of the roadway, a selected design speed, and then by posting the speed limits at values 10 to 20 kilometers per hour lower than the design speed (Shaheen, 2014). Traditional roadway design also incorporates current and projected traffic volumes, roadway capacity, and the level of service (LOS) in determining the size and shape of the roadway (Shaheen, 2014). Traditionally, the design of streets has been closely related to road safety concerns. It became important to protect pedestrians from the perils posed, initially by horse and carriage, and later by the automobile – after the mass motorization that occurred after the 1950s (Kaparias, Bell, Biagioli, Bellezza, & Mount, 2015). This was achieved through the segregation of pedestrian traffic from vehicular traffic via infrastructure such as guardrails, walls, and pedestrian bridges (a design practice dating back to the work of Le Corbusier in the 1930s) (Kaparias, Bell, Biagioli, Bellezza, & Mount, 2015). Roadway design throughout much of the 20th Century, prioritized the rapid transportation of vehicular traffic (Liu et al., 2019). Auto-oriented planning decisions, in turn, facilitated urban sprawl and a widespread reliance on motorized vehicles for transportation (Creatore, Glazier, Moineddin, Fazli, Johns, Gozdyra, Matheson, Vered Kaufman-Shriqui, Rosella, Manuel, & Booth, 2016). Approaching roadway design in this manner has ultimately ignored the spaces outside of the road ‘red line’, which has left sidewalks, building frontages, roadway green spaces, and open spaces in the block out of the design considerations (Liu et al., 2019). This resulted in roadways being split and separated from the rest of the public space surrounding it (Liu et al., 2019).

In the past, the general urban design preferences in Canada have favoured sprawling, car-oriented neighbourhoods where walking is not feasible to meet daily needs, thus the reliance on vehicles increased (Creatore, Glazier, Moineddin, Fazli, Johns, Gozdyra, Matheson, Vered Kaufman-Shriqui, Rosella, Manuel, & Booth, 2016). As a result, a variety of public health concerns have erupted in Canada related to ailments stemming from decreased activity (Creatore, et al., 2016).

In the 1970s, the process of roadway design had shifted to include factors not previously included in roadway design decision-making (Shaheen, 2014). The shift expanded design consideration to include “noise, air quality, speeding, shortcutting, community severance, other travel modes (transit, pedestrians, and cyclists) as well as urban design, public realm and place-making considerations” (Shaheen, 2014 p 2). Since the turn of the 21st Century, there has been increasing attention paid to how roadways are designed. As streets in many cities across the globe comprise a considerable amount of the built environment, increased collaboration between traffic engineers, urban planners, and designers became a required for the successful evolution of roadways for all (Hamilton-Baillie, 2004). Now,

there has been increasing societal pressure to plan and design streets in urban settings for more than just moving traffic and providing driveway access. This changing paradigm is leading to alternative classifications of our roadway networks. More and more, streets are as classified by, or performing functions that are more closely related to the surrounding environment (Shaheen, 2014 p 9).

Today when designing a road, often a ‘target speed’ for the roadway design to be based on is selected (Shaheen, 2014). In this approach to roadway design, once the target speed is selected, the roadway is designed to influence drivers’ behaviour and speed in order to match the current or desired future context – this is also a central element in the ‘context sensitive design’ approach (Shaheen, 2014). This newer approach to streetscape design has been spurred on by a number of interconnected themes: pollution, emissions, economic activity, pedestrian flows, rental values, traffic congestion, obesity, mental health, public safety, and quality of civic life (Hamilton-Baillie, 2008a). Overall, planners now “consider multi-modal approaches that focus on moving people rather than vehicles [...] [fostering] greater attention on the design of facilities that better accommodate transit, bicycle travel and pedestrian circulation for shorter trips” (Shaheen, 2014 p 14). There is an increased emphasis on the importance of streets in communities as more than just conduits for automobile traffic.

2.5 Road and Street Safety

Numerous factors regarding traffic safety have been studied. Some studies focus on the factors that contribute to vehicle-to-vehicle collisions, while others are concerned with factors that help or hamper all other road users’ safety. As this study is focused on the use of roadways by all types of users, this literature review contains research focused on the safety concerns faced by those using the street. Acknowledging that there is a plethora of studies focused on the dangers of vehicle-

to-vehicle collisions, this literature review is intended to highlight the dangers that vehicles pose to all other users along a roadway – a public space intended for all users.

In the latter half of the 20th Century, each year in North America over 2.5 million people were injured or killed in collisions with motorized vehicles (Malenfant & Van Houten, 1990). Of this number, approximately 140,000 were pedestrian injuries or fatalities (National Safety Council, 1979; Transport Canada, 1981 in Malenfant & Van Houten, 1990). Despite the lower overall distances travelled by pedestrians compared to all other modes, 22% of all fatalities on roadways across the world involve pedestrians (World Health Organization, 2013 in Osama & Sayed, 2017). It is telling that the commonly used term for pedestrians, cyclists, micro-mobility users (scooters, roller blades, skateboards), and motorcyclists in the field of traffic safety is ‘vulnerable road users’ (VRUs). This diverse group of transportation modes are considered vulnerable road users because they are smaller in size and lack adequate mechanisms to protect against a potential collision with a motorized vehicle (Rifaat et al., 2012; Shaheen, 2014). These groups are compared with motor vehicles, in which design features (such as air bags and seatbelts) have evolved at a rapid pace to ensure the protection of those inside the vehicle in the event of a motor vehicle collision (Vanlaar et al., 2016). At the global level, VRUs make up 50% of all fatal road traffic injuries (World Health Organization, 2015 qtd in Vanlaar et al., 2016). Looking to Canada, within the last decade, among road traffic fatalities VRUs made up 29.1% of the total (Vanlaar et al., 2016). Transport Canada and The Canadian Council of Motor Transport Administrators (2015 qtd in Vanlaar et al., 2016) reported that of all road traffic fatalities, 15.6% were pedestrians, 10.3% were motorcyclists, and 3.2% were cyclists.

Most studies revealed that of VRUs involved in vehicular collisions, older adults (65 years and older) were disproportionately affected (Vanlaar et al., 2016 ; Osama & Sayed, 2017). Yet, many other studies have found that younger-aged groups of people are most commonly fatally or seriously injured while using the roadway (Vanlaar et al., 2016; Abdel-Aty et al. 2013 in Osama & Sayed, 2017). The literature on street safety is mixed, with researchers finding conflicting results. Despite the differing findings on traffic safety for VRUs, the conclusion can be drawn that all people are at risk when rightfully using any and all roadways. Despite the bleak statistics and numbers pointing to the dangers of being a VRU, Vanlaar et al. (2016) found there to be an overall reduction (21.8%) in the number of serious injuries to VRUs between 1995 and 2012. As roadway design has evolved to ensure safer transportation networks, studies have found that certain road users have benefitted more – namely, the most significant beneficiaries of advancements in road safety have been the occupants of personal vehicles (Vanlaar et al., 2016).

Many factors have been identified that contribute to unsafe roadways for VRUs. It was found that, compared with a traditional gridiron pattern, street networks with less connectivity, more cul-de-sacs, and more looping street configurations were less safe for pedestrians as they increased the likelihood of injury or fatality in the event of a vehicle-pedestrian collision (Rifaat et al., 2012). Speed is also a factor in pedestrian injury and fatality – a reduction in speed has been attributed to a reduction in the number of fatal pedestrian collisions (Anderson et al., 1997 in Rifaat et al., 2012). The width of a given roadway has been found to have an impact on the safety of VRUs, as roadways with higher speeds and larger lane widths led to more collisions involving pedestrians and automobiles (Garder, 2004 in Rifaat et al., 2012). As well, numerous studies have found that those of a lower socio-economic status have an increased likelihood of being involved in a pedestrian-vehicle collision (Osama & Sayed, 2017).

A study looking at the built environment of high incident locations (hotspots) for pedestrians found that a majority of hotspots were located on streets in the downtown area of Vancouver, British Columbia (Schuurman et al., 2009). This highlights the danger that motorized vehicles pose in areas where there is a higher concentration of people, or VRUs. In Toronto, the results of a study implied that pedestrians who walk longer distances or more frequently interface with vehicular traffic are not the reason collisions take place – rather, pedestrian and vehicular collisions are more so related to features of the built environment (Rothman et al., 2014). Even compared with other motorized forms of transportation modes, it was demonstrated that the personal automobile is the most dangerous threat to pedestrians and cyclists within the streetscape. Comparing pedestrian and cyclist injuries attributable to public buses and private automobiles along given routes in Montreal, Quebec, it was found that of those injuries, 95% of pedestrians and 96% of cyclists were injured by a private automobile (Morency et al., 2018). The study by Morency et al. calculated that the existence of the select bus transportation routes resulted in eliminating 2,332 injuries and 105 fatalities that would have otherwise occurred if only private automobiles were in operation along those routes (2018). Overall, vehicles are more dangerous to all other road users due to a variety of factors, which has deadly consequences. Studies have demonstrated that “within the City of Calgary, only 7.4% of the vehicle-vehicle collisions on local roads resulted in injuries (Rifaat & Tay, 2009) whereas 84.8% of the pedestrian-vehicle collisions on local roads resulted in deaths or serious injuries” (Rifaat et al., 2012).

Beyond the design of the built environment impacting the safety of VRUs, driver behaviour in areas where vehicles and pedestrians interface also has an impact. In a study looking at the

effectiveness of a program to increase the amount of drivers yielding to pedestrians, baseline data showed that the percent of motorists yielding to pedestrians at select crosswalks averaged: 54% in St. John's, Newfoundland; 9% in Fredericton, New Brunswick; and 44% in Moncton-Dieppe, New Brunswick (Malenfant & Van Houten, 1990). After the program's implementation, there was an overall increase in the percentage of motorists that yielded the right of way to pedestrians at each crosswalk – although the numbers did not increase above 71% (Malenfant & Van Houten, 1990). Although roadway safety for pedestrians increased through this program, the outcomes reported by Malenfant & Van Houten (1990) demonstrate that drivers continue to neglect the existence and safety of pedestrians rightfully traversing the roadway.

As knowledge about the environment and the negative environmental impacts of the current state of transportation practices has grown, the awareness has spurred transportation engineers and planners to explore and implement “designs and policies that encourage the use of non-motorized modes such as cycling and walking” (Rifaat et al., 2012 p 338). As more individuals are encouraged to walk as a means of transportation, more people will be more vulnerable to severe – or fatal, injuries if involved in a collision with an automobile (Osama & Sayed, 2017; Morency et al., 2018). On a positive note, research has demonstrated that “designing pedestrian-friendly roadways has the potential to reduce pedestrian injury” (Schuurman et al., 2009) and can contribute to an increase in the number of people opting to walk as a transportation mode (Rothman et al., 2014).

2.6 Public Spaces & Streets

Increasingly, public streets are being recognized as critical public spaces. In addition to “providing access to necessary goods and services, streets have the capacity to provide comfort, social interaction, and community engagement—though these outcomes are rarely prioritized and frequently overlooked” (Kent, 2015). Although streets are distinctly part of the public realm, many streets are perceived as hostile or dangerous spaces for those not inside an automobile (Elbech, 2020). Public streets have long been the focus of planning and design considerations in terms of: mobility; streets completed for all user modes; block and building composition; heritage preservation; security; retail viability; and, design features (Kent, 2015).

There is growing movement in recognizing public streets as public spaces and designing them to support a strong sense of place. It has been determined that in order for streets to function as places, “it is the design and management of a street, the variety of uses it can support, and, most importantly, the process through which the space is created, which will be the most fundamental

determinants of its sustainability and success” (Kent, 2015). Street design promoting more equal space amongst vehicles, pedestrians, and cyclists is intended to improve the aesthetic of the streetscape, and lead to environmental, economic, and health benefits for all community members (Hamilton-Baillie, 2008a). Thus, the shift towards public streets as public places is an endeavour that must be approached delicately. The mainstream planning realm heavily cites ‘the Dutch approach’ as an aspirational transportation planning and design approach that is premised on the transformation of urban streets into public places (Elbech, 2020). This approach dates back to the 1970s when Dutch communities began voicing opposition to the prevalence and presence of automobiles and instead championed the experience and safety of vulnerable road users such as pedestrians, cyclists, and particularly children (Elbech, 2020).

2.7 Woonerf & Living Street

A well-referenced street design typology stemming from Europe is the Woonerf. This approach to street design emerged in the late 1960s in Delft, a city in the Netherlands (Curl, Ward Thompson, & Aspinall, 2015; Collarte, 2012). A woonerf is a public street space that is designed so that pedestrians have priority over all other modes of transportation, even automobiles (Collarte, 2012). Woonerf is a Dutch word that means “living yard” – but is also often translated to mean “living street” (Canin Associates, 2014). Initiating the new streetscape design were the residents in a neighbourhood who were concerned with automobiles cutting-through and speeding within their neighbourhood, posing a threat to the safety of residents’ (Collarte, 2012). To combat this, “the residents took out their brick streets and replaced them with winding serpentine paths” (Collarte, 2012 p. 3). The alteration of the street allowed for continued use by automobiles while prioritizing the residents’ needs (Collarte, 2012).

For the residents who live along woonerven (plural of woonerf), “the public space in front of their homes is a place to play, socialize, and engage in the community” (Canin Associates, 2014). As the name suggests, this is because, along with being a new conduit for traffic, the woonerf is intended to be a front yard for the residents who live along it (Reid, 2015). In woonerf spaces (*Figure 1*), “cars should be rare, local, and restricted to walking speed” (Reid, 2015). To achieve this, intentional design measures are undertaken. Notably, woonerven are designed “without a clear division between pedestrian and auto space (i.e., no continuous curb), so motorists are forced to slow down and travel with caution” (Collarte, 2012 p. 3).



Figure 1: A picturesque Woonerf (Canin Associates, 2014)

Other design elements of a woonerf include having a distinct entrance and exit to the space, removal of curbs, employing a variety of traffic calming measures, providing on-street parking strategically to ensure automobiles do not over-power the space but also act as a traffic calming measure, and the incorporation of outdoor furniture and landscaping (Collarte, 2012). This streetscape design is unique compared to other approaches as woonerfs are intended for residential streets. Further, research suggests that ideal streets for woonerf implementation are streets which are used by fewer than 100 vehicles per hour during peak travel times (Collarte, 2012). Research has also demonstrated that the woonerf should not be more than 1,968 feet (600 meters) in length (Biddulph, 2001 ref in Collarte, 2012). Other research has suggested that the ideal length of a woonerf should instead be anywhere from 300 to 500 feet (Appleyard & Cox, 2006 ref in Collarte, 2012).

The concept has been adopted and adapted elsewhere. In the 1990s the woonerf concept was reconfigured for application in Britain – this iteration is termed a *home zone* (Appleyard & Cox, 2006 ref in Collarte, 2012). It is important to note that the *Shared Street* concept – which is more commonly used in the United Kingdom and the United States, borrows heavily from the woonerf concept; however, woonerven are only applied to residential streets while the Shared Street design concept can be applied to commercial streets and residential streets (Collarte, 2012).

Biddulph (2001) found that woonerven work best when implemented on streets with residents who support the redesign and where on-street activities are already occurring. It was also identified that, like the initial impetus for this street design, vehicular traffic posing a threat to residents' safety aids in the success of implementing a woonerf (Collarte, 2012). Another key finding in the success indicators of woonerven is a distinct lack of open spaces available in close proximity for residents to use (Biddulph, 2001). A lack of open space is typical in older European towns or larger cities (Canin

Associates, 2014). The lack of open spaces for recreation would be effective in persuading residents along the woonerf to use it as public space, fulfilling the overall aim of a ‘living yard.’

The implementation of woonerven has improved many aspects of urban life for those living adjacent to a woonerf. For example, increasing access and mobility within the street environment for older adults and others who may have limited mobility (Collarte, 2012). Other benefits include creating a more pleasing street environment; increased opportunities for socialization and other activities; making more efficient use of the previously limited space; and, slowing down automobile traffic (Collarte, 2012). In fact, areas where woonerven have been implemented in the Netherlands there has been a 40% reduction in traffic accidents (Canin Associates, 2014). Drawbacks of the woonerf concept include delayed response times for emergency services (Collarte, 2012) and fear that the mix of transportation modes will lead to collisions (Alan M. Voorhees Transportation Center, 2004).

The woonerf concept has impacted the lives of many around the world. Approximately two million people live alongside the over 6,000 woonerven in The Netherlands (Canin Associates, 2014). The British adaptation, home zones, has been applied to over 70 streets in England and Wales (Canin Associates, 2014). In the United States the woonerf concept has spurred the implementation of over 400 redesigned streetscapes (Canin Associates, 2014). Beyond these countries, the concept has been implemented elsewhere in Europe and in Australia, Japan, and Israel (Appleyard & Cox, 2006). Canada has also promoted the woonerf concept with a project in Toronto (Reid, 2015) and a proposal in Waterloo (Jackson, 2019).

2.8 Shared Street Space(s)

The shared-use streets concept stems from western Europe (PPS & Mobycon, 2017). It ultimately aims to differentiate between the traffic realm (highways) and the social realm (city streets) (Gilman, & Gilman, 2007). Shared Street Space is about both the people travelling through the space and the people who live and work adjacent to the space (PPS & Mobycon, 2017). Definitions of Shared Street Space vary and have evolved over time. An early definition from the United Kingdom Department for Transport defined Shared Space as “a design approach that seeks to change the way streets operate by reducing the dominance of motor vehicles, primarily through lower speeds and encouraging drivers to behave more accommodatingly towards pedestrians” (PPS & Mobycon, 2017). Which is a perspective from traffic engineering focused on altering driver behaviour. The Netherlands, which is

the birthplace of the Shared Streets Space (*Figure 2*) concept, developed a definition adhered to by those in the planning and design realm.



Figure 2: A Shared Space in Poynton (Cheshire, England). Image by Ben Hamilton-Baille (PPS & Mobycon, 2017)

The definition is as follows: “a new concept of holistic planning, designing and maintaining public space, in which the design is done in such a way that the interests and the individual responsibility of all users of that space comes first” (Netherlands Knowledge Center qtd in PPS & Mobycon, 2017).

Mainstream planning circles cite Dutch traffic safety analyst, Hans Monderman, as coming up with the idea for Shared Street Spaces in 1995 (PPS & Mobycon, 2017). Monderman pondered whether or not less prescriptive traffic control measures (lights, signs, posted speed limits) would make streets safer (PPS & Mobycon, 2017). Beyond increasing the safety of streets, he felt that traffic safety measures impacted society’s capacity for socially responsible behaviour as prescriptive traffic control measures decreased people’s sense of personal responsibility in public (PPS & Mobycon, 2017). Thus, Monderman began to alter streetscapes in an attempt to facilitate pedestrians, cyclists, and motorists directly negotiating the space with one another (PPS & Mobycon, 2017).

These streets have evolved to follow a general set of design guidelines that help inform how the streets ought to be used. The main aim of this type of street design is,

to minimize the distinction between the movement of vehicles, cyclists and pedestrians using the exception of attributes inherent in road traffic: curbs, isolated walkways, markings, traffic lights, traffic signs and pedestrian crossings. The uniform paved space becomes a public place of harmonious interaction of all road users. Thus, all design elements are intended to reduce the distinction between flows of motorized and non-motorized means of transport (Prelovskaya & Levashev, 2017 p. 524).

Designing streets as shared spaces, instead of as a space for vehicle traffic, involves creating a public space with visual cues to slow vehicle traffic and support the safe use by pedestrians, cyclists, and others (Gilman, & Gilman, 2007). It has been demonstrated that concerns around safety are paramount in the design of shared public spaces (Hamilton-Baillie, 2008b). Shared Street Space “fosters civility and interaction between modes, which enables users to move safely through the space using social cues rather than assigning right-of-way to one mode over another” (PPS & Mobycon, 2017).

Research has demonstrated that it is achievable to calm traffic flows through the use of aesthetically appealing design (Kennedy, Gorell, Crinson, Wheeler & El, 2005). Considering detailed case studies on design principles of shared-space streets across Europe (Jayakody, Keraminiyage, Alston & Dias, 2018), a general understanding of this design practice has emerged. Studies have demonstrated that a significant number of users of Shared Street Spaces perceive an increase in the placemaking power of the intervention (Karndacharuk, Vasisht & Prasad, 2015). Research has also found that in Shared Street Spaces designed to facilitate both pedestrian and vehicular traffic flows, both pedestrians and drivers do modify their behaviours (Kaparias, Bell, Biagioli, Bellezza & Mount, 2015). Overall, drivers do travel at lower average speeds; however, an observed issue is that drivers often do not ensure pedestrians are completely across the road before accelerating (Kaparias, Bell, Biagioli, Bellezza & Mount, 2015). This is a potential safety issue that may deter people from using streets where vehicles are present due to perceived danger of this type of interaction with vehicles.

2.9 Complete Streets

The term ‘complete streets’ emerged out of the reaction against the state of roadways in the United States at the turn of the new millennium. In 2002, the federal Bureau of Transportation Statistics (BTS) conducted a national survey which revealed that around one quarter of all walking trips occur on roadways without sidewalks or shoulders (McCann, 2005). The survey also revealed that bike lanes were available for only five percent of all bicycle trips (McCann, 2005). The BTS’s National Transportation Availability and Use Survey in 2003 found that the main complaint by both

able-bodied pedestrians, cyclists, and those with disabilities was that there were not nearly enough useable sidewalks and bikeways available (McCann, 2005). This highlighted the significant lack of infrastructure for non-automobile road users on streetscapes across the country.

It is from these widespread realizations that the groundwork for the evolution of complete streets was solidified. The essence of a complete street has existed, or at least been considered, since before the concept was formally recognized. In 2003, the term ‘complete streets’ was coined “by bicycle advocates as a way to describe-and sell-what had until then been referred to as routine accommodation” (McCann, 2005 p. 2). A complete street is defined as a roadway “that is designed to be safe for drivers; bicyclists; transit vehicles and users; and pedestrians of all ages and abilities” (Hui et al., 2018 p. 24). The concept of complete streets is focused “not just on individual roads but on changing the decision-making and design process so that all users are routinely considered during the planning, designing, building and operating of all roadways” (Hui et al., 2018 p. 24). Overall, “policies for complete streets are aimed at producing roads that are safe and convenient for all users” (McCann, 2005 p. 1). Thus, the concept itself intends to address more than simply how the streetscape is designed. The complete streets movement also involves a drastic shift in transportation planning and design policy (Hui et al., 2018).

Having formed in 2004, the National Complete Streets Coalition operates within the United States championing both policy and procedural changes at the local, state, and federal levels (Hui et al., 2018). Since the emergence of the complete streets concept in 2003, a plethora of complete street policies have been adopted and projects undertaken. By 2015, there were 656 jurisdictions that had adopted complete streets policies (Garrett & Cusack, 2014). There are now over 1,650 complete streets policies that have been passed in the United States (Smart Growth America, 2020). A significant underpinning of the movement towards complete streets is to “create a complete and safe transportation network for all modes” (Hui et al., 2018 p. 25). The emphasis on accommodating all users is to ensure that each road user is able to use a roadway without being compromised by automobile road users (Garrett & Cusack, 2014). The sentiment of safety is echoed throughout the literature on complete streets.

The specific design criteria of what makes a complete street is not rigidly defined nor required. Thus, a major component of the complete streets “design paradigm is selecting a design speed that is appropriate to the actual street typology and location and that allows safe movement by all road users, including more vulnerable pedestrians and bicyclists” (Hui et al., 2018 p. 26). Simply changing the speed limit is not an effective means to achieve the objective of safer roadways for all –

instead, using the target speed of a street as its design speed can result in a safe multimodal urban environment (Fitzpatrick, 2003 ref. in Vega-Barachowitz et al., 2013). There are numerous design interventions that can be implemented to reach complete streets objectives. The typical infrastructure design elements that a complete street entails include “sidewalks, bicycle lanes (or wide, paved shoulders), shared-use paths, designated bus lanes, safe and accessible transit stops, and frequent and safe crossings for pedestrians, including median islands, accessible pedestrian signals, and curb extensions” (Garrett & Cusack, 2014 p. 13). A basic rendering of a complete street can be viewed below, in *Figure 3*.

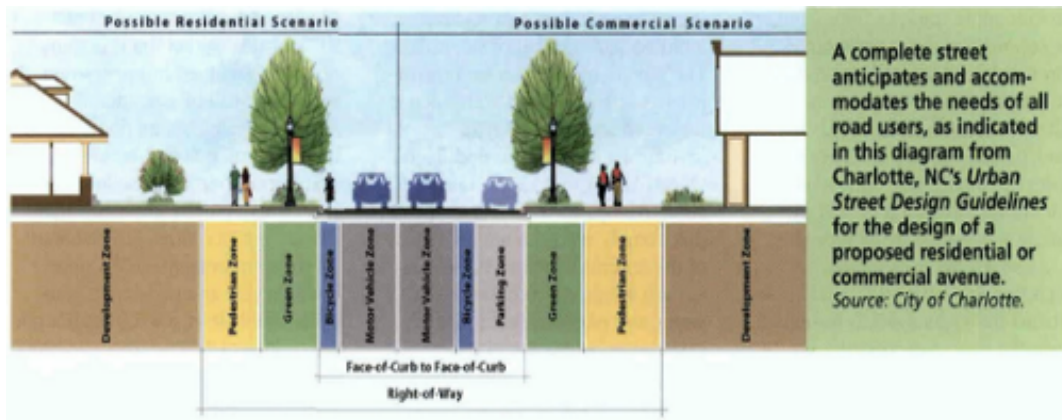


Figure 3: A diagram of one possible iteration of a Complete Street (Garrett & Cusack, 2014)

Further elements of a complete street, used primarily to calm traffic include narrower travel lanes, road diets (eliminating lanes for traffic), tightening corner curb radii, eliminating any free-flow right-turning lanes, raised medians, landscaping on the median and parkway, curbside parking spaces, and curb bulb-outs alongside on-street parking spaces (La Plante & McCann, 2008). In addition to slowing automobile traffic, the aforementioned design elements directly benefit pedestrian users –less roadway to cross, mid-street refuge provided by a raised median, as well as the inclusion of pedestrian-actuated crosswalk warning signs, pedestrian-actuated HAWK-style signals, full signalization of the Walk/Flashing Don’t Walk times, and countdown clocks communicate when an individual should cross the roadway (La Plante & McCann, 2008). Within the complete streets design paradigm, there is no ‘checklist’ as to what a roadway must have in order to be considered a complete street.

The design elements employed will vary depending on the context and use of the roadway – complete streets projects tend to be unique (McCann, 2005). For example, a busy street through an urban centre may include design features for public transit (buses, streetcars, or light rail), bicycles,

pedestrians, and private automobiles (Hui et al., 2018). In a rural setting, a paved shoulder alongside the road may be considered a complete street as it allows cyclists and pedestrians to use the roadway alongside automobiles (McCann, 2005 & Hui, 2018). Thus, the complete streets design concept can be implemented in all roadway contexts.

In terms of measuring complete streets, different jurisdictions have created unique approaches. The oft cited transportation planners in Charlotte, North Carolina, have developed and used a complete streets planning process comprised of six steps to systematically evaluate the needs of all modes of transportation before constructing a roadway (Hui et al., 2018). As complete streets are intended to be designed for each unique context, the way in which they are measured is not uniform. As part of the complete streets movement, there has been a push to change the way in which traffic flow and other traditional indicators of roadway performance are measured in order to realize this newer kind of street (Vega-Barachowitz et al., 2013). This is because the traditional standards of measurement and evaluation for roadways are not suitable for streets that are based on a balance of mode share (Vega-Barachowitz et al., 2013).

Despite the widespread applicability and purported benefits for all users, the complete streets movement has faced – and continues to face, challenges. The biggest challenge to contemporary planners is the barriers created by past policies. Research has found that to more easily facilitate the implementation of complete streets there must be a re-write of agency policies and procedures to instead serve all transportation modes; a re-adaption of design guidelines to reflect the aims of complete streets; more training for practitioners in designing for all transportation modes; and more data collected on how all transportation modes are using a given roadway (Hui et al., 2018). In some scenarios, legislation enacted to aid in the complete streets movement has been largely ignored, with transportation engineers and designers taking years to become aware of new requirements (McCann, 2005). However, there is a largely positive trajectory for the complete streets movement. One indication of continued implementation is the growing volume of complete streets design guidelines that jurisdictions are enacting across the United States (Garrett & Cusack, 2014).

2.10 Ciclovías & Open Streets

A concept increasing in popularity and adoption is known as Open Streets. This concept is different from other streetscape typologies yet shares some similar aims. The approach of Open Streets is stark in comparison to the other streetscape design concepts as Open Streets does not involve any redesign or permanent altering of the roadway. Instead, Open Streets are implemented via

programs uniquely tailored to the specific community. An Open Street involves the closure of “streets to vehicles to increase open space and physical activity opportunities for local communities” (Chaudhuri & Zieff, 2015). This is a result of public health professionals and urban planners increasingly working together to redesign the built environment to facilitate more opportunities for physical activity (Creatore, et al., 2016). The term Open Streets is used widely in the United States and Canada, while the original term preceding it is Ciclovías.

The approach stems from Central and South America, where successful Ciclovías are established (Hipp et al., 2017). A well-known example is the Ciclovía in Bogotá, Colombia which occurs every Sunday and covers a significant portion of roadways across the city (Hipp et al., 2014). The Ciclovía in Bogotá began in 1976 and has since been expanded in scope and used all over the world (Hernández, 2008). The Open Streets projects implemented across the globe all stem from a concern about worsening health and wanting to provide citizens with the opportunity for physical activity via cycling and an improved pedestrian experience (Cohen et al., 2016; Chaudhuri & Zieff, 2015; Greene et al., 2017; Sarmiento, Torres, Jacoby, Pratt, Schmid & Stierling, 2010). Research has shown that a combination of safety and walkability in the design of a street increases the likelihood of physical activity and active commuting (Yang, Griffin, Khaw, Wareham, & Panter, 2017).

Open Streets and Ciclovías have been the focus of many studies. These street projects are measured in a variety of ways, based on the objective of the study. Studies have used qualitative and quantitative methods to investigate different Open Streets programs. Some have focused on the program setting, number of events per year, duration of events, length of the Open Streets, and number of participants in evaluating Open Streets (Sarmiento, Torres, Jacoby, Pratt, Schmid & Stierling, 2010; Hipp, Bird, van Bakergem & Yarnall, 2017). Other studies have focused on participation in Ciclovías in terms of physical activity levels (Cohen et al., 2016) or in terms of perceptions of community improvement (Greene et al., 2017). Lastly, the impact of Open Streets on surrounding businesses has been an area of inquiry (Chaudhuri & Zieff, 2015). In combination, these assessments of Open Streets programs help to further justify the expansion of programs or highlight challenges caused or faced by these programs.

Studies have found that Ciclovías do contribute to increased levels of physical activity in participants. For example, 45% of participants the Opens Streets program in Los Angeles – called *CicLAvia* (Figure 4), reported that they would have otherwise been sedentary if not for the Open Streets program (Cohen et al., 2016).



Figure 4: An Open Streets event in Pasadena (CicLAvia Los Angeles, 2015)

In terms of perceptions of the community, a study on the Ciclorecreovía in Santiago, Chile found that 88% of participants’ perception of the city improved positively, 64% had discovered a new place in the city, and 69% of participants said their health improved by attending the event (Greene et al., 2017). Looking to impacts on local businesses, a study found that there “was a modest increase in business activity along Sunday Streets routes with increases in revenue, customer activity and sales as well as employment, demonstrating an unintended outcome for a program originally intended for improving health behaviors” (Chaudhuri & Zieff, 2015). Studies have also demonstrated the sheer proliferation of Open Streets programs across North America (Hipp et al., 2017) while other studies have shown the popularity of such programs, some that have up to 1,000,000 participants (Sarmiento, Torres, Jacoby, Pratt, Schmid & Stierling, 2010).

Other research focusing on Open Streets has revealed that these programs (pedestrian street spaces) are a unique way to address disparities that vulnerable populations experience in access to recreational opportunities (Zieff, Musselman, Sarmiento, Gonzalez, Aguilar-Farias, Winter, Hipp, Quijano & King, 2018). The research, overall, points to the positive impacts of Open Streets programs. Research has also highlighted some challenges faced when implementing an Open Streets program. Pedestrian street initiatives involve far more than simply closing off the street to vehicular traffic, often government funding and community leaders or staff are required to ensure the viability of the street-as-public-space-type initiatives (Newman, Waldron, Dale & Carriere, 2008). This work can be fraught with challenges. One study found that program organizers noted considerable barriers in expanding Open Streets programs – namely, in terms of procuring funding, permits, and event

branding (Hipp et al., 2017). Despite the challenges in facilitating Open Streets programs, these streetscape-based projects have been popular in a plethora of places.

2.11 Great Streets

A Great Street is not a street design concept, rather it is the term given to streets deemed particularly good by renowned urban designer Allan Jacobs based on criteria he has identified as contributing to a desirable right-of-way (1993). Jacobs' work intended to convey knowledge for designers and community decision makers to use "however they wish; As models, as guides, as points of departure for new designs, or to find out just how much or how little can take place in a given cross section of a street" (1993 p 271). This approach is often used as an evaluative framework to assess a given streetscape through considering the requirements set out in *Great Streets* (Jacobs, 1993). This framework entails a set of Requirements for Great Streets along with additional Qualities that Contribute to ideal urban throughfares.

The first requirement of a Great Street is 'Places for People to Walk with Some Leisure' (Jacobs, 1993). To achieve this, there must be walkways that allow users to walk at varying paces – especially at a leisurely pace, "with neither a sense of crowding nor of being alone, and that are safe, primarily from vehicles" (Jacobs, 1993 p 272). Crowding leads to safety issues as people may have to move off the walkway into lanes of vehicular traffic. Instead, Jacobs writes that "no physical separation at all between vehicle and pedestrian paths, that is, no curbs, can be a better solution, particularly on crowded, small streets; Let cars and people mix" (1993 p 273). In short, the requirement for a great street is that people are able to walk easily and safely on it.

The next requirement for a Great Street is 'Physical Comfort,' which has to do with features and articulation of a street that impacts one's exposure to the natural elements (Jacobs, 1993). The physical comfort of a street comes from balancing, depending on the context, sun and shade along the right-of-way, relative protection from precipitation, and shelter from the wind (Jacobs, 1993). This can be achieved through the use of building heights, street trees, storefront awnings, or arcaded streets (Jacobs, 1993).

The third requirement for a Great Street is Definition. This has to do with the boundaries of a street, and how those boundaries are communicated to users. Urban "streets are defined in two ways: vertically, which has to do with height of buildings or walls or trees along a street" (Jacobs, 1993 p 277) and horizontally, which entails the length of and spacing between the defining features, the definition of the street can also occur at either end of a street (Jacobs, 1993). Typically, it is the

buildings that define a street, but can be the other elements such as walls or trees (Jacobs, 1993). The definition of a street also always involves the floor. The height to distance ratio of a well-defined street, was found to be at least 1:4 (Jacobs, 1993). Jacobs found that the ‘very best streets’ did not have very tall buildings, rather that the height of buildings along the best streets were less than 100 feet; however, an upper limit to building height was not provided (1993). Another important factor in street definition is the spacing of buildings along a street. Jacobs (1993) concludes that tighter spacing between buildings is more effective than larger spacing in achieving street definition.

The fourth requirement for a Great Street is Qualities That Engage the Eyes – in which the physical characteristics of a street “help the eyes do what they want to do, must do: move” (Jacobs, 1993 p 282). This includes ensuring there are “many different surfaces over which light constantly moves that keeps the eyes engaged; separate buildings, many separate windows or doors, or surface changes” (Jacobs, 1993 p 282). As well, this can be achieved through surfaces themselves that move, for example, signage or trees. People meandering on the streets and cars moving at a non-threatening speed along the roadway are other factors that contribute to this quality of a Great Street (Jacobs, 1993).

Transparency is the fifth requirement set out by Jacobs for a Great Street. This quality is found at the edges of streets, “where the public realm of the street and the less public realm, often private realm of property and buildings meet” (Jacobs, 1993 p 285). It is about providing actual visual access to, or suggesting what is behind the street wall. According to Jacobs, it is usually the windows and doors of buildings that give a sense of transparency (1993).

The sixth requirement of a Great Street is Complementarity. This aspect of a great street is about the buildings that flank the street expressing “respect for one another, most particularly in height and in the way they look” (Jacobs, 1993 p 287). Buildings of a same general height are found along the best streets, as identified by Jacobs (1993). The variables that add to the complementarity of a street are “materials, colour, cornice lines and belt courses, building sizes, window openings and their details, entrances, bay windows, porches, overhangs and shadow lines and details like downspouts” (Jacobs, 1993 p 289).

The Maintenance of a street – including the trees, buildings, and the materials that a street is comprised of is another requirement for a Great Street. Jacobs (1993) explains that understandably, people prefer clean, well-maintained streets versus streets in varying levels of disrepair. Beyond cleaning the street space, Maintenance “involves the use of materials that are relatively easy to maintain and street elements for which there is some history of caring” (Jacobs, 1993 p 291).

A final requirement for a Great Street is Quality of Construction and Design. Although all of the requirements for Great Streets are design-focused and about design quality, this requirement has to do specifically with the standard of workmanship and materials used (Jacobs, 1993). In terms of materials, those used in places that will “have to take a lot of wear and tear but are not capable of doing so usually have a negative impact” (Jacobs, 1993 p 291). With poor workmanship, “there is a sense of shabbiness attached to a street where things that are supposed to line up regularly do not, or where there is sloppy painting or bad joinery” (Jacobs, 1993 p 292). Although quality is typically associated with increased costs, suggesting that only affluent communities can afford Great Streets, Jacobs (1993) rejects this notion.

There are a variety of Qualities that Contribute to Great Streets that Jacobs (1993) has identified. Trees are noted as a quality contributing to the improvement of a street (Jacobs, 1993). Of course, what matters is that trees are appropriate for the space and that there will be routine maintenance for the trees (Jacobs, 1993). A street with ‘Beginnings and Endings’ – communicating to a user that they have arrived in the space, left the street, or as a means to provide boundaries, is a contributing quality for a Great Street (Jacobs, 1993). A notable start and stop can be communicated through a special physical quality, including gates, fountains, statues, or special buildings (Jacobs, 1993). Jacobs asserts that more buildings along a street positively contributes more so than fewer buildings (1993). Having ‘Many Buildings Rather Than Few; Diversity’ supposes that the buildings are uniquely designed, adding visual interest along the street (Jacobs, 1993). Further, more buildings mean that there will be more owners, and thus, the likelihood for more diversity in how the buildings are used (window displays, colour changes, and landscaping) and maintained (Jacobs, 1993).

The details of a street lend to the establishment of a great street – including canopies, signage, paving treatments, lights, kiosks, fountains, gates, and benches (Jacobs, 1993). Thus, ‘Special Design Features: Details’ are a contributing quality of a great streetscape. The ‘Places’ found along a street are also contributing factors to the greatness of a given street. Jacobs found that the ‘breaks’ found along some streets are important contributions to a Great Street as they “provide stopping places, pauses, reference points along the path” (1993 p 301). The Accessibility of a street is another quality that Jacobs identifies. First, a street must be in an accessible location within a municipality in order for people to reach it (Jacobs, 1993). In addition, to ensure accessibility for all users, a street must facilitate the movement of all users equally through traffic lights and buffers between fast moving vehicles and pedestrians (Jacobs, 1993). Another type of access considered is for people with disabilities. Jacobs highlights design features that to accessibility for those with disabilities, namely

the installation of ramps or the regularity of streets that bode well for those with visual impairments in deciphering their routes (Jacobs, 1993).

Jacobs writes that ‘Density Helps’ in contributing to a great street as streets are activated by people using them – ensuring that people live along streets or at least nearby is addressed via density (Jacobs, 1993). Diversity is a contributing factor that is about the uses found alongside a given street (Jacobs, 1993). A diversity of uses leads to variety, activity, and the liveliness of a physical place (Jacobs, 1993). The Length of a street is a quality that Jacobs identifies, although a definitive minimum or maximum length is not provided (1993). Rather, it is about sustaining “visual interest, diversity, eye- and thought-provoking images” (Jacobs, 1993 p 304), which can be in the form of special focal points, a park, or special buildings (Jacobs, 1993). Jacobs found that the best streets are found to have noticeable changes in the elevation – making Slope a contributing factor of great streets (1993). Jacobs notes that the upper limit for slope would be if the street became so steep that it negatively impacted the ability of groups like older adults, those with disabilities, and families with young children to traverse the length of the street (1993).

Parking is noted as a contentious issue, although itself is a contributing quality of a Great Street. Of the exemplary streets identified by Jacobs, none have much parking spaces on or off the street, thus “auto parking in great amounts, to any contemporary standard, is not a characteristic of great streets” (Jacobs, 1993 p 306). In regard to the design of the street and how it is set apart from other streets, Contrast is a quality that contributes to a great street (Jacobs, 1993). It involves the “shape or size or regularity within an urban physical context [that] may set one street apart from others, may make it more noticeable, may give it a head start toward being special” (Jacobs, 1993 p 307). The last contributing quality of a great street is Time. It is suggested that time is needed to make a street great – to develop a history, witness the buildings change, and achieve diversity; however, streets where surrounding buildings were constructed in a more recent time frame can also be great (Jacobs, 1993).

2.12 Equitable & Accessible Streetscapes

Looking to equitable public spaces, there is a significant amount of research looking at the intentionality of public space design pertaining to community. Although cities are purported to be for all inhabitants, visible and invisible boundaries exist (Sandberg & Rönnblom, 2016). Such “boundaries are the result of yesterday’s spatial planning, including its norms and values, and they affect our way of life, our way of being and moving in the city” (Sandberg & Rönnblom, 2016 p

1751). Beyond these restrictions, it has been noted “that visions of a ‘good’ city are largely defined by the values of the dominant or hegemonic group and legitimated by planning discourses and documentation” (Sandberg & Rönnblom, 2016 p 1751), thus limiting the notions available in shaping an community-driven ideal city. In having a hegemonic group championing planning matters, minority and disadvantaged groups are left out of the discussion or neglected completely. It is acknowledged that there are many nuances when it comes to social groups and the diversity of all experiences in the built environment cannot be detailed in full in this section. Select issues will be addressed in the following paragraphs.

One group that has been historically disregarded are those with physical disabilities. A study by Syaodih and Aprilesti (2020) detailed findings on the accessibility of public spaces for those with disabilities. It was found that in this instance that public spaces did not meet the expectations of accessibility for those living with a disability, and these findings has been corroborated by other studies (Syaodih & Aprilesti, 2020). Thus, the built environment “is a key variable in enabling or disabling impaired people with regard to access to public space” (Syaodih & Aprilesti, 2020).

Another concern about the equity of public space is the experience of racialized people. When concerned with fostering equitable public spaces, in particular,

in a racially segregated society, we must consider members’ proximity to environmental hazards, the relative security provision on offer, the nature of their contact – whether more or less violent or punitive – with police and other state agents, members’ access to transportation, relative time spent traveling from employment centers to their residences and access to nutritious food within their environment (Threadcraft, 2015 p 57).

Considering the lived experiences of all people, not just those in power, is a necessary dimension in creating equitable public spaces. Beyond the physical barriers that some face, there are limiting barriers stemming from economic status, gender, sexuality, and race that may preclude people from equally participating in both the planning process and in accessing public spaces as equals.

Although created to be a space for all community members, some research suggests that more equitable street designs are not as inclusive as desired. Research findings demonstrate that people who have disabilities perceive certain changes to the built environment – initially communicated as inclusive to all, as not inclusive once implemented (Edwards, 2009). In some cases, it has been found that the consultation process does not seek out the input of people with disabilities, rather the general public consultation with certain advocacy groups is thought to ‘cover’ the perspectives that people with disabilities likely would have on a given development (Edwards, 2001). This pertains directly to the issues stemming from more equitable roadway design as these are public spaces that ought to be

accessible and easily traversable for all. For example, it is of great importance for individuals with vision loss to be able to traverse public spaces safely and independently (Keeffe, Lam, Cheung, Dinh & McCarty, 1998).

Redesigned streetscapes using non-traditional design concepts – although improving upon many factors for users, has caused additional challenges for those with visual impairments. Specifically looking to Shared Space environments, despite benefits “such as lower speeds, a reduced emphasis on motorized traffic, and increased recognition of the importance of attentiveness to other road users” (Havik, Melis-Dankers, Steyvers & Kooijman, 2012 p 134), the less predictable and less-structured traffic flow can cause those with visual impairments to feel unsafe (Havik, Melis-Dankers, Steyvers & Kooijman, 2012). As Shared Streets are increasing in implementation, organizations representing individuals with visual impairments have expressed concerns and advocated against the further implementation (Havik, Melis-Dankers, Steyvers & Kooijman, 2012). A study assessing environmental characteristics of Shared Streets judged against accessibility for visually impaired persons, found “common to all locations were the absence of traffic lights, kerbs, sufficient luminance contrasts marking the walking route, and separate areas for cars and cyclists” (Havik, Melis-Dankers, Steyvers & Kooijman, 2012 p 139). Many Shared Streets lacked a tactile distinction between vehicle and pedestrian traffic flows while all locations studied “had unobstructed lines of sight of oncoming traffic and sufficient free walking space” (Havik, Melis-Dankers, Steyvers & Kooijman, 2012 p 142). The accessibility problems found to be associated with Shared Streets, specifically for visually impaired people, were the absence of tactile demarcations and brightness contrast between different areas of the roadway - such as ‘pedestrian zones’ and carriageways or street crossings, the absence of traditional guidance cues or pathways, the potential for cyclists to use the same space as pedestrians, and the absence of designated parking spaces (Havik, Melis-Dankers, Steyvers & Kooijman, 2012). To combat this, it is recommended that Shared Street Spaces employ numerous tactile indicators to allow for pedestrians with visual impairments to be aware of the surroundings and safely navigate the streetscape (Havik, Melis-Dankers, Steyvers & Kooijman, 2012). Further, more consistency in where parking spaces are was found to be an important design consideration that can make a street more accessible for all users (Havik, Melis-Dankers, Steyvers & Kooijman, 2012). These recommendations are applicable to all non-traditionally designed roadways.

2.13 Policy Mobility

Understanding the policymaking processes and how policies are adopted and adapted across municipalities is key in assessing how streetscape design concepts have proliferated across the world. The concept of policy mobility is an approach to capturing “empirical observations about contemporary international movement of policy” (Ward 2006; McCann 2011a; Peck 2011 ref in Lovell, 2016). It evolved out of the approach to assessing the international movement of policy, called policy transfer, which is heavily based in the political sciences (Lovell, 2016). In order to understand policy mobility, it is helpful to first know about policy transfer.

The most commonly referenced definition of policy transfer was established by Dolowitz and Marsh, they define policy transfer as a “process in which knowledge about policies, administrative arrangements, institutions and ideas in one political setting (past or present) is used in the development of policies, administrative arrangements, institutions and ideas in another political setting” (Dolowitz & Marsh, 2000 p 5). The term was first coined in 1996 by Dolowitz and March when they looked at the connections between policy transfer and if it achieved policy ‘success’ or ‘failure’, as well as to encompass both voluntary and coercive policy transfer (Dolowitz & March, 1996 in Dolowitz & Marsh, 2000; Benson & Jordan, 2011). Although most literature surrounding the concept did not emerge until the late 1900s, thought leaders on the subject acknowledge that the practice of policy transfer had been occurring previously (Dolowitz & Marsh, 2000).

Why and how policy transfer became a popular approach for understanding policy is inextricably linked with the growth of globalization. Parsons (1996) posits that,

as the world economy in particular is transformed by new modes of production and trade, and as transnational corporations and institutions come to exercise more influence and power, so the capacity of national policy-makers to frame their own agendas is diminished. Public policy now takes place in a world system as well as in national political systems (p 234 in Dolowitz & Marsh, 2000).

Further aiding the approach of policy transfer is new communication platforms, which have allowed for the wider exchange of ideas (Dolowitz & Marsh, 2000).

In terms of what can be transferred, Dolowitz and Marsh (2000) note that there are no limits on what can be transferred between one political system and another. However, eight distinct categories on what can be transferred are identified: “policy goals, policy content, policy instruments, policy programs, institutions, ideologies, ideas and attitudes and negative lessons” (Dolowitz & Marsh, 2000 p 12). The policy phenomena are typically garnered from a host of sources, including international, national, and local levels of governance (Dolowitz & Marsh, 2000). Over time, a

country, province, or municipality may switch roles between being the 'idea generator' or the one taking ideas from elsewhere. Another key conceptualization in policy transfer is the categorization of the different political actors that are involved in the policy transfer process. The initial work of Dolowitz and March in 1996 outlined nine main categories of actors engaged in the process, which included “elected officials, political parties, bureaucrats/civil servants, pressure groups, policy entrepreneurs and experts, transnational corporations, think tanks, supra-national governmental and nongovernmental institutions and consultants” (Dolowitz & Marsh, 2000 p 10).

Further, the policy phenomena transferred is not necessarily an ‘all-or-nothing’ process. In their work on the subject, Dolowitz and Marsh identified four distinct degrees of policy transfer:

copying, which involves direct and complete transfer; emulation, which involves transfer of the ideas behind the policy or program; combinations, which involve mixtures of several different policies; and inspiration, where policy in another jurisdiction may inspire a policy change, but where the final outcome does not actually draw upon the original (2000 p 13).

A final important note about the policy transfer process is distinguishing between voluntary and coerced transfer. Dolowitz and Marsh (2000) conceptualizes policy transfer as “a continuum that runs from lesson-drawing to the direct imposition of a program, policy or institutional arrangement on one political system by another” (p 13).

Policy transfer is not intended to simply explain a policy outcome, it is also fundamental in the approach to understand and explain what caused the transfer (Dolowitz & Marsh, 2000). Thus, the updated framework of policy transfer developed by Dolowitz and Marsh is premised on queries aimed at addressing the entire process. The framework for understanding policy transfer involves six core questions. Those questions are:

Why do actors engage in policy transfer? Who are the key actors involved in the policy transfer process? What is transferred? From where are lessons drawn? What are the different degrees of transfer? What restricts or facilitates the policy transfer process? [And,] How is the process of policy transfer related to policy “success” or policy “failure”? (Dolowitz & Marsh, 2000 p 8).

In the decades after its emergence, policy transfer is now commonly applied to more than systems of government. Policy transfer evolved to address phenomena including Europeanisation, globalisation and policy innovation (Benson & Jordan, 2011). Policy transfer is clearly rooted in the political science realm (Dolowitz & Marsh, 2000); however, it is very much applicable to the planning process and the policy work of municipal planners, as well as the proposals and work of private planners. In a review of policy transfer scholarship, it was specifically noted that researchers have used policy transfer to study spatial and urban planning (De Jong & Edelenbos, 2007; Dolowitz & Medearis, 2009

in Benson & Jordan, 2011). Based on contributions from researchers outside of political science – and instead from human geography and urban studies, the concept of policy mobility arose (Lovell, 2016).

A broad understanding of policy mobility is that “it analyses how successful political ideas are often mobilized, imitated, adapted and reused in new places different from those in which they originated” (Crivello, 2015). Fundamentally, policy mobility is focused on the policymaking process. The common foci of studies on urban policy mobilities include investigating “the role of benchmarking, comparison, consultants and think-tanks in urban policymaking” (McCann & Ward, 2015). For example, the work of policy mobilities scholar, Kevin Ward (2006), examines how business improvement districts (BIDs) were introduced in cities within the United Kingdom (UK). His work is premised on the origins and evolution of BIDs, the processes through which specific BIDs came to be considered a ‘model’ practice, an assessment of the ‘local’ export and import conditions that made BIDs in New York City an attractive example for UK policymakers (Ward, 2006). He then examined the work of those involved in the ‘policy-transfer process’ and the initial BID pilot program in the UK (Ward, 2006). Lastly, he considered the introduction of the BID program in the wider context of state restructuring in the UK (Ward, 2006). In combination, these areas of inquiry establish a multi-faceted understanding of how and why a given set of urban policies mobilized elsewhere.

2.14 Limitations on Existing Knowledge

In terms of flexible streets in Canada, most projects are newly implemented or still currently under construction. The infancy of this concept may be a factor in why there is currently no academic literature on this matter. As a result, a significant limitation in existing knowledge is the lack of research and exploration of flexible streets. This has made research more difficult as information from global examples of street design concepts and street-design considerations must be assembled in order to situate this study to be undertaken.

2.15 Research Objectives & Importance

The most significant gap in the knowledge is the lack of literature on flexible streets in Canada and elsewhere in the world. The term ‘flexible street’ is non-existent in academic literature. Thus, it is difficult to situate the foundation upon which this study is based. Further research in this area is justified as the use and impacts of flexible streets in Canada have not been looked at before by

academic researchers. As articulated by Farthing (2015), this research area has been neglected and gaps exist in the literature. As mentioned, the major gaps involve an omission of research conducted in the Canadian context and elsewhere in the world on flexible street projects. The research questions will address the gaps by focusing on flexible streets in Canada and help move towards adopting a consensus of what flexible streets are and how they fit into the planning and transportation practice. This will help planning practitioners to be aware of an additional streetscape design approach that can mitigate the negative impacts of continued auto-centric roadway planning. Further, allowing for improvements of public spaces in Canadian municipalities.

Chapter 3: Research Methods

3.1 Introduction

The following chapter details the research process used for this study. The research contained in this thesis explored flexible street projects, seeking to understand how this design approach is conceptualized and how it emerged as a planning practice in Ontario. To garner information about this emergent street design approach, an exploratory qualitative study design was used to explore the planning policy backgrounds that have resulted in the implementation of flexible streets and the public feedback about such projects. This chapter details the research methodology used for this study to uncover information in order to produce knowledge claims about flexible streets as a concept and current planning and design practice. This chapter addresses the following matters: 1) Research Design & Rationale, 2) Research Ontology, Epistemology, Methodology & Conceptual Framework, 3) Data Sources, 4) Research Setting, 5) Data Generation Method, 6) Data Collection Methods, and 7) Data Analysis Methods.

3.2 Research Design & Rationale

The research contained in this thesis is an exploratory qualitative study on flexible streets as an emerging design concept and planning practice. The aim of conducting this research is to produce knowledge claims about flexible street projects, adding to streetscape design literature and aiding practicing planners by providing insight into this emergent design approach. Guiding this study are exploratory research questions. Exploratory research is oriented towards ‘what?’ questions of a more curious nature - for example, “what is this social activity really about?” (Neuman, 2012, p. 16). These questions are in contrast to descriptive questions, which involve a ‘what’ query and “seek answers which describe a situation or event or a pattern of behaviour or a set of practices” (Farthing, 2016 p 43). Exploratory questions are also distinct from explanatory questions, which are premised on ‘why’ questions and seek to provide further insight into why a given phenomenon has occurred (Farthing, 2016).

Exploratory research involves examining areas of research that are currently ‘unknown’ in order to inspire research questions that can be addressed through future research studies (Neuman, 2012; Pajo, 2018). Unlike other research design approaches, exploratory research is not a well-defined research design approach, it requires the researcher to be flexible and investigative when conducting a study (Neuman, 2012). The exploratory aspect of this study is focused on the planning

and design components of a flexible street, the history of how this practice emerged, as well as how it has been perceived and implemented in a variety of municipalities. This research approach is appropriate as studies about flexible street projects do not currently exist in academic literature, thus, rendering this area of research largely unknown. An aim of this research is to adequately prepare the foundation for future research focused on flexible streets.

3.2.1 Qualitative Research Design

The answers to the research questions of this study were sought through a qualitative study design. Qualitative research is defined by Denzin and Lincoln as,

a situated activity that locates the observer in the world. It consists of a set of interpretive, material practices that make the world visible. These practices transform the world. They turn the world into a series of representations, including field notes, interviews, conversations, photographs, recordings, and memos to the self. At this level, qualitative research involves an interpretive, naturalistic approach to the world. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them (2005a, p. 3 qtd in Flick, 2007a p 2).

In more direct terms, and in comparison, with quantitative research, qualitative research relies on “text as empirical material (instead of numbers), starts from the notion of the social construction of realities under study, is interested in the perspectives of participants, in everyday practices and everyday knowledge referring to the issue under study” (Flick, 2007a p 2). Qualitative research designs are needed in instances when a researcher seeks “discover reasons for observed patterns, especially the invisible or surprising ones” (Busetto, 2020 p 1). Findings from qualitative research contributes “to an understanding of the human condition in different contexts and of a perceived situation” (Bengtsson, 2016). Based on the qualitative research approach, the research for this study was conducted. In endeavouring to answer the posed research questions, conducting qualitative research was the best choice as it garnered meaningful data, capturing distinct differences and key pieces of information.

A major challenge of conducting qualitative research is assessing and ensuring the qualitative process produces good quality knowledge (Flick, 2007). Qualitative research has been criticized and viewed as unfavourable by some researchers as it cannot invoke the same quality assurance measures as quantitative measures, such as standardization, one-size-fits-all checklists, prescribed research criteria from publishing journals and funding sources, or quality assessment tools (Flick, 2007). When assessing qualitative research using textual data, the quality of the qualitative research can be measured based on a variety of assessment criteria and lists specifically developed for qualitative

research (Russell & Gregory, 2003; Shenton, 2004; Mays & Pope, 2000 ref in Busetto, 2020). The common criteria used to assess qualitative research are credibility, dependability, confirmability, and transferability.

To ensure credibility, the researcher must explicitly justify the methodological approach chosen for the study and provide an explanation for the selection of data collection methods (Stenfors, 2020). As well, the data collected should also be justified and be appropriate in relation to the methodology chosen (Stenfors, 2020). For qualitative research, the sheer amount of data collected, or the number of respondents is not necessarily indicators of quality. Rather, “when assessing quality, the focus needs to be directed towards the depth, richness and appropriateness of the data, and whether, when analysed, the data provide enough evidence to answer the research question(s)” (Stenfors, 2020 p 597). Credibility can also be measured via the analytic process. Based on the ontological and epistemological approach, the inter-rater relationship/reliability may be judged as a marker of quality or, the research findings may be a co-construction between the researchers analyzing the data (Stenfors, 2020). Co-construction, or co-coding, is undertaken to ensure that codes are consistently applied to the data (Busetto, 2020). The dependability of qualitative research comes from ensuring that “the process of data collection and data analysis should be described in enough detail for someone to follow the same steps” (Stenfors, 2020 p 598). This also entails clearly outlining the analytic strategy and analytic framework of the research (Stenfors, 2020). Additionally, clearly defining the rationale and steps of the coding scheme provides dependability (Stenfors, 2020). In assessing the quality of the research methodology, a final measure is “the ability of the researcher to perform analysis that generates a theory or develops a novel conceptual framing” (Stenfors, 2020 p 598).

When judging the quality of the research findings in qualitative research, the confirmability of findings can be enhanced through the inclusion of direct quotations or direct textual data amassed from the study (Stenfors, 2020). It is in the discussion and conclusion sections that markers of quality can also be found. To do so, aspects to look for are the direct address of the research question and through situating the findings in the context of existing literature. Researchers “should not go beyond the data that they have presented in drawing conclusions about their findings, nor should they go off on tangents” (Stenfors, 2020 p 599). The transferability of research means that there is the possibility for the findings to be transferred to a different context, setting, or group (Stenfors, 2020). To ensure transferability, researchers must provide information on the specific context where the study was conducted and how it may have influenced the findings – an important factor as the findings, although

lending to new knowledge, “may not be directly transferrable to other social or organizational settings” (Stenfors, 2020 p 599).

Although qualitative research poses a number of challenges, it offers the best approach to investigating flexible street projects for this study. By researching flexible street projects through a qualitative lens, more robust details can be garnered about these projects and therefore communicated more thoroughly as research findings helping to guide or inspire future urban planning practices and establish a basis for future research. To ensure that the research produced via this study adheres with measures of quality, the processes and methods of investigation will be detailed fully, and ethical considerations will be appropriately addressed to further certify the quality.

3.2.2 Rationale for Research

The research contained in this thesis is justified as there is a need for an investigation of flexible streets. The Literature Review demonstrated that the topic of flexible street projects in academic literature is currently non-existent. Thus, the questions put forth for this research have not yet been answered, nor have they been satisfactorily answered – which is a significant rationale for conducting research into this area of inquiry (Farthing, 2016). In addition, the research is justified as knowledge claims from this study can be of practical benefit to the planning profession. Planning professionals can gain more knowledge about this type of street design project, and other community leaders can better grasp how or why such projects may be of benefit. Farthing (2016) explains that this type of justification for a research question is important because, increasingly in planning research, it is necessary to justify a practical application of the findings in order to give back to the direction of the planning practice.

3.3 Research Ontology, Epistemology, Methodology & Conceptual Framework

The following sub-sections provide details on the theoretical positions, analysis frameworks, and methodology used to guide this research.

3.3.1 Ontological Perspective

Ontology is the “philosophical arguments about the nature of what sorts of things are thought to exist” (Farthing, 2016 p 23). In looking at what constitutes a social reality, this research takes an institutionalist approach to understanding planning phenomenon. Borrowing from Healey, this ontological approach is based,

on the conception of individual identities, as socially constructed. Ways of seeing and knowing the world, and ways of acting in it, are understood as constituted in social relations with others, and, through these relations, as embedded in particular social contexts. Through that particular geographies and histories of these contexts, attitudes and values are framed. It is in these relational contexts that frames of reference and systems of meaning are evolved (1997 p 55-56 qtd in Farthing, 2016 p 23).

The institutionalist ontological approach is the basis of this research as the planning phenomena under investigation is based on human creation as a means to achieve a desired outcome. Thus, flexible street projects are very much the result of particular histories and contexts which have been formed by specific values of urban planners, designers, and political leaders. Flexible streets can be viewed as a reaction against traditional roadway design, which stemmed from the transportation system built to facilitate early capitalist (resource extraction) and colonial (settling land) pursuits in Canada as well as ownership of private automobiles *en masse* beginning at the turn of the 20th century.

3.3.2 Epistemological Perspective

The epistemological approach of this research is via the lens of interpretivism. Epistemology is “the claims of assumptions made about possible ways of gaining knowledge of social reality, whatever it is understood to be” (Blaikie, 2000 qtd in Farthing, 2016 p 23-24). The epistemological position of interpretivism maintains,

there is something distinctive about the social world, that people possess consciousness and can reflect on their situation, indeed they make sense of the world they live in, so that Social Research needs to pay particular attention to the way that people understand and give meaning to their actions, rather than make assumptions about these interpretations (Farthing, 2016 p 24).

This approach is beneficial for this study as it seeks to uncover the meanings around flexible streets, which are born out of particular understandings of the world. In studying an emergent roadway design concept, examining the existing understandings of the projects and the meanings attributed to projects implemented based on the flexible streets concept is how knowledge claims will be made. This is related to an institutionalist ontology as identities are socially constructed through various historic and geographic contexts, framing values and attitudes, which gives rise to systems of meanings (Healy, 1997 in Farthing, 2016). The interpretivist lens of epistemology focuses on making sense of these meanings that and how people understand what their behaviours convey.

3.3.3 Methodological Approach

Methodology refers to the “discussions of how research is done, or should be done, and to the critical analysis of methods of research” (Farthing, 2016 p 25) that will guide the research study and the methods employed. There are many methodological approaches that can be selected to guide a research project. In endeavouring to answer the research questions posed, the methodological approach followed for this study was thematic analysis.

Thematic analysis in research is a method “for systematically identifying, organizing, and offering insight into patterns of meaning (themes) across a data set” (Braun & Clark, 2012 p 57). This method is “a descriptive method that reduces the data in a flexible way that dovetails with other data analysis methods” (Vaismoradi, Turunen, and Bondas, 2013 ref in Castleberry & Nolan, 2018 p 808). Employing thematic analysis allows for the researcher to discern and understand collective or shared meanings and experiences by focusing on an entire data set (Braun & Clark, 2012). Put another way, thematic analysis “is a way of identifying what is common to the way a topic is talked or written about and of making sense of those commonalities” (Braun & Clark, 2012 p 57). It is considered the most useful method for “capturing the complexities of meaning within a textual data set” (Guest, MacQueen, and Namey, 2012 p 10). It is a commonly used method in qualitative research designs (Guest, MacQueen, and Namey, 2012) “because of the wide variety of research questions and topics that can be addressed with this method of data analysis” (Braun & Clarke, 2012 ref in Castleberry & Nolan, 2018 p 808).

The purpose of this method of analysis is to identify patterns across the data set that are relevant to answering the posed research question (Braun & Clark, 2012). Some defining features of thematic analysis are: identification of key themes in text; themes based on coded data; use of multiple techniques including word searches and data reduction; can be used to build upon theory or to address problems in society (Guest, MacQueen, and Namey, 2012 p 17). Thematic analysis shares key similarities with the methodological tradition of Grounded Theory. Specifically, it is the “emphasis on supporting claims with data is what links applied thematic analysis to grounded theory” (Guest, MacQueen, and Namey, 2012 p 11). Further, the results of this research may entail a theoretical model, which is a key aim of Grounded Theory; however, the research also may not lead to a theoretical model, making thematic analysis distinct from Grounded Theory (Guest, MacQueen, and Namey, 2012). Another distinction from Grounded Theory is that with thematic analysis, quantitative techniques can be used along with interpretive qualitative techniques (Guest, MacQueen, and Namey, 2012). As a methodological approach, thematic analysis “comprises a bit of everything—

grounded theory, positivism, interpretivism, and phenomenology—synthesized into one methodological framework” (Guest, MacQueen, and Namey, 2012p 14). Overall, thematic analysis borrows from a range of methodological and theoretical traditions in order to approach research from an applied standpoint (Guest, MacQueen, and Namey, 2012).

Applied thematic analysis involves a multi-phase approach to collecting, assessing, organizing, and communicating data. Similar to Grounded Theory, it involves the steps of “(1) read verbatim transcripts, (2) identify possible themes, (3) compare and contrast themes, identifying structure among them” (Bernard & Ryan, 1998 ref in Guest, MacQueen, and Namey, 2012 p 11). Thematic analysis is a method allowing researchers to employ a level of flexibility in the manner that data is assessed – whether looking at meaning across data sets or at a specific aspect of a given phenomenon (Braun & Clark, 2012).

In terms of what is reported upon and how, the latent meanings or semantic (obvious) meanings can be interrogated via thematic analysis (Braun & Clarke, 2006 ref in Braun & Clarke, 2012). Thematic analysis moves “beyond counting explicit words or phrases and [focuses] on identifying and describing both implicit and explicit ideas within the data, that is, themes” (Guest, MacQueen, and Namey, 2012 p 9). The analysis process to identify themes involves specific phases and a process of coding (Castleberry & Nolen, 2018 and Braun & Clark, 2012). Overall, the “primary concern is with presenting the stories and experiences voiced by study participants as accurately and comprehensively as possible” (Guest, MacQueen, and Namey, 2012 p 14). Using thematic analysis for qualitative research has numerous benefits. Thematic analysis is notably well-suited for team research projects; analysing large sets of data; and because the interpretations are supported by the data (Guest, MacQueen, and Namey, 2012). As well, it can include quantitative techniques, adding to the analytic breadth of the findings, and further, thematic analysis can be used for studying topics beyond individual experiences of people (Guest, MacQueen, and Namey, 2012).

3.3.4 Application of Thematic Analysis to Research

Thematic analysis was selected for this study as it offers a means to approach research via “coding and analyzing qualitative data systematically, which can then be linked to broader theoretical or conceptual issues” (Braun & Clark, 2012 p 58). It is flexible in how it can be used, especially in terms of different approaches to qualitative research (Braun & Clark, 2012). Qualitative research can be “inductive versus deductive or theory-driven data coding and analysis, an experiential versus critical orientation to data, and an essentialist versus constructionist theoretical perspective” (Braun &

Clark, 2012 p 58). The research for this thesis was carried out using a combination of both an inductive and deductive approach to collecting data. It was deductive as certain data was specifically sought through collection. Notably, the work of Naumann and colleagues in *Design, implementation and cost elements of Green Infrastructure projects* (2011), inspired the key areas of analysis for this study. Naumann and colleagues (2011) endeavoured to typify green infrastructure projects in the European Union and to do so, categorized a collection of information about the selected projects into different parameters. These parameters included items such as: objectives, setting, project description, funding sources, geographic scale, and ecosystem/habitat covered (Naumann et al., 2011). Although not copied exactly, these parameters provided a basis to understand and begin charting excerpts from the policy documents about flexible street projects and organizing the information for further analysis. Otherwise, the research developed inductively based on the data collected and analyzed.

In addition, by using thematic analysis, a researcher “can report the obvious or semantic meanings in the data, or [...] interrogate the latent meanings, the assumptions and ideas that lie behind what is explicitly stated” (Braun & Clarke, 2006 ref in Braun & Clark, 2012 p 58). For this study, the manifest meanings found in the texts were of interest and what was focused on for analysis. Finally, thematic analysis was employed for this study due to a major strength of this method being “its pragmatic focus on using whatever tools might be appropriate to get the analytic job done in a transparent, efficient, and ethical manner” (Guest, MacQueen, and Namey, 2012 p 18). This research sought to explore an urban design practice actively being implemented in Ontario municipalities, thus, a pragmatic research methodology was the best choice to investigate this topic and communicate findings for the benefit of practitioners.

3.3.5 Conceptual Framework of Policy Analysis

The following details the conceptual framework that guided the policy analysis aspect of this study. The conceptual framework was established via careful consideration of the research questions and the desired objectives of this study. This framework assisted in shaping the research processes, guiding the data collection process, and the organization of collected data.

Policy analysis is commonly applied to research in the public health promotion realm. There are numerous policy typologies that can be applied to a scenario in order to approach research. For this research, the policy typologies considered are based on the work of Colebatch (2006) and Bacchi (1999). Both Colebatch (2006) and Bacchi (1999) – as referenced by Browne (2018), conceptualize policy as divisible into three broad categorizations. These three policy orientations of policy-based

research are: traditional, mainstream, and interpretive. The typologies are based on the ontological and epistemological assumptions specific to each approach, providing “a way to distinguish between orientations that are firmly positivist from those that are more constructionist/interpretivist” (Browne, 2018). Each policy typology is predicated on a certain view of the world and different objectives in terms of research findings.

The traditional policy orientation embraces “a ‘scientific’ approach to the identification of problems and their solution” (Browne, 2018 p 3). Based on this orientation, “policy analysis involves deploying a rational comprehensive approach of problem solving, in a world that is objectively knowable” (Browne, 2018 p 3). The mainstream policy orientation is focused on “studies of agenda-setting, policy processes, policy networks and governance” (Browne, 2018 p 4). From this viewpoint, policy is conceptualized “as ‘the interaction of values, interests and resources guided through institutions and mediated through politics’” (Davis et al., 1993, p. 15 qtd in Browne, 2018 p 4). Lastly, the policy orientation that this study aligns with – the interpretive approach, entails “two implications for policy studies across the policy problem and policymaking domains: first, policy problems are not pre-existing givens, but are historically and culturally produced. Second, the policy process is understood as a process of discourse and argumentation” (Hastings, 1998 ref in Browne, 2018 p 7). The interpretive policy orientation was selected to guide analysis for this study as the analytical focus of this policy typology is on ‘meanings’ and it is the best fit for research questions concerned with how a policy problem is defined and what assumptions influence the framing of the problem (Browne, 2018). This research aims to uncover the meaning of ‘flexible street’ as well as why and how this concept is being implemented.

Further, there are numerous theoretical frameworks of policy analysis that can be adopted by researchers to aid in assessing a set of policies. Within the interpretive orientation of policy analysis, there are three main theoretical frameworks of analysis that can be applied. They are: ‘What’s the problem represented to be’, frame reflexive policy analysis, argumentative discourse analysis, and governmentality. This study employed ‘What’s the problem represented to be’ as the theoretical framework of policy analysis.

The ‘What’s the problem represented to be’ approach, as championed by Bacchi (1999), is explained as,

a way of studying policy which opens up a range of questions that are seldom addressed in other approaches: how every proposal necessarily offers a representation of the problem to be addressed, how these representations contain presuppositions and assumptions which often go un-analysed, how these representations shape an issue in ways which limit possibilities for

change. It also offers a framework for examining gaps and silences in policy debates by asking what remains unproblematised in certain representations” (p. 12 qtd in Browne, 2018 p 7).

This approach informed the exploratory study as the framework allows for exploration into the policies associated with flexible street projects, allowing for critical reflection and questioning about these emerging public streetscape design projects.

3.4 Research Phases

The research contained in this thesis was conducted in a phased approach. The first phase, *Phase 1*, involved establishing an overview of the flexible street projects that had been proposed or implemented in Canada. This was undertaken in order to ensure a sufficient list of flexible street projects were identified for the subsequent research. From this list, the projects that this study investigated were selected. In *Phase 2* of this study, the selected group of flexible street projects were explored in order to garner knowledge about the design concept and how it is being implemented. The last phase of this research, *Phase 3*, involved an assessment of the public feedback about the selected streetscape redesign projects. The remaining portion of this chapter will reference each phase in detailing the research methods employed throughout this study.

3.5 Data Sources

In order to answer a research question, a sample – or samples, must be selected to draw data from in order to establish an answer. Called ‘data sources’, this concept often describes “a repository of secondary data, like the census or other official statistics from which data can be accessed” (Farthing, 2016 p 79). However, in planning research, data is typically generated “from people, [as well as] [...] publications, administrative records, maps, plans, diagrams, and laws” (Farthing, 2016 p 79). To answer the question posed in this thesis research, the data sources used were documents and feedback from community members.

The first phase of this study involved assessing the newspaper articles amassed in an attempt to establish a comprehensive list of flexible street projects in Canada. Using Factivia (a database of newspaper articles from across Canada) to search the terms ‘flexstreet’ and ‘flexible street’ yielded a number of newspaper articles about flexible street projects across the country. From this, a list of flexible street projects in Canada was established. In addition to the database search, four (4) flexible street projects that were previously know about by the researcher – but did not appear in the database

search, were added to the list. A total of nineteen (19) flexible street projects in Canada were identified. Below, in *Table 1*, is a list of all flexible street projects identified in Canada.

▪ Dundas Street (London, ON)	▪ Elgin Street (Ottawa, ON)
▪ Dunlop Street (Barrie, ON)	▪ King Street (Midland, ON)
▪ King Street (Kitchener, ON)	▪ Sackville Street (London, ON)
▪ Rue Ste-Catherine (Montreal, QC)	▪ Market Street (Toronto, ON)
▪ Carden Street (Guelph, ON)	▪ Argyle Street & Grafton Street (Halifax, NS)
▪ Jasper Avenue (Edmonton, AB)	▪ Granville Street (Vancouver, BC)
▪ Douglas Street (Guelph, ON)	▪ Wyndham Street (Guelph, ON)
▪ Baker Street (Guelph, ON)	▪ Macdonell Street (Guelph, ON)
▪ Quayside Neighbourhood (Toronto, ON)	▪ Quebec Street (Guelph, ON)
▪ Front Street (at Union Station and Royal York) (Toronto, ON)	

Table 1: List of known flexible street projects in Canada as of December 2019.

Based on this list, the projects implemented in Ontario were selected as the focus of this study.

3.6 Research & Policy Setting

Based on the availability of data, the research for this master’s thesis was focused on the flexible streets concept via projects identified in Ontario, Canada. The province of Ontario was chosen as the research setting as it was found that the greatest amount of flexible street projects have been implemented, or are currently under construction, in this province. In addition, the researcher has a better familiarity with the province, the municipalities, and the planning processes that led to the implementation of municipal projects.

Through *Phase 1* of this study, a total of fourteen (14) flexible street projects in the province of Ontario were identified by searching the Factivia database and based on prior awareness of the researcher. Below, in *Table 2*, are the details of the projects included along with high level demographic, political, and project details.

Municipality	Tier-Level	Population	Flexible Street	State of Implementation
London, ON	Single Tier	383,822	Dundas Street (Dundas Place)	Complete
Midland, ON	Lower Tier	16,864	King Street	Under Construction
Barrie, ON	Single Tier	141,434	Dunlop Street	Under Construction
Ottawa, ON	Single Tier	934,243	Elgin Street	Under Construction
Kitchener, ON	Lower Tier	233,222	King Street	Complete
London, ON	Single Tier	383,822	Sackville Street	Complete
Guelph, ON	Single Tier	131,794	Carden Street	Complete
Toronto, ON	Single Tier	2,731,571	Front Street	Complete
Toronto, ON	Single Tier	2,731,571	Market Lane	Complete
Guelph, ON	Single Tier	131,794	Wyndham Street	Identified as Future Project
Guelph, ON	Single Tier	131,794	Macdonell Street	Identified as Future Project
Guelph, ON	Single Tier	131,794	Quebec Street	Identified as Future Project
Guelph, ON	Single Tier	131,794	Douglas Street	Identified as Future Project
Guelph, ON	Single Tier	131,794	Baker Street	Identified as Future Project

Table 2: Flexible Street projects identified in the province of Ontario.

These projects were identified as they had either been completed or formally approved for construction by the respective municipality. Of the fourteen (14) flexible street projects in Ontario, four (4) were ultimately excluded due to data being unavailable. Therefore, this study included ten (10) flexible street projects that are based in Ontario municipalities. These projects were included as data was available to investigate regarding the flexible street project. The ten (10) projects included in this study are bolded in *Table 2*.

In the province of Ontario, the planning profession operates within a prescriptive manner. The *Municipal Act, 2001* sets forth the framework for the *Planning Act, 1990* which outlines the planning process, powers, directions, and objectives for Ontario. Further, there are two main professional oversight boards mandated to guide planning in the province. The Ontario Professional Planners Institute (OPPI) is in charge of overseeing the planning profession within the province. As well, the national planning board – the Canadian Institute of Planners (CIP), is also involved with overseeing the planning profession in Ontario. Both CIP and OPPI are concerned with advocating for the planning profession, supporting planning as a means to enhance communities, and both organizations are involved with granting the Registered Professional Planner (RPP) designation to qualified candidates. Knowledge of the overarching powers and policies that guide the planning profession is useful in understanding the broader contexts through which municipal infrastructure projects are implemented.

3.7 Data Generation Method

The data for this study was generated through document analysis. The data for all *Phases* of this study was collected via documents. A very broad understanding of documents is that they are “things which we can read and which relate to aspects of the social world” (Macdonald & Tipton, 1993 qtd in Farthing, 2016 p 136). Documents include both text-based and visual materials (photographs, plans, maps, diagrams) (Farthing, 2016). This research relies on the use, specifically, of newspaper articles, municipal webpages, public presentation materials, records of public feedback, Council reports, and a host of municipal planning documents (master plans and environmental assessments) to establish knowledge claims about flexible street projects in Canada.

Conducting document analysis involves “a systematic procedure for reviewing or evaluating documents – both printed and electronic (computer-based and Internet-transmitted) material” (Bowen, 2009 p 27). The documents used for this study had been created prior to and without the researcher’s intervention (Bowen, 2009). There are a variety of reasons to rely on documents for generating data for further research. Document analysis is an advantageous data collection method due to its efficiency, availability, cost-effectiveness, lack of obtrusiveness and reactivity, stability, exactness, and coverage (Bowen, 2009). The disadvantages of document analysis – which are framed as ‘flaws’ rather than disadvantages by Bowen, are that documents may contain insufficient detail, have low retrievability, and an incomplete collection of documents may signal ‘biased selectivity (2009).

For this study, the main reasons for using documents were that the details of flexible street projects and information about the implementation process could be extracted in a straightforward manner. As this research sought to determine a cohesive explanation of flexible streets, the information contained in policy documents framing these projects was of key importance to analyze. As articulated by Farthing (2016), planning policy documents that guide development are a significant aspect of the planning process that have had a considerable amount of time and effort expended into their creation. Thus, focusing on the policy documents that initially outlined the implementation of flexible street projects was of key importance in this research.

Using document analysis to collect data entails an analytic procedure of “finding, selecting, appraising (making sense of), and synthesising data contained in documents” (Bowen, 2009 p 28). The process of document analysis “yields data – excerpts, quotations, or entire passages – that are then organized into major themes, categories, and case examples” (Labuschagne, 2003 qtd in Bowen, 2009) through the data analysis process. Overall, document analysis as a research method is particularly suitable to qualitative case studies as they seek to produce “rich descriptions of a single

phenomenon, event, organization, or program” (Stake, 1995; Yin, 1994 qtd in Bowen, 2009 p 29). Although document analysis is typically used in a complementary manner to other research methods, it can – and has, been used in research as the stand-alone method (Bowen, 2009). Using document analysis to uncover the meanings and ideas about the flexible streets design concept is the sole research method employed for this study.

The key rationale for document analysis as a research method is its function in methodological and data triangulation, the utility documents lend to research, and its role in specialized forms of qualitative research as a stand-alone research method (Bowen, 2009). Although this research is not specialized (for example, relying on antiquated planning documents to explore planning practices in a historical context), document analysis was the sole research method used due to unforeseen circumstances (COVID-19 pandemic) that compromised conducting qualitative interviews.

3.8 Data Collection Methods

The remaining sections of this chapter focus on the data collection and analysis of *Phase 2* and *Phase 3* of this study. Through *Phase 2*, the data collection and analysis of each project was conducted in order to establish knowledge claims about flexible street projects. the focus of *Phase 3* of the data collection was to assess the public feedback on the proposed designs of the flexible street projects.

3.8.1 Discourse Analysis

For this study, the data collection method used to assess the data generated through *Phase 2* was discourse analysis. There were ten flexible street projects included in this phase of the study. Overall, the purpose of discourse analysis is to “cover a wide range of types of analysis, with different theoretical assumptions” (Farthing, 2016 p 170). In this data analysis tradition, “language is a topic in its own right” (Bryman, 2008 p 19 qtd in Farthing, 2016 p 170). As this data analysis method is based heavily in language, words are the primary focus of the analysis, making it a suitable method for qualitative research.

When discourse analysis is applied in research about urban planning, the interest “is in how language is used in specific contexts and what ‘version of the world’ is produced” (Rapley, 2007 ref in Farthing, 2016 p 170). A variety of data collection methods can be analyzed through discourse analysis – including: semi-structured interviews, unstructured interviews, and documents. For this

study, policy documents and municipal webpages with information pertaining to each flexible street project were used. Policy documents were the primary source of data as they are “interpreted as arguments about how we should define urban problems and what we should do to solve these problems” (Farthing, 2016 p 170). Further, policy documents “attempt to create realities, rather than to reflect them, and to affect the practices of organisations” (Farthing, 2016 p 171).

3.8.2 Content Analysis

The final phase of data analysis, *Phase 3*, involved assessing records of public feedback regarding the streetscape projects proposed in each municipality. This data was sourced via records of public feedback, public consultation summaries, and reports to Council. Consultation documents were used because they provided insight into exactly how residents viewed and interpreted, the flexible streets design approach and more generally a redesigned right-of-way. The consultation documents used in this study were from public engagement events that took place during the streetscape design processes. The public engagement events were intended to garner feedback to assist in developing the final design of the streetscape projects. This allowed for analysis of how residents perceived the proposed design of a flexible street as well as the features and designs that people wanted for the given street. In order to analyze the public feedback comments, manifest qualitative content analysis was employed.

At a high level, “the purpose of content analysis is to organize and elicit meaning from the data collected and to draw realistic conclusions from it” (Bengtsson, 2016 p 8). As data analysis is the last stage in the qualitative research process, throughout it is imperative that the researcher has adhered with the qualitative perspective. Of which, the major aim being to strive for rigor and credibility as it will help make the results most trustworthy (Bengtsson, 2016). A unique note about content analysis is that it is a suitable method for both quantitative and qualitative and can be used for inductive or deductive conclusions (Bengtsson, 2016). For qualitative content analysis, as this study used, the data is “presented in words and themes, which makes it possible to draw some interpretation of the results” (Bengtsson, 2016 p 10). The analytic strategy of *Phase 3*, detailed in section 3.9.2, is an inductive approach to extracting data.

The research for this thesis employed content analysis in the manner of a manifest analysis. In content analysis, a manifest analysis involves describing “what the informants actually say, stays very close to the text, uses the words themselves, and describes the visible and obvious in the text” (Bengtsson, 2016 p 10). For comparison, the other type of content analysis is latent analysis, which

involves a focus on the interpretation of the text – seeking to find what the text is ‘talking about’ (Bengtsson, 2016). This latter type of content analysis did not lend to the aim of the study.

3.9 Data Analysis

The data collected for this study was analyzed using two different approaches. The following sub-sections provide details on how the data sources were analyzed for each phase of the study.

3.9.1 Analysis of *Phase 2*

For the analysis of the documents, a multistep process was used. The relevant policy documents were procured via the search function on the respective municipalities websites. Many of the municipal websites had specific pages dedicated to their respective flexible street project – this served as the starting point of gathering relevant documents as many of the related plans, reports, and presentation materials were identified already. First, the documents were visually scanned in order for the researcher to obtain a general sense of the policy document’s organization and to determine how the streetscape project was initially delineated. It was important to ensure that only policy documents pertaining to the flexible street projects were included in this study.

Once the appropriate data was compiled, the next steps in analysis could take place. The next step involved reading through the policy documents collected for each municipality’s flexible street project. Becoming familiar with the data via reading and rereading the texts as well as making notes to prepare for subsequent analysis is a key initial step (Braun & Clark, 2012; Castleberry & Nolen, 2018). As this study is focused on flexible street projects, information about the projects was included from various sources beyond policy documents. This additional data helped to build upon the data extracted from formal policy documents. Hence, information from other supporting documents such as municipal webpages, Council Reports, and public presentation materials were also included for analysis.

After gaining familiarity with the data and identifying relevant data for answering the research question, a more systematic approach to analyzing the data was undertaken. This step involved disassembling the data and rearranging it into meaningful groupings, which is achieved via coding (Castleberry & Nolen, 2018). Coding contributes to analysis as it is “a system of indexing the data to mark up points of interest” (Dey, 2007 p 15). The process of coding involves the data being “broken down, compared, and then placed in a category. Similar data are placed in similar categories, and different data creates new categories” (Walker, 2016 p 549). In short, “codes identify and provide

a label for a feature of the data that is potentially relevant to the research question” (Braun & Clark, 2012 p 61). For this study, the coding endeavoured to capture the semantic level of meaning from the texts about flexible streets. Thematic analysis allows for flexibility in the segments of data that are coded– some of the coded data was larger in amount while other data coded was shorter in length, with some data in the planning documents not coded at all (Braun & Clark, 2012). A general coding strategy was established prior to coding (*a priori*), which was based on the work of Naumann and colleagues regarding green infrastructure projects (2011). Using a coding scheme that others have used in a similar context can be adopted for use in a new research study (Castleberry & Nolen, 2018). Descriptive codes were used to identify and organize the data based on processes, places, roles, and other easily identifiable features (Castleberry & Nolen, 2018). The coding process ceased once no new themes or ideas were identified upon reviewing the data (Castleberry & Nolen, 2018).

Next, the focus of analysis shifted from coding to the identification of themes. This shift to identifying themes “captures something important about the data in relation to the research question, and represents some level of patterned response or meaning within the data set” (Braun & Clarke, 2006, p 82 qtd in Braun & Clarke, 2012 p 63). This involved “collapsing or clustering codes that seem to share some unifying feature together, so that they reflect and describe a coherent and meaningful pattern in the data” (Braun & Clark, 2012 p 63). The relevant data was collated “into each potential theme and continuously [reviewed] [...] to determine if it is robust in relation to the coded extracts and data set” (Castleberry & Nolen, 2018 p 810). Finally, all of the data was reassessed to ensure that the themes meaningfully captured the important aspects of the data set (Braun & Clark, 2012).

The entirety of the data – in the form of codes and themes, was then focused on in order to draw conclusions and interpret viewpoints or perspectives. Through thematic analysis, the identified “themes capture an essence of the phenomenon under investigation in relation to your research question or purpose of the study” (Castleberry & Nolen, 2018 p 812). Interpretation entails moving beyond the specific themes and codes to consider “relationships between themes and more global findings in the context of all codes” (Castleberry & Nolen, 2018 p 812). At this juncture, the analysis involved selecting extracts of data to analyze and present as a means to establish “the story of each theme with or around these extracts” (Braun & Clark, 2012 p 67). The data extracts presented were also interpreted with connection to the research question and objectives, and in later chapters, linked with findings from other planning literature as suggested by Braun & Clark (2012).

The final step in thematic analysis is to make conclusions based on the interpretation of data and explicitly answer the research questions of the study (Castleberry & Nolen, 2018). The themes were explored beyond their descriptions to present a narrative about the data and to provide answers for the research question (Braun & Clark, 2012). The analysis was premised on the presentation of flexible street projects to explore how these projects are conceptualized and implemented in Ontario municipalities.

3.9.2 Analysis of *Phase 3*

In order to perform content analysis, there are four main stages identified that aid in achieving a quality analysis - the decontextualisation, the recontextualisation, the categorisation, and the compilation (Bengtsson, 2016). To achieve good quality and a trustworthy analysis, each of the four stages must be performed several times (Bengtsson, 2016). This study used policy documents and public feedback from numerous municipalities as sources to facilitate knowledge claims about the flexible streets concept. The following details the stages of content analysis conducted for this study.

3.9.2.1 The Decontextualisation

This stage in content analysis involves the researcher becoming familiar with the data by perusing through all of the text to get a sense of the entire phenomenon being examined (Bengtsson, 2016). This is an important first step as the full scope of the phenomenon ought to be understood before the text can be divided into smaller ‘meaning units’ of information (Bengtsson, 2016). According to numerous authorities on the matter (Catanzaro, 1988; Graneheim & Lundman, 2004 in Bengtsson), ‘meaning unit’ refers to “the smallest unit that contains some of the insights the researcher needs, and it is the constellation of sentences or paragraphs containing aspects related to each other, answering the question set out in the aim” (2016 p 11). Once meaning units are obtained from the text, they are to be labeled with a code related to the context (Bengtsson, 2016). For this portion of the content analysis, the relevant texts were read to garner a full understanding of the public consultation event and the nature of the public feedback received. For example, it was helpful to understand the public consultation event as, in some instances, the event was held at the beginning of the project’s conceptualization and the aim of the consultation was to obtain feedback about the types of features or uses the community wanted the redesigned streetscape to address. This provided a frame of reference for understanding the nature of the public feedback and why certain project aspects were focused on via public feedback. Only the verbatim public feedback comments and summaries of

public feedback comments were included in the content analysis. While reading the materials, meaning units were identified and coded according to the aspect the meaning unit addressed.

This is known as the ‘open coding process’ in the data analysis portion of research (Bengtsson, 2016). The codes for this study were created inductively via the analysis process as more data was assessed through records of public feedback. More data led to a larger variety of codes (conceptualized as categories of comparison) established. A coding list was used to guide the process of analysis to ensure reliability of the findings. To further increase the reliability of the findings, the texts were assessed repeatedly to ensure all key meaning units were coded.

3.9.2.2 The Recontextualisation

After the ‘meaning units’ were identified, the documents were re-read to ensure that all of the content relating to the public feedback comments or summaries was included. Next, the remaining text in each document that was *not* included was re-considered for inclusion based on applicability to aim of the analysis. When the remaining text does not lend answers to the research questions, it can be excluded (Burnard, 1991, 1995 ref in Bengtsson, 2016). This stage of content analysis can be difficult as, to the researcher, everything seems to be of importance (Bengtsson, 2016). Alas, text was omitted that did not involve either public feedback comments or a summary of the public consultation event. A variety of documents were analyzed in order to obtain a sense of the public feedback about the flexible streetscape projects. The documents analyzed include Environmental Assessments, Summaries of public consultation events, and project Reports to Council.

3.9.2.3 The Categorisation

At this stage in the content analysis, categories for the information collected from the texts were created. The meaning units extracted from the texts were not condensed as the excerpts were short and already concise. Further, the manifest content analysis of this study is focused primarily on the text itself, thus it was not altered in any way between the documents and what is included in the content analysis chart. The material collected was divided into categories based on the aspect of the streetscape project that each comment addressed. The categories of the content analyzed were born out of the information revealed through the text.

In the instances where summaries of the public consultation event were assessed, the general theme identified in the summary was noted. As actual public feedback was not readily presented in these instances, rather a general statement made about the public feedback, there was not an

abundance of content to analyze. Thus, in order to best communicate these findings, the general topics that were identified to have been addressed through the public consultation events were categorized across all projects. This part of the content analysis focused on identifying the topics that were voiced during public consultation, but not the actual conversations or comments that were made.

3.9.2.4 The Compilation

This stage of the content analysis process begins after all of the meaning units have been categorized. When performing this part of the process, researchers must “consider the data collected from a neutral perspective and consider their objectivity” (Bengtsson, 2016 p 12). At this juncture, the analysis and writing-up of the findings begins (Bengtsson, 2016). For this study, each category was perused and all the information in that category was assessed in order to generate knowledge claims about each category as a whole. As this was a manifest content analysis, the original texts were referred back to in cases when clarity was needed, or the context of the meaning units was deemed helpful. This made it “possible to stay closer to the original meanings and contexts” (Burnard, 1991 qtd in Bengtsson, 2016 p 12).

Qualitative content analysis also allows researchers to provide certain findings via quantification of categories (Bengtsson, 2016). Although usually not conducted in qualitative research, by combining quantification with qualitative research “the magnitude of the individual phenomena studied appears more clearly (Berg, 2001; Morgan, 1993 ref in Bengtsson, 2016 p 12). For this research, some items in specific categories were quantified for purposes of communication.

A usual method of validating the findings of content analysis involves ‘respondent validation’ – returning to the informants and presenting the results to achieve agreement (Burnard, 1991; Catanzaro, 1988 ref in Bengtsson, 2016). In this study, respondent validation could not be conducted as the research did not involve any form of interviews or interaction with respondents. Another recommended approach to increase the validity is to include an outside researcher to read the original text along with the results for the purpose of judging the reasonableness of the findings (Burnard, 1991; Catanzaro, 1988; Downe-Wambolt, 1992 ref in Bengtsson, 2016). A final option to assess the data is to review the findings in comparison against existing literature in order to determine if the findings are reasonable and logical (Burnard, 1991; Morse & Richards, 2002 ref in Bengtsson, 2016).

The analyses were used in combination to answer the research question of this study. First, the discourse analysis provided an understanding of flexible streets in terms of the justification and rationale for implementation, design features employed, project specific details, and determining links

with other non-traditional streetscape design concepts. The content analysis provided an overarching glimpse into how the streetscape redesign projects were perceived and ultimately supported – lending to both the final design of each unique project and the proliferation of the design approach across Ontario municipalities. The combination of both analyses demonstrates both the professional planners and general public’s perspectives on redesigning roadways and more specifically the flexible streets concept.

3.10 Chapter Summary

To address the questions and aims of this thesis, the study’s approach was predicated on exploratory qualitative research. Using document analysis, data about flexible street projects in Ontario, Canada was collected. To analyze this data, discourse analysis was employed to collate an improved understanding of what this concept is and how this approach to streetscape redesign is being operationalized. The data pertaining to public feedback was also garnered via document analysis and then analyzed through content analysis. Overall, the data was extracted and analyzed to provide insight into the emergence of flexible street projects and the flexible streets design concept itself.

Chapter 4: Results

4.1 Introduction

The following chapter presents the results of the analysis of the policy documents and supporting materials used in this study as well as the assessment of public feedback. The research question guiding this study was: how did flexible streets emerge as a planning practice in Ontario? The analysis sought to i) understand how flexible streets are defined, ii) explore the policy and planning processes from which flexible street projects have emerged, iii) identify the historical roots of this emergent planning and design practice, and iv) assess public feedback regarding the flexible streets projects. This chapter is divided into five sections, addressing various aspects of the study on flexible street projects.

4.2 Overview of Flexible Street Projects

A total of ten projects were selected for analysis, with varying time frames for construction. As of Fall 2020, two flexible street projects have been completed while three are currently under construction. The five flexible streets identified in the City of Guelph (Wyndham Street, Macdonell Street, Quebec Street, Douglas Street, and Baker Street) have not yet been formally initiated as construction projects. Although not at the implementation stage, these projects were included in this study as the plan to redesign these streets contributed to the exploration of the flexible streets design concept. *Table 3* provides details for the overview of each project.

Street	Document Project is First Identified as ‘Flexible Street’	Construction Timeline
Dundas Street	<i>Our Move Forward: London's Downtown Plan</i> (2015)	July 2018 - December 2019
King Street	C.C. Tatham & Associates and Envision-Tatham: King Street Rejuvenation Project - Public Information Centre Presentation (January 18, 2017)	September 2019 – Present [Phase 1 completed December 2019]
Dunlop Street	<i>City of Barrie: Dunlop Street Corridor Improvements Class Environmental Assessment Phases 1 & 2 Report Final Report</i> (2015)	August 2019 – Present [Phase 1 completed November 2019; Phase 2 March 2020 - November 2020]
Elgin Street	<i>Elgin Street and Hawthorne Avenue Functional Design Study</i> (2017)	Early 2019 - Spring to Fall 2020
Sackville Street	Hamilton Road Corridor Streetscape Master Plan - Community Information Meeting Presentation (October 4, 2017)	Spring 2018 - Fall 2018 (for entire Hamilton Road and Sackville Street Reconstruction project); Sackville Street Reconstruction later deferred to April 2019 - July 2019
Wyndham Street Macdonell Street Quebec Street Douglas Street Baker Street	<i>City of Guelph Downtown Streetscape Manual & Built Form Standards</i> (2014)	To be determined

Table 3: Location and overall timelines of flexible street projects included in this study.

4.2.1 Construction Timelines

To demonstrate the length of time these projects can take, the first mention of ‘flexible street’ in the project planning process was identified. Overall, the projects were initially deemed a flexible street between 2014 and 2017, with the majority having been first identified in 2017. The construction timelines of each project were identified through analysis. Considering the variables of each project, such as the overall size of the project, the construction timelines of the projects are varied. *Table 3* also provides the timing of each construction phase outlined by each municipality. Construction on the Dundas Street project began in mid-2018 and was complete by the end of 2019. The other projects for which construction timeline data was available – King Street, Dunlop Street, and Elgin street, had the construction process begin in 2019 and are slated for completion in late 2020. Of the projects included in this study, all were planned to be completed in a phased construction approach with the exact details of each phase varying due to the differing contexts of each municipality. Overall, it was found that many flexible street projects were planned and completed in phases spanning from about one-and-a-half to two years of construction time.

4.2.2 Cost of Project

By analysing the documents from each municipality, the projected cost of each flexible street project was obtained. The costs for each project, in increasing order, are as follows: \$11.75 million (Midland), \$16 million (London – Dundas Place), and \$40 million (Ottawa). Exact costs were not able to be discerned for all projects included in this study. The costs of these projects may appear large for a roadway redesign; however, there is a reason for these inflated costs. A finding of this study is that flexible street projects are often undertaken along with underground infrastructure construction, resulting in an increased cost. This will be discussed in a later section of this chapter. Considering the different factors of construction timelines, project sizes, and design features of each project, the costs for implementing a flexible street were found to be varied and dependent on the scale of the proposed project.

4.2.3 Location of Project Area

A key finding identified through the analysis was the location within each municipality that the flexible street was planned to be implemented. This was of interest as the project's location may impact the surrounding neighbourhood and, conversely, the surrounding community could have an impact on how the project is utilized. The Sackville Street project (*Figure 5*) was implemented within the Hamilton Road Corridor in the east end of London. This is a distinctive microcosm containing a mix of residential, institutional, and commercial uses situated around Hamilton Road. This flexible street project was a unique outlier in terms of the location it was implemented.

All of the other projects in this study were planned for construction within the delineated downtown area of each respective municipality. The flexible streets in Ottawa (*Figure 6*), Barrie (*Figure 7*), the other flexible street in London (*Figure 8*), Guelph (*Figure 9*), and Midland (*Figure 10*) were all planned specifically for the downtown area. Considering the commonplace aspects and land uses of a downtown area, the majority of flexible street projects were deemed appropriate to facilitate larger strategies for the downtown.



Figure 5: Sackville Street project area (City of London, n.d.)



Figure 6: The Elgin Street project area (City of Ottawa, 2017)

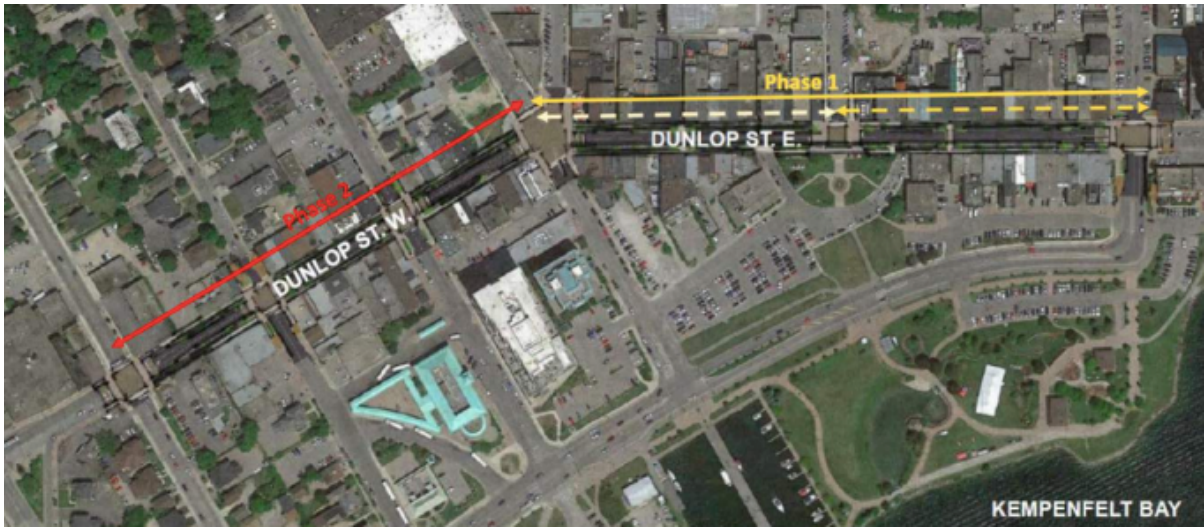


Figure 7: Map of Dunlop Street project area (City of Barrie, 2019)



Figure 8: Map of Dundas Place project area (City of London, 2018)

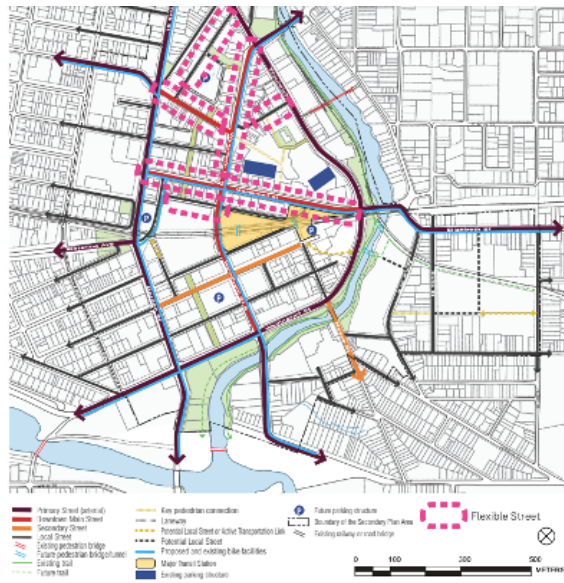


Figure 9: Map of future Flexible Streets in Guelph (City of Guelph, 2014)

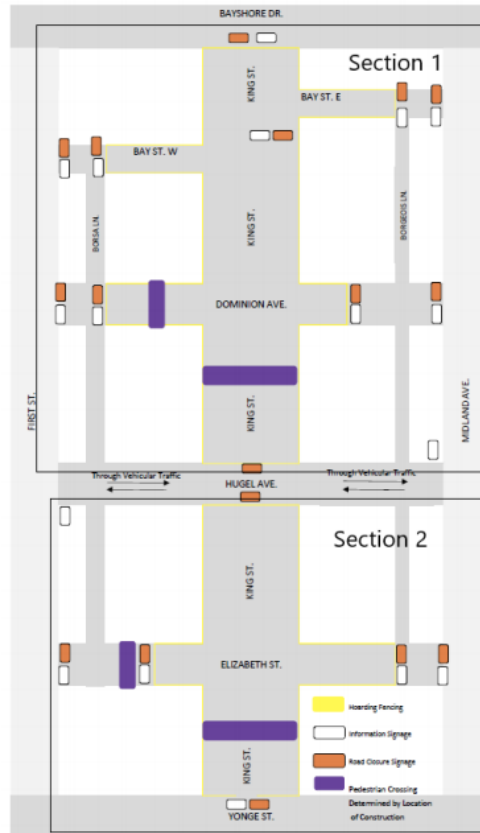


Figure 10: Map of King Street project area (Town of Midland, 2020)

4.3 Defining a Flexible Street

In assessing the policy documents and other public documents about the flexible street projects in each municipality, particular interest was taken in the definitions or descriptions provided for each project. In addition, the terms used to refer to the street project were also categorized for analysis. Below, *Table 4*, contains the descriptions of each flexible street project and the terms used to identify the design concept.

Flexible Street	Terms Used	Project Description
Dundas Street	Flexstreet, Flexible Street	<p>Dundas Place runs from Wellington Street to the Thames River transforming Dundas Street into a seamless flexible street and linear public space. A unifying surface treatment will extend from building face to building face along this section of Dundas Street, enabling the space in between to easily transition functions at different times of the year. On-street parking or sidewalk patios can be accommodated by relocating removable bollards. These bollards can also be removed entirely to create a continuous surface during events that close the street to vehicular traffic. Ensuring the highest standard of day-to-day and life cycle maintenance also is an essential aspect of this project.</p> <p>A flexible street is a space shared by pedestrians, cyclists, and motorists. A flexible street can serve different functions for the community depending on the time of day, week or year.</p> <p>London's flexible street is curbless and incorporates mid-block crossovers, allowing pedestrians to navigate from side to side with ease. It has been designed to accommodate vehicles and will remain open to two-way traffic whenever the space is not being used for an event or activity requiring one or several blocks to be closed to traffic.</p>
King Street	Flexible Street, Shared Street	<p>The Town is planning to reconstruct King Street beginning in the next five years, which will provide an opportunity to update the street's landscaping. Except between Elizabeth Street and Yonge Street, reconstruction should not significantly change the existing cross-sections, maintaining two travel lanes, parking bays on both sides, wide sidewalks and mid-block bump-outs.</p> <p>Public road environment where pedestrians, cyclists & motorists share space Space allocation & street programming can be modified to provide flexibility & accommodate various uses Options for businesses (outdoor retail displays & patios) Parking & pedestrian uses often share boulevard space Roadway separated from boulevard by a mountable curb Tree planting & other street features can also be integrated into a shared parking zone</p>

Dunlop Street	Flexible Street, Reconfigurable street	<p>Alternative 5 - Will provide a flexible street where the complete cross-section is barrier free and parking stalls can be easily reconfigured to provide either patio space or a pedestrian throughway. This alternative would require a complete reconstruction of the road cross section. New sidewalks, roll-over curbs, bollard system, asphalt roadway, street furniture/lighting, traffic signals and landscaping would be constructed.</p> <p>Flexible Street Highlights: Public road environment where space allocation between uses (pedestrian, parking & vehicles) and street programming can be modified to provide flexibility and accommodate various retail and public space opportunities Provides equal opportunities for businesses to access outdoor space for patios and retail displays Pedestrian space separated from vehicular & parking environments by movable bollards Road is delineated by a mountable curb which provides access for vehicles to boulevard parking and ensures accessibility during temporary event closures</p>
Elgin Street	Flexible Street	N/A
Sackville Street	Shared Street, Plaza, Flexstreet	With a successful library as anchor, lower Sackville becomes a place for people and art and urban forest cafes.
Wyndham Street	Flexible Street	Wyndham Street, north of Carden, is classified in the DSP as a Downtown Main Street as it is a principle commercial street in downtown. It should therefore seek to give equal prioritization to all modes of transportation by re-balancing the allocation of space to provide wide boulevards, on-street parking and shared travel lanes.
Macdonell Street	Flexible Street	Macdonell Street is also classified in the DSP as a Downtown Main Street as it is a principle commercial street in downtown. It should therefore seek to give equal prioritization to all modes of transportation by re-balancing the allocation of space to provide wide boulevards, on- street parking and shared travel lanes.
Quebec Street	Flexible Street	Quebec Street is also classified in the DSP as a Downtown Main Street as it is the third principle commercial street in downtown. It should therefore be a pedestrian priority street with wide boulevards, on-street parking and accommodation for cycling.
Douglas Street	Shared Street, Flexible Street	By applying the Flexible Street Approach to Douglas, a European style shared street emerges that will afford businesses new opportunity to flourish. As it will remain a one-way street that does not have any significant transportation function, Douglas could be closed during summer evenings to allow restaurant patios and other businesses to spill out on the street.
Baker Street	Flexible Street	N/A

Table 4: The descriptions and terms of each flexible street project

A small collection of terms was found that were used in identifying the design approach of the projects. The most common term was flexible street. Other terms used included flexstreet, plaza, reconfigurable street, and shared street. The use of this term denotes that the approach is unique from other streetscape design concepts as it has only been used for a select few streetscape projects in Ontario, majority of which are included in this study.

The project descriptions were mostly premised on the design details of the streetscape and how the specific flexible street would function. Descriptions of some flexible street projects were robust and provided details on the design concept, while others were premised on the design details. An example of a project description that emphasizes the flexible street concept and intentions for use was Dundas Street – re-branded as Dundas Place, in London. From this description, it is explained that a flexible street,

is essentially the entire street right-of-way, from building face to building face shared by pedestrians, cyclists and motorists. By combining uses rather than segregating them to certain parts of the right-of-way, there is more flexibility, sharing of surfaces and respect in the way that motorists and pedestrians share the space and how it can be programmed. At times, motorists will be allowed to have a higher usage and at times when it is desirable to reduce the vehicle usage, these spaces will function as pedestrian spaces, where retail, festival and other occasional, casual, and programmed activities dominate the space and they essentially become civic plazas, or piazzas (London).

This description provides insight into how the project ought to function once completed, beyond simply what design aspects are included. Similarly, for the streets in Guelph identified for transition to flexible streets, an explanation of the design concept and how it will impact roadway users was found. It outlines that “curbless streets seamlessly transform segregation of pedestrians and vehicles to a more integrated and flexible street” and that,

Flexible Streets slow vehicles and intentionally blur the boundary between pedestrian and vehicle space, allowing the boulevard and roadway to read as one space and adapt to a variety of conditions. In contrast to traditional streets - which utilize a conventional raised curb and gutter - flexible streets place all users and elements of the street at the same level, allowing for unrestricted movement between roadway and boulevard zones. Flexible Streets also increase safety for pedestrians and cyclists as they inherently require that vehicles move slowly through them (Guelph).

Both explanations of the flexible streets concept emphasized how the design approach will alter the roadway environment for users. Specifically, detailing how such street spaces will be improved for pedestrians, cyclists, and community uses while continuing to ensure automobiles can use the street.

Through analysis of the project descriptions in *Table 4*, five main aspects of flexible streets emerged. These components comprise the core concept and aspects of flexible streets. Each component is outlined below in *Table 5*.

Components of Flexible Streets	Details of Component
Flexibility	A flexible street is not intended to facilitate all uses at once, instead, it is designed to have the ability to be transformed into spaces for anything.
Safety	Refers to the design elements which will contribute to a safer roadway environment for users. The safety aspects mentioned in the flexible street descriptions are intended to slow down vehicular traffic, thus ensuring that motorized vehicles move more slowly alongside pedestrians. In addition, maintaining some separation between pedestrians and motorized vehicles is presented as contributing to a safer environment for non-motorized vehicle users.
Public & Private Gathering Ability	Beyond a roadway for vehicular transportation, flexible streets must also be able to function as spaces for people to gather casually or for programmed events. This involves designing the street in a manner that, when closed to vehicular traffic, it is an adequate space for events and generic public space.
Equal Use of Space	The concept emphasizes that the street space be of equal accessibility and adequate space allocation for all types of street users – pedestrians, cyclists, and motorized vehicles. With explicit mention of ensuring those with visual impairments are also able to traverse the flexible street without undue obstruction.
Intentional Design	The design of a flexible street must be wholly intentional, supporting the varied uses and all users of the streetscape once completed.

Table 5: The components of a flexible street

Based on the analysis, the components that a flexible street is comprised of are: flexibility, safety, public and private gathering ability, equal use of space, and intentional design. Each component is expanded upon in the following.

4.3.1 Flexible Component

In analyzing the project descriptions for this study, it was found that flexible streets are all planned and designed to include modular features. This allows for public space that can be easily maneuvered between roadway or, for example, a public plaza. For the Dundas Place project, the “on-street parking or sidewalk patios can be accommodated by relocating removable bollards. These bollards can also be removed entirely to create a continuous surface during events that close the street to vehicular traffic” – demonstrating the flexibility of the project. The King Street project is presented

as having “space allocation & street programming [that] can be modified to provide flexibility & accommodate various uses” along the street. Another example is the cross section of Dunlop Street, which is proposed to be “barrier free and [the] parking stalls can be easily reconfigured to provide either patio space or a pedestrian throughway.” Based on analysis, it was found that flexible streets are intentionally designed to be ‘flexible’ in order to facilitate a range of uses and users.

4.3.2 Safety Component

Of the project descriptions procured for this study, most contain references to increased safety or allude to provisions that will maintain safety post-implementation of the flexible street project. Specifically, the references towards the aspect of safety in the project design are regarding pedestrians and other non-motorized vehicle users of the complete streetscape project. The King Street project was designed to have the “roadway separated from boulevard by a mountable curb” - lending to the safety of road users. Likewise, the Dunlop Street project had the “pedestrian space separated from vehicular & parking environments by movable bollards” as a presumed safety precaution. For the Dundas Place project in London, the safety aspect is based upon previous research conducted about Shared Streets. Prior research had shown that, “by combining the activities, and designing them to reflect the intended usage and slow speeds (30 km/h or less), motorists become more aware of pedestrians and pedestrians, when not depending on regulatory signage, are more aware of motorists.”

The proposal to implement a flexible street, a non-traditional streetscape design, was acknowledged as having the potential to increase the danger some users face in public rights-of-way. Namely, “the right of pedestrians with visual impairments to be able to travel independently in the public right-of-way without relying on the motorist’s ability to avoid conflicts with them” (Dundas Place). To combat this, “providing ‘comfort space’, an area within the street predominantly used by pedestrians where motor vehicles are unlikely to be present, may still be needed within a shared space particularly for younger and older pedestrians and those with impairments” (Dundas Place). Although utilizing research from other streetscape projects, the new flexible street project was designed to incorporate safety considerations gleaned from other non-traditional street designs. This underscores why there is still some level, or sense, of separation between lanes for vehicular traffic and pedestrians in an environment intended to be shared by all modes – that there is a real effort to ensure the flexible street is a place that all people can use without compromising their personal safety.

4.3.3 Public & Private Gathering Ability Component

It was found that once implemented, all the flexible streets are to continue acting as roadways for motorized vehicles. However, analysis revealed that all flexible streets are to be also be used as public spaces for events or community celebrations - uses other than that of a typical roadway. An example being Wyndham Street, which will offer the “opportunity for day-to-day and event users to seamlessly use the street as public space” in the downtown. Likewise, the Dunlop Street project will be a “public road environment where space allocation between uses (pedestrian, parking & vehicles) and street programming can be modified to provide flexibility and accommodate various retail and public space opportunities” which “provides equal opportunities for businesses to access outdoor space for patios and retail displays” on the street. Other street uses include Sackville Street becoming “a place for people and art and urban forest cafes” and potentially closing Douglas Street “during summer evenings to allow restaurant patios and other businesses to spill out on the street” increasing their customer capacity.

4.3.4 Equal Use of Space Component

Noted from the collection of descriptions, a major aspect of the flexible street concept is the emphasis on the street space being of equal accessibility and space allocation for all street users. The King Street project is presented as a “public road environment where pedestrians, cyclists & motorists share space.” The key term differentiating this description from an explanation of a traditional urban roadway is ‘share’ – as this demonstrates the intent to reprioritize roadway users to achieve equality in the usage of the street space. The Macdonell Street project is identified as a principle commercial street and “should therefore seek to give equal prioritization to all modes of transportation by re-balancing the allocation of space to provide wide boulevards, on-street parking and shared travel lanes” once completed. The use of a mountable curb delineating the road space for vehicles “ensures accessibility during temporary event closures” for the Dunlop Street project. This component of flexible streets also emphasizes the consideration for those with disabilities. As articulated within the findings about the safety component of flexible streets, ensuring the safety of those with visual impairments is critical for non-traditional street designs. This highlights that a flexible street ought to be a space which does not impede any user, allowing those with mobility impairments to equally use the street.

4.3.5 Intentional Design Component

Another finding about flexible streets is that the concept involves using design features intended to facilitate all other components of a flexible street. It was found that Flexible streets endeavoured to change how a given streetscape was used. Beyond simply changing municipal policies or by-laws, for example allowing for a café to take up sidewalk space, this concept explicitly entails that a full redesign of the street is undertaken to facilitate such uses. An excerpt that demonstrates the intentionality of design, is the Dunlop Street project, which

will provide a flexible street where the complete cross-section is barrier free and parking stalls can be easily reconfigured to provide either patio space or a pedestrian throughway. This alternative would require a complete reconstruction of the road cross section. New sidewalks, roll-over curbs, bollard system, asphalt roadway, street furniture/lighting, traffic signals and landscaping would be constructed.

The Dundas Place project also demonstrates the precise design features used to achieve the intended use of the street. The design of Dundas Place involves,

a unifying surface treatment [that] will extend from building face to building face along this section of Dundas Street, enabling the space in between to easily transition functions at different times of the year. On-street parking or sidewalk patios can be accommodated by relocating removable bollards. These bollards can also be removed entirely to create a continuous surface during events that close the street to vehicular traffic.

These excerpts demonstrate that one of the main components of flexible street projects is an intentional design to facilitate the desired set of uses.

4.4 Justification & Design of Projects

In analysing the data, an area of interest was the justification for implementing a flexible street. The justification – the ‘why?’ - for each project was understood through analyzing the strategic goal(s) of the policy document guiding the project, the objectives of the specific project, and the rationale for initiating construction of the flexible street. The findings revealed similar strategies, objectives, and rationale for the projects in this study. The guiding strategies and project objectives are detailed in *Table 6*, below.

Street	Strategy	Project Objectives
Dundas Street	<ul style="list-style-type: none"> • Create Place • Economic Development 	<ul style="list-style-type: none"> • Create Place • Support Businesses • Use as Events Space
King Street	<ul style="list-style-type: none"> • Create Place • Economic Development 	<ul style="list-style-type: none"> • Improve for all Modes of Transportation • Support Businesses • Create Place • Use as Events Space
Dunlop Street	<ul style="list-style-type: none"> • Economic Development • Create Place • Improve Aesthetics 	<ul style="list-style-type: none"> • Support Businesses • Improve for all Modes of Transportation • Create Place
Elgin Street	<ul style="list-style-type: none"> • New Street Design 	<ul style="list-style-type: none"> • Create Place • Support Businesses • Design & Complete Project
Sackville Street	<ul style="list-style-type: none"> • Create Place • Economic Development 	<ul style="list-style-type: none"> • Create Place • Improve for all Modes of Transportation • Support Businesses
All Flexible Streets in Guelph	<ul style="list-style-type: none"> • Create Place • Economic Development • Improve Transportation Modes 	<ul style="list-style-type: none"> • Improve for all Modes of Transportation • Support Businesses

Table 6: The policy document strategies and objectives guiding each flexible street project

4.4.1 Strategies Guiding Flexible Streets

The following priorities emerged across the collection of guiding strategies. First, the aspiration around creating place was a commonality across the strategies. For the King Street project in Midland, the guiding strategy entailed identifying “the improvements needed to maximize downtown’s potential as a place to live, enjoy and prosper.” This is also evidenced in the downtown streetscape strategy put forth by Guelph, which states, “creating a place where people want to meet, watch the scene and interact with a wide range of people reinforces that the place is itself part of the destination.” The City of Barrie similarly strategized that “the west end of Dunlop Street, historically known as the theatre district, will be become the address for dining and entertaining” through upgrades to the area. Lastly, another strategy that champions creating place is the Dundas Place project, which was “to become a destination to arrive at for shopping, leisure, civic activities and

celebrations” through the implementation of a flexible street. Creating place entails making changes to the built environment to facilitate community interest in the space. It appears the flexible street projects were proposed as a means to change how the original streetscape, and surrounding area, was perceived and used.

A notable priority found amidst the strategies was the intention to spur economic development. This suggests that economic development is a key strategy aim that flexible streets are presumed to remedy. The City of Guelph was clear in communicating that making a desirable street space for people to congregate “is a fundamental goal of the economic development strategy for Downtown.” For the King Street project, the guiding strategy had set “out a broad set of goals for downtown and guidelines for both private development and public investment.” The remaining projects were guided by strategies that purported the enhancement of local businesses and commercial activities surrounding the streetscape project area. For example, the guiding strategy for the Sackville Street project included mention of the area becoming a destination for “diverse local businesses and multi-cultural restaurants” in London.

Outliers were found in the strategies guiding the flexible street projects in this study. The aim of the City of Barrie included creating an aesthetically pleasing environment by implementing “trees, street furniture, lighting and banners” along the streetscape. For the Elgin Street project, the guiding strategy was simply to determine a preferred street design that would “serve as a basis for the subsequent detailed design of Elgin Street” in Ottawa. A strategy guiding the proposed Wyndham Street, Macdonell Street, Quebec Street, Douglas Street, and Baker Street projects included ensuring transportation modal equality for all users. The strategy was premised on future intensification, noting that,

the public realm’s role in downtown requires a fundamental shift away from a focus on vehicle movement to one that supports businesses and provides modal equality for all users – including pedestrians, cyclists, transit, and private and commercial vehicles (Guelph).

This specific focus on modal equality may have occurred as the policy document it is from was specifically focused on the street networks in Guelph’s downtown. The other policy documents analyzed for this study included downtown master plans and community improvement plans, thus, focused on the larger downtown area beyond the roadways.

4.4.2 Objectives of Flexible Streets

Next, the objectives of each flexible street project were explored. The analysis found specific objectives present across multiple projects, suggesting common objectives for the implementation of

flexible streets. The objectives found for flexible street projects in this study were: Create Place, Support Businesses, Use as Events Space, Design & Complete Project, and Improve for all Modes of Transportation. Of these objectives, all were common except for the objective of Design & Complete Project, which was only found for the Elgin Street project. Although not all projects had all of the aforementioned objectives in combination, each project had at least one of the outlined objectives. Considering that flexible street projects are unique to their contexts, the objectives varied.

Beyond the local context, this study considered flexible streets in the wider context of contemporary streetscape redesign and re-prioritization of users. The policies regarding flexible street projects are best exemplified by the following excerpt from the City of Guelph, in that,

the past half century in downtown Guelph has been dominated by the personal vehicle. Streets have been altered from their original 19th century form to accommodate the safe and efficient movement of the motor vehicle. With renewal comes opportunity to re-balance the allocation of space within the street right-of-way. Flattening the prioritization hierarchy will better prioritize pedestrians, cyclists and transit users in downtown. On constrained streets in particular, where there are competing demands for space, pedestrians should be given equal priority to the demands of vehicles.

In addition to a hyper-local project that facilitates economic development and the making of place, flexible streets were found to be a concept that is part of a larger movement towards an improved built environment and new ideas about how cities ought to function.

4.4.3 Rationale for Flexible Street Project

Another area of investigation was to determine why the project was to be undertaken at the time it was proposed. Some municipalities cited the need to ‘update’ the downtown, specifically the streetscape, for purposes of future growth and intensification. This was evidenced by the Town of Midland in communicating that King Street “will provide an opportunity to update the street’s landscaping” once it is constructed as a flexible street. The City of Barrie had future growth-oriented rationale, stating that the Dunlop Street project was vital to the downtown and “will ensure this area is ready for future growth” once completed. *Table 7* provides details on the reason for construction on each project being scheduled at the time it was. The five projects in the City of Guelph are not included in the following table as they have not been scheduled for construction, thus no rationale is currently available.

Dundas Street	King Street	Dunlop Street	Elgin Street	Sackville Street
Utilities Upgrades Needed	Utilities Upgrades Needed	Utilities Upgrades Needed	Utilities Upgrades Needed	Utilities Upgrades Needed

Table 7: Rationale for the construction of each flexible street included in this study.

Beyond these motives, a key reason that the projects were contemplated at a specific time was due to the need for underground infrastructure upgrades. For all flexible street projects included in this study, the primary impetus for going forward with the proposed streetscape changes was because of the need to remedy outdated sewer, watermain, and public utility infrastructure. This allowed for the municipalities to redesign the streetscape to support user experience and bring the street in line with other design plans and guidelines. This finding suggests that the opportunity to redesign the streetscape as a flexible street is most strategic to apply when the roadway is already scheduled to be excavated for other purposes.

4.4.4 Flexible Street Design Features

The characterization of flexible streets was determined by assessing the design features commonly employed for the projects. Identifying the design features provided insight into how the intended use of flexible streets are operationalized. A key finding of this research was the design features employed to achieve the desired goal of a flexible street. In analysing the design elements of all the projects included in this study, commonalities emerged. *Table 8* is an aggregate of all design features that were included across all projects. The design features that were common for all flexible street projects are in bolded text.

Design Features		
<ul style="list-style-type: none"> • Wider sidewalks • Intersection bump-outs • Public art • Reduced width of roadway • Turning lanes added or removed • Tree and other foliage plantings • Coloured and patterned paving treatments 	<ul style="list-style-type: none"> • Curbless • Bike parking • Soil cells • Mid-block crossovers • Improved street lighting • Increased space for bus stop amenities • Benches and other street furniture 	<ul style="list-style-type: none"> • Planters • Bike lanes or sharrows • Removable bollards • ‘Traffic calming measures’ • Waste and recycling receptacles • Tactile walking surface indicator (TWSI) plates • Signage to delineate appropriate navigation of space

Table 8: List of all flexible street design features commonly included as part of each project.

The design details of each project in this study included either some or all of the above design features. An outlier found in the assessment of design features was the oft-cited “traffic calming measures” – which was determined to include design features like narrower lanes, raised intersections, and reduced speed limits (to 30km/h). Of particular interest is the notion of lowering the speed limit. Although not itself a design feature, this ‘traffic calming measure’ can be achieved through the implementation of certain design features. While some of the design features identified are understood to be good for public places - namely, bike parking, benches, and public art, some of the proposed design elements were unique to this emergent street typology. The prominent design features commonly employed for flexible street projects were road structure changes such as lane widths, turning lanes added/removed (*Figure 11*), removable bollards to delineate flexible space (*Figure 12*), coloured/patterned paving treatments to delineate different spaces and/or to achieve a desired aesthetic (*Figure 13*), tactile paving treatments to delineate different spaces for those with visual impairments (*Figure 14*), curbless city block(s) (*Figure 15*), and mid-block crossovers for pedestrians (*Figure 16*).

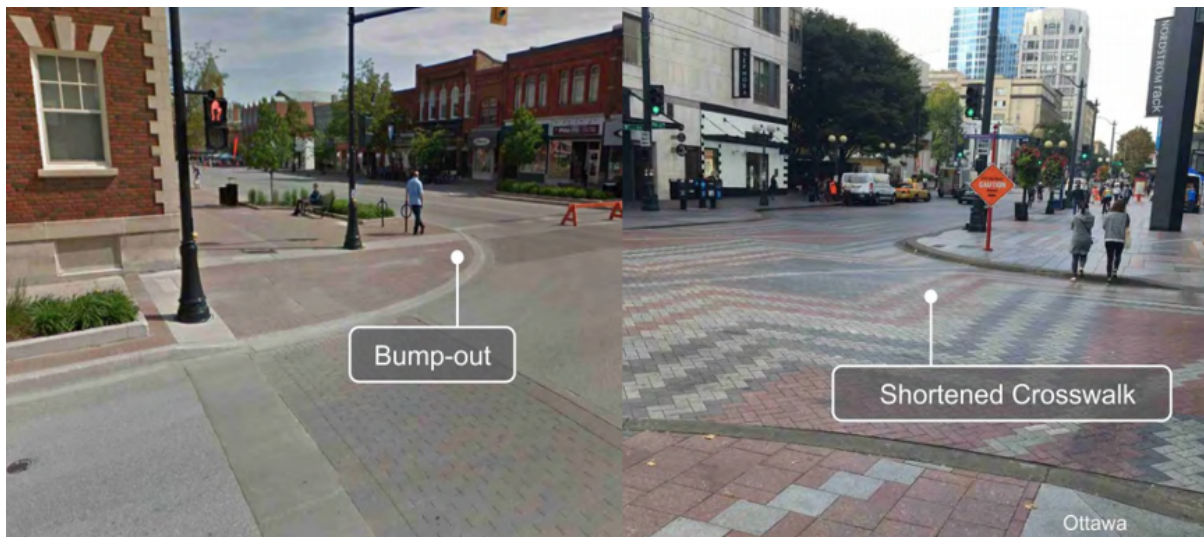


Figure 11: Examples of decreased lane widths (City of Ottawa, 2017)



Figure 12: Design rendering of removable bollards delineating space for different uses (City of Barrie, 2019)

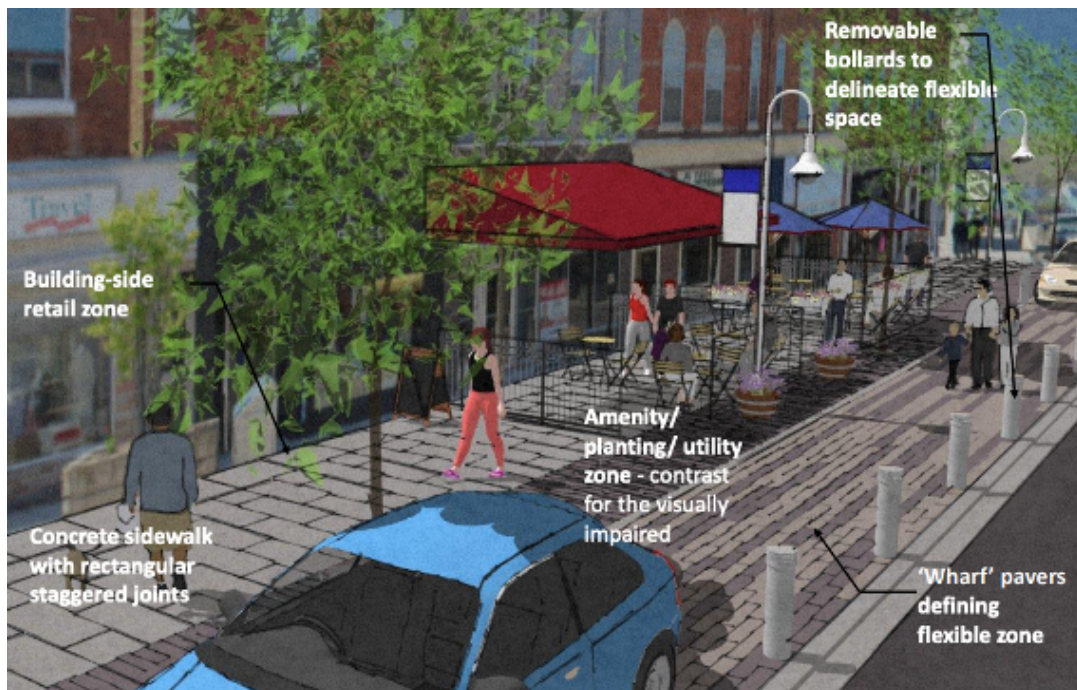


Figure 13: Design rendering of the coloured/patterned paving treatments used for flexible streets (Town of Midland, n.d.)



Figure 14: Design rendering of tactile paving treatments (City of Guelph, 2014)

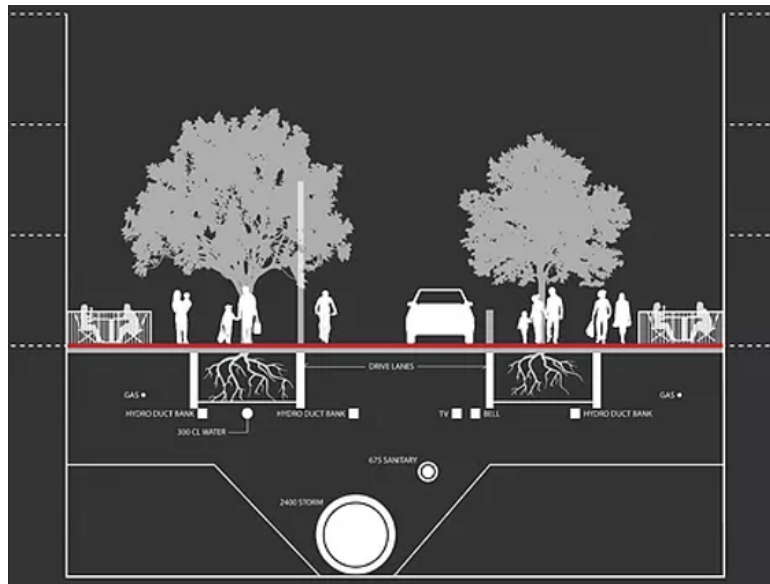


Figure 15: Cross section of curbsless street design and underground infrastructure (Dundas Place, 2019)

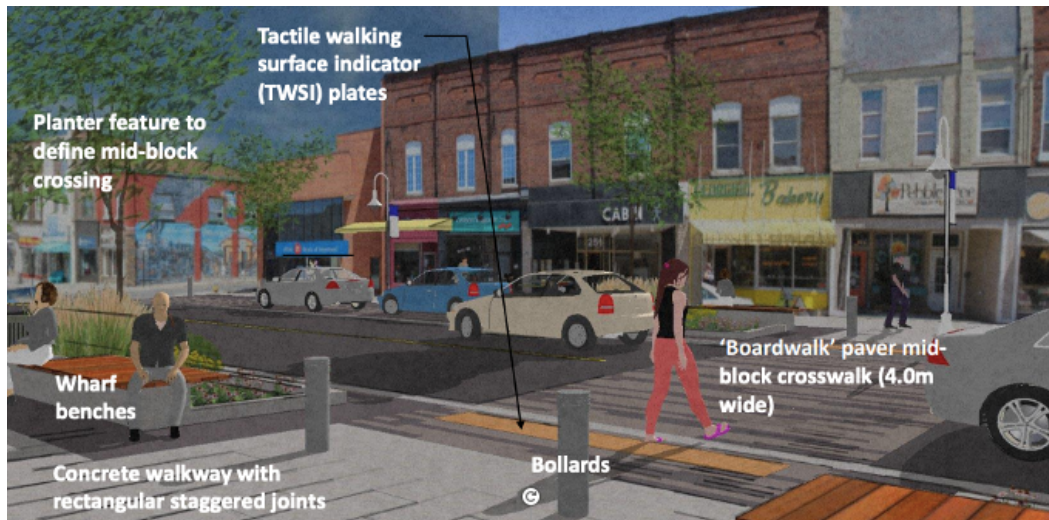


Figure 16: Design rendering of mid-block crossings for pedestrians (Town of Midland, n.d.)

The term ‘flexible space’ – referenced for more than one project, appears to refer to an area between the traditional roadway and sidewalk that could be modified via the removal or addition of bollards. This space could be modified for on-street parking, patios, or other seasonal uses. The emphasis on safety was found to be a main component of flexible streets and it was operationalized through the specific design features used for each project. This was most evident through the references to employing ‘traffic calming measures’ that would slow motorized vehicles travelling through the area. Other design features for flexible streets also ensured safety. The removable bollards (*Figure 12*) included for all streetscape design projects are modular and are intended to provide a semblance of boundaries, keeping vehicular traffic and pedestrians separated. Lastly, the tactile paving treatments (*Figure 14*) are a design feature that can help people with visual impairments to navigate the streetscape. This ensures all users are both safe from vehicular traffic and able to use the space equally without added impediments. Beyond stating that the street space is an area that all users can traverse equally, it was found that very intentionally, design features were applied to ensure that the flexible street would facilitate an enjoyable and safe space for all users.

Along with specific design elements of the street, it was found that some flexible streets also involved an overarching artistic theme of the design. For example, “inspired by London’s relationship with the Thames River, Dundas Place will uniquely integrate our City’s history with a simple and playful streetscape” – alluding to a design approach using intentional colour schemes, surface treatments, and details to evoke a desired aura. In *Figure 17*, the design of the street shows how history, place, and playfulness were melded together.



Figure 17: River rocks as public seating (Rodriguez, 2019)

The Dunlop Street project was planned to have a “contemporary style to complement Memorial Square/Meridian Place design and to express progressive values” via the design. For many of the projects included in this study, it was clear that there was a desired aesthetic for the streetscape and in some cases, even the preferred colours were presented as part of the initial design. This indicates that beyond the design features proposed, there was also a great deal of consideration geared towards the overall artistic theme of the street.

4.5 Inspiration & Proliferation of Flexible Streets

A major aim of this research was to assess the policy mobility of flexible streets. Through the analysis of policy documents and supporting project documents, findings about the origins of flexible streets and influential projects serving as inspiration for flexible streets were made. The following is an exploration into the policy mobility of the flexible street approach.

4.5.1 Flexible Streets Origin & Influences

The influences of flexible street projects were determined through investigating the organization that designed the project, other flexible streets or projects referenced, and the organization that prepared the policy document(s) guiding the project. Assessing the references to previous projects deemed influential for the design of the flexible streets in this study provided the opportunity to trace a larger history of this design practice. This aided in collating a more robust ‘list’ of flexible street projects in the world and established a better sense of the influence(s) on this

emergent planning practice. Below, *Table 9* includes a comprehensive list of all the projects cited as examples for the flexible streets in this study. The range of referenced projects includes roadways within the province of Ontario, roadways across Canada, and roadways in other countries. Overall, based on the study sample, the most commonly referenced projects were: King Street in Kitchener, Market Street in Toronto, Castro Street in Mountainview, California, and Carden Street in Guelph.

Inspiration for Flexible Street Projects	
• King Street (Kitchener, ON)	• Stephen Avenue Walk (Calgary, AB)
• 16th Street Mall (Denver, CO)	• Market Street (Toronto, ON)
• Place D'Armes (Montreal, QC)	• Castro Street (Mountainview, California)
• Exhibition Road (London, UK)	• Carden Street (Guelph, ON)
• New Road (Brighton, UK)	• Rue Saint Catherine (Montreal, QB)
• Bell Street (Seattle, WA)	• Shared Street [a photo referenced] (Quebec City, QB)
• Main Street (Streetsville, ON)	• Shared Retail Street [a photo referenced] (United Kingdom)

Table 9: A complete list of all streetscape projects referenced as design examples for flexible street projects in this study

A major finding was identifying the origins of flexible street design concept. Based on the information in select documents, it was found that the Shared Street design concept, most popular in the United Kingdom, is a main reference point for the flexible streets design concept. In analyzing the policy documents for the projects in Guelph, visual references to street designs implemented in the United Kingdom demonstrated the connection between the application of the flexible street concept in Canada and another geographic context. Further, the connection to a European streetscape design approach was asserted in the description of a proposed flexible street project. It was stated that, “by applying the Flexible Street Approach to Douglas, a European style shared street emerges that will afford businesses new opportunity to flourish” (Guelph). In detailing the proposed Dundas Place project, it was stated that “a flexible street or shared street, is essentially the entire street right-of-way, from building face to building face shared by pedestrians, cyclists and motorists” (Dundas Place). This provides a direct connection with the Shared Street concept. Although seemingly minuscule, such references reinforce connections to earlier projects that have influenced the policies of flexible streets. These connections situate flexible streets as an iteration of a European Shared Street.

The connection with Shared Streets is important as it links the concept of flexible streets with an established concept and practice. This also distinguishes flexible streets as a practice for which an earlier version had been successfully implemented. This is exemplified in an excerpt about the

Dundas Place project (quoted in 4.3.2 Safety Component), which referenced prior research on the success of Shared Streets design in slowing motorists and achieving the intended shared usage. The connections to previously implemented Shared Streets and the research about them provides the flexible street approach with increased legitimacy in the planning and design realm. This leads to a further aspect of the concept's origins – the geographic history of flexible streets. Not only have flexible streets been linked to the Shared Streets concept, but the Shared Streets referenced were all located in the United Kingdom. This adds a dimension of geography to the origin story of flexible streets – a concept that has now been determined to have originated in Europe. The European origin of the Shared Streets concept is solidified through the explanation that “this concept has been more fully accepted in European countries, but is now becoming more common in north American cities and even locally, in cities such as Kitchener, Ontario and Toronto” (Dundas Place). This demonstrates how flexible street policies have mobilized elsewhere.

Of the projects included in this study, all cited other projects within the province of Ontario as design influences. Another finding suggests that not only are flexible street policies mobilizing from the international level, national level, and provincial level, but also have been proliferating within the local level. In outlining the objectives of the five proposed flexible streets in Guelph, the already existing flexible street in the city is used as grounds for the projects. The additional flexible streets are supported “as Carden Street has demonstrated, slowing vehicles - especially on flexible streets - benefits all road users” – providing a reason for the increased application of this street design approach. Beyond quantifying how often certain projects were cited as influential, this study did not generate data regarding ‘why’ those projects were considered models for flexible streets. However, the collection of streetscapes heralded as exemplary has led to an understanding of which projects are models of the flexible street design concept. Based on findings in this study, the models of the flexible street approach are King Street in Kitchener, Market Street in Toronto, Castro Street in Mountainview, California, and Carden Street in Guelph.

4.5.2 Rationale for Implementation

In analyzing the ‘export’ and ‘import’ conditions that make flexible street policies and projects attractive, in-depth information was not able to be gleaned from the data collected. The data does suggest that there are a few conditions required – or at least beneficial, to implement a flexible street. The first condition stems from the overarching strategies of the plan and objectives of the project guiding implementation. Looking at municipalities that are implementing flexible streets, the

data highlighted that this occurred with the overarching objectives to spur economic development and to facilitate the making of a ‘place’. The data also suggests that a condition for a flexible street to be implemented is that it be within the municipality’s downtown area. Or, at least a downtown-like area, as is the case for the Sackville Street project. All the other flexible streets in this study were proposed for implementation in the downtown area of the municipality. This suggests that the typical downtown amenities - shops, restaurants, cultural centers, and entertainment facilities, benefit a flexible street. Lastly, a key finding of this study was that underground utility work was required for all of the roadways proposed as flexible streets. This suggests that a potential condition in implementing a flexible street is to simultaneously perform underground infrastructure upgrades. Coupling a streetscape redesign project with necessary underground infrastructure work is a strategic approach as the roadway would have to be completely excavated for work on utilities anyways. Thus, it would allow a municipality the opportunity to more seamlessly implement an entirely new streetscape while repairing the roadway surface.

4.5.3 Actors in Policy Process

As policy mobilities research is focused on the policymaking process itself, a key aspect to address is the work of the actors in the ‘policy-transfer process’ and implementation of flexible streets. This study revealed that all municipalities had contracted private planning or design firms to assist in implementing the flexible street project. Only the City of London and the City of Ottawa were solely responsible for preparing the initial policy documents that initially identified the need for an updated streetscape. All other municipalities in this study had engaged a private firm to prepare the documents that outlined the need to redesign the particular street. Supporting reports, plans, and studies were required for the implementation of the roadway design projects. In later stages of the project processes the flexible street concept was presented as a potential design concept to apply on the project area. Again, a mix of public and private organizations were involved in crafting supporting documents for the project’s implementation.

Below, *Table 10* shows the flexible street projects and the organizations that were involved in creating each planning document. Of note is that C.C. Tatham & Associates and Envision-Tatham were with both the Dunlop Street and King Street projects, leading the design and public engagement portion of the projects. These private organizations appear to be associated. Otherwise, a variety of private firms were engaged by municipalities for implementing the flexible street project. This

suggests that certain private firms may be gaining particular expertise on this streetscape design approach, which may result in increased proliferation of flexible street projects.

Flexible Street	Policy Document(s) Involved	Documents Prepared By	Project Designed By
Dundas Place	<i>Our Move Forward: London's Downtown Plan</i> (2015) <i>Creating Dundas Place: A Flexible Street Scoping Study</i> (2015) <i>Dundas Place Environmental Study Report</i> (2016)	City of London IBI Group Dillon Consulting Ltd.	N/A
King Street (Midland)	<i>Town of Midland: Downtown Master Plan and Community Improvement Plan</i> (2015)	Urban Strategies Inc.	Tatham Engineering
Elgin Street	<i>Elgin Street and Hawthorne Avenue Functional Design Study</i> (2017)	City of Ottawa	City of Ottawa
Dunlop Street	<i>Downtown Commercial Master Plan</i> (2006) <i>Dunlop Street Corridor Improvements Class Environmental Assessment Phases 1 & 2 Report Final Report</i> (2015)	Patty Xenos Design Inc. and collaborators City of Barrie	C.C Tatham & Associates and Envision Tatham
Sackville Street	<i>Hamilton Road Corridor Streetscape Master Plan</i> (2017) <i>Hamilton Road Area Community Improvement Plan</i> (2018)	City of London and IBI Group City of London	IBI Group
Wyndham Street Macdonell Street Quebec Street Douglas Street Baker Street	<i>City of Guelph Downtown Streetscape Manual & Built Form Standards</i> (2014)	BrookMellroy Inc. in association with Unterman McPhail Associates and McCormick Rankin Inc.	BrookMellroy et al

Table 10: The guiding policy documents and planning entities involved with each project.

Overall, the findings were not conclusive, nor did they suggest any particular organization(s) serving as the source for this streetscape design practice. It was found that a mix of private planning firms and municipalities proposed, planned, and designed flexible street projects. This is relevant as it demonstrates that there are no flexible street experts *per se*, rather, the concept has emerged through

various planners and urban designers, regardless of their place of employment. Another finding about the project process was that flexible street projects were often initially introduced through downtown master plans, community improvement plans, or streetscape plans. This demonstrates that flexible streets are hyper-local projects that need to be mindfully proposed within a specific context. In addition to professional policymakers, it is important to note the stakeholders engaged in the process. From the data collected, it was found that the projects all engaged similar stakeholders in the planning and design process. For Elgin Street, those consulted included business owners, community groups, residents, and the Urban Design Review Panel. Similarly, the King Street project had engagement from business owners, landowners, community groups, social service providers, cultural organizations, Town staff, and representatives of the Business Improvement Area (BIA). The BIA and City staff were also major stakeholders for the Dunlop Street and Dundas Place projects. In addition, the London Transit Commission, London Hydro, Bell Canada, Rogers cable, Union gas, and London District Heating were engaged for the Dundas Place project. Reinforcing the common overarching strategy for flexible streets to support economic development and commercial activities, is that the Business Improvement Area (BIA) was a stakeholder engaged in the process of implementing many of the flexible street projects.

4.6 Public Feedback on Flexible Street Projects

For the last phase of data analysis, public feedback from community consultation events for the flexible street projects was assessed. The public feedback obtained for each project stemmed from different stages of project implementation. As a result, the data was not comparable across all projects. To combat this, analysis of public feedback was conducted in two separate groups. Verbatim public feedback comments and summaries of public feedback comments were assessed separately. Despite the difference in public feedback focus, information about how community members felt about implementing flexible street design and, more generally, about how a given street or downtown should be redesigned was garnered.

4.6.1 Public Support for Flexible Street Design

The public information sessions from which the public feedback comments was obtained occurred early on in the projects processes. The consultation events were intended to garner public feedback on the types of design features or future uses for the streetscape and to assess a variety of street design layout options. Categories formed to reflect all topics of public concern, support,

suggestions, and observations pertaining to the roadway redesign projects. The following sub-sections detail the findings.

4.6.1.1 Events & Programming

One of the most popular topics found through public feedback was the desire for increased event capacity, frequency, and variety based within the streetscape. This included ideas for potential events or articulated the want for events to occur to ensure the success of the project. For example, “being able to section off event space would be great. Much like Collingwood – bring life back to the downtown for events” (Dundas Place). Many of the comments were about the street becoming a suitable space for holding events and encouraging public gatherings. It was posited that “events should be on the ‘street,’ not just in Budweiser Gardens. Those events can spill out onto street and encourage patrons to stick around, not hurry back to their parked cars” (Dundas Place). The inclusion of events infrastructure into the street was even suggested - “do this! but make sure to have electrical /water for live shows, festival's, etc” (Dundas Place).

A community member suggested “maybe at weekends leading up to Christmas with a Christmas market with stalls on the street and memorial square.” (Dunlop Street). The specific event and activity suggestions ranged from coordinating events in the future flexible streetscape with surrounding event centres and museums, having activities during the evening hours, to encouraging theatre performances. The idea of using the street as a public space closed to automobiles was supported, but public feedback made it clear that to be successful, there needed to be programming to attract people. For example, a community member said

I think if you're going to do it, it needs to be bold to offer something completely new, different and attractive to visitors. Simply closing the street is not enough, you have to add fixtures, entertainment and markets to bring it to life (like promenade days) (Dunlop Street).

Overall, these comments are all positive and in support of increasing event capacity as well as the variety of programming and activities taking place within the roadway space.

4.6.1.2 Space for Restaurant/Café Patios & Food Trucks

The desires for increased patio space and space for food trucks was another major topic brought forth via public feedback. Expanded outdoor seating and patio space was one of the more common suggestions for the streetscape projects, as “it would be a great feel and the summer would be awesome” (Dundas Place). Others suggested that the outdoor patios could function all seasons with “heaters outdoors in winter for café outdoor seating (see Victoria, BC)” (Dundas Place). One

community member reasoned that “the success of the wood patios in the summer and promenade days during Canada Day weekend have proven that this is a viable option for the city” (Dunlop Street). Overall, feedback sought to “encourage restaurants to be open & on street” (Dundas Place). In response to assessing the possibilities for streetscape design elements, it was suggested that considerations for “small local business opportunities (food trucks/coffee cart)” (Dundas Place) be made. Others claimed the street would be a “great spot for food trucks!” (Dundas Place) and to “allow food trucks” (Dundas Place). The public feedback regarding space for patios and food trucks demonstrates that residents wanted reasons to go to and enjoy the downtown street space.

4.6.1.3 Public Seating

The request for more public seating was found through analysis. One person explained, “since my husband is now using a walker, more benches under shade trees would benefit us” (Dunlop Street). Community members supported the addition of public seating and wanted to “have enough seating to be comfortable while going on long walks or events” (Dundas Place). Providing more seating was viewed as a means to enhance the streetscape “to draw people there + also spend more time there” (Dundas Place). Only one person expressed a negative view of public seating, saying it, does not work. Dundas St had bench seating. Loitering a big problem. City has to put spikes on concrete flower beds so people would not loiter. Seating will become a ‘BIG PROBLEM’ without police moving loiterers. Seating should only be by restaurants and cafes (Dundas Place).

Despite this negative view of public seating, the remaining comments about public seating were positive and included suggestions to have more of it.

4.6.1.4 Safety of Area & Improvement of Social Issues

From a mostly negative standpoint, the topic of safety and improvement of social issues emerged from public feedback regarding the projects. In a particularly critical comment, one participant wrote that “the major problem with downtown, the perception that it is unsafe due to drug dealers, street people and prostitutes. This is the #1 reason my clientele say they don't frequent downtown shops and restaurants” (Dunlop Street). Other feedback stated, “try walking the downtown area with the panhandlers and other marginal persons in doorways, living, panhandling. The downtown area is a place you do not want to shop” (Dunlop Street). Many comments regarding the perception of the street’s safety suggested that it “needs work to make the character of the street seems safer” (Dundas Place).

Beyond comments about perceived safety issues stemming from the presence of people deemed ‘undesirable’, concerns about safety were voiced due to the danger that vehicles posed to others. One community member simply submitted that “mixing vehicle and pedestrian traffic is fraught with safety problems, especially with today’s distracted drivers” (Dundas Place). Overall, community members sought “to feel safe while crossing the street” (Dundas Place) and an improved sense of security in light of street-level social issues.

4.6.1.5 Pedestrian Priority & Bicycle Infrastructure

A major topic that emerged from analysis was the desire for increased pedestrianization of the streetscape. Majority of the public comments in this theme made reference to the desire to create a “pedestrian-friendly shopping + events space” (Dundas Place), have “more space for pedestrians” (Dundas Place), and generally, “to be more pleasant for pedestrians at all time (day, night, season)” (Dundas Place). To highlight the importance community members felt about creating a streetscape with pedestrian-friendly design, a community member wrote that

Barrie needs to be bold in order to compete with other Ontario municipalities. Just like Stephen Avenue in Calgary, Sparks Street in Ottawa, and the Distillery District area in Toronto have become famous because of their pedestrian-only streets, Barrie can also be added to the list of innovative and progressive Canadian cities that are putting people first (Dunlop Street).

Most comments do not elaborate on ‘why’ or ‘how’ the streetscape should be more pedestrian friendly, but the number of comments on this matter clearly demonstrates that people are interested in an improved pedestrian experience.

Looking to bicycle infrastructure - based on the public feedback, it is apparent that members of the community wanted space for cyclists. Comments were put forth by community members for “barrier protected bike lanes” (Dundas Place) and “more bike parking (full time & event)” (Dundas Place). The general sentiment was to “please ensure that all alternatives include space for cyclists on the road way” (Dunlop Street).

4.6.1.6 Improved Transit & Traffic

Concerns about how the new streetscape project would impact vehicular traffic and public transit systems were voiced by community members. It was mentioned that, after events at venues in the downtown “traffic is always an issue, and the traffic is slow and congested during other times” (Dundas Place). To combat the traffic complaints, it was suggested that the street be “closed to

vehicular traffic during events (prior & post)” (Dundas Place). Another suggested more frequent blocking of vehicular traffic by having “a midday period where cars aren't allowed on the Main Street” (Dundas Place). However, many comments on this topic were about how changing vehicular traffic flows as part of the new streetscape project may make navigating the downtown more difficult for drivers and cause increased vehicular traffic on other downtown streets.

The expressed want for more public transit available near the project area was also found through the public feedback. Community members advocated for transit-oriented design and to “improve downtown transit so people don’t have drive there” (Dundas Place). Despite the positive comments about increasing public transit capacity, some felt there were too many buses and instead the aim should be “keep traffic down and have more pedestrian activity” (Dundas Place). These findings demonstrate that changing a particular streetscape or the access for certain transportation modes are perceived to have impacts on the wider community – and likely do. This feedback suggests a strong apprehension to such changes and that care must be given to how these changes will affect a community.

4.6.1.7 Parking Spaces

Many comments received by staff at the public consultation events were about the availability of parking spots and the negative impacts if parking spots for vehicles were removed. When assessing streetscape design options for the project, one community member wrote that “several options remove too many parking spaces/displace people to park further away and will discourage attendance” (Dunlop Street). There was “concerns from customers about not being able to drive through Dunlop to location. Customer counts already dropping due to busy roads and lack of parking. Business will suffer” (Dunlop Street). Others asserted that “walking along Dunlop Street in the Winter to reach banks, restaurants, theatres, doctors, etc. is often not a choice. Driving is a necessity and parking is a must” (Dunlop Street). The support for maintained or increased parking along the roadway stemmed from an economic standpoint – to provide ease for customers accessing the area. In opposition to those who voiced concern about the need for parking were those who submitted comments in favour of less, or even “no on street parking!!” (Dundas Place). To facilitate decreased parking availability, someone explained that “London is by force an auto-intensive city, so a park + walk culture is going to take encouraging” (Dundas Place). Potential benefits were explained as,

a loss in on-street parking will mean a gain in human movement by foot and bike. That's where a communities values should be; in accommodating human-powered movement and

not lending our valuable downtowns to cars and parking. [...] This is the chance to choose the boldest future (Dunlop Street).

Availability of parking was one of the more contentious topics that emerged from public feedback. There were intense advocates for both removing parking spaces and keeping parking spaces.

4.6.1.8 Surrounding Businesses & Building Design

Through public feedback, concern for the commercial and retail businesses surrounding the streetscape project area was identified. Comments focused on the displacement of businesses or amenities, the existing vacancies along the street, and the need for “more small scale businesses (mom + pop stores)” (Dundas Place), while many others said the City “needs to remove certain businesses” (Dundas Place). Other comments were about how businesses are perceived to suffer because of construction and the potential for the street to be closed to vehicular traffic. These concerns were not something that could be addressed through the streetscape redesign projects. The overall sentiment – although presented as fear of losing businesses, can be viewed instead as concern that the “the street needs a drawing card to bring people all the time not just events. A shopping experience needs to be done at the same time.” (Dundas Place). In terms of the plans and preliminary design options, it was said that “all is great but it can only be successful if you have businesses move back to the core” (Dundas Place).

In addition to surrounding land uses, the public feedback also focused on the architecture and façades of surrounding buildings. Many articulated the want for “building facades that are stimulating & unique while maintaining the heritage of the buildings” (Dundas Place). It is key to note that the streetscape redesign projects did not intend to address building façades or surrounding land-uses. This finding suggests that a harmonious balance between private spaces deemed ‘good’ by the community and an attractive public street space makes for an overall ideal street.

4.6.1.9 Additional Suggestions for Streetscape Project

Through analysis, a category of comments emerged regarding miscellaneous suggestions for streetscape features. Despite being a general category, common suggestions were found. A prominent suggestion included “a drop off/taxi stand area to make it easier for people to access the area” (Dunlop Street). This suggestion indicated the intention for increased pedestrian activity by ensuring that people are able to easily arrive at an access point for the street. Multiple community members recommended “weather protective awnings (See Seattle) with heat capability in

winter” (Dundas Place), suggesting an interest in using the streetscape area during all four seasons. Other popular suggestions were premised on celebrating the local history and contemporary culture through digital way finding kiosks or by erecting “signs near key historical buildings to educate the public of the buildings despite their current use” (Dundas Place). Overall, there was an enthusiasm about celebrating the history of the municipality and sharing it with others. Through public feedback, designers were urged to consider “creating a water feature that could serve as a water park in the summer and an ice skating park during the winter” (Dundas Place). This finding suggests that people want public spaces to be cheerful and incorporate natural elements. There were also suggestions for recreational activities to be available, namely a “bike rental area” (Dundas Place) and “canoe/boat rentals” (Dundas Place). Although this could not be addressed via the streetscape redesign projects, this demonstrates the want for more types of activities available in the downtown area.

4.6.1.10 Streetscape Design Features & Landscaping

A number of topics arose about the design features of the streetscape and the use of landscaping. The major streetscape design elements identified as desirable by community members were “flush paving/plaza” (Dundas Place) and “wider sidewalks” (Dundas Place). The flush paving design application that gives a street more of a plaza feel was explained as desirable “because it allows for the most flexibility and pedestrian priority” (Dundas Place) and because “typically, people will drive slower on streets like this.” (Dundas Place). Artwork installations and lighting were other features that community members sought for the streetscape. These were simply requests for “lighting fixtures/displays” (Dundas Place) or “better lighting” (Dundas Place) as, “lighting – well lit = feeling safer” (Dundas Place). In terms of artwork, the general sentiment was for “art installations” (Dundas Place) and “public art spaces” (Dundas Place) to be included in the final design of the flexible street project.

In terms of landscaping and trees, the feedback revealed support for the addition of street trees. The consensus from members of the public is that they wanted the future streetscape to include “more planters” (Dundas Place) and that the “downtown needs more GREEN! More trees” (Dundas Place). By having more trees and greenery incorporated into the design of the streetscape, it was said that such a “microclimate would help those really hot days but also look nice” (Dundas Place).

4.6.1.11 Create Interest for all Times & Seasons

The topic of creating interest emerged from the analysis. The public feedback revolved around directives such as “need draws for parents to bring children downtown” (Dundas Place) and to “make it more lively and exciting” (Dundas Place). In addition to having the space be of interest to residents, some cited that “this could be a great project to market in order to attract tourists. Making it ‘different’ enough to have people’s curiosity peaked” (Dundas Place). Such comments highlight the general sentiment that community members wanted the new streetscape to attract visitors from outside and within the municipality.

Concerns about climate and nighttime hours were identified through analysis. Such comments raised concern about how the proposed future streetscape would function in off-peak hours or in less-ideal weather conditions. In terms of timing, an interest in ensuring the street is viable for most hours of the day, and not desolate at nighttime, was found. Regarding seasonal conditions, the main concern was about ensuring the street space remain active during the winter months. It was suggested that “the solution needs to be flexible to account for the strong seasonal differences in how people use the downtown” (Dunlop Street). This is not a surprising concern as winters are notoriously hostile in Canada, making it unpleasant to be outdoors for too long.

4.6.1.12 Comments about Project Scope and Project Process

A small collection of comments was made about the streetscape project and its connections to the larger municipality. The comments had to do with the “need to make better and easier connections to the River and pathways below” (Dundas Place) in order “to encourage the public to go to the River & use the parks” (Dundas Place). Overall, there was a desire for increased ease of connection between the more built-up urban part of the city with the riverfront and surrounding parklands. This peculiar category of public feedback is likely to have emerged due to the Dundas Place project area abutting vast park lands and trail networks connecting to other areas in the city.

The public feedback about the construction of the project and public consultation events was limited. Comments about construction included a question about the state of water and sewer infrastructure existing on the street and questions about when construction will start and how long it will take. Comments about the public consultation event involved critiques regarding the “poor display of the total detail(s) and impact(s)” (Dunlop Street) of the proposed project. The remainder of comments organized into this category were directives from agencies about their involvement in the project’s implementation. Although not directly applicable to the design of flexible street projects,

these comments are useful in highlighting what community members are concerned about when a new large-scale project is proposed in their community.

4.6.1.13 Approving and Disapproving of Streetscape Project

Despite the common ire received when a new large-scale public project is announced, the public feedback was overall encouraging and positive. Even if an aspect of the downtown or street project was perceived as negative, a suggestion for improvement often accompanied the comment. In terms of flat-out rejection of the project, a small smattering of comments were submitted. One community member exclaimed that the streetscape project “has been discussed ‘to death’. We appreciate the available public input. The City does not need to spend "experimental" money at this time” (Dunlop Street). Another said the street is “good as it is. Let's stop kicking taxpayers out of their homes for silly projects” (Dundas Place). One community member begrudgingly wrote that “I’m not a supporter of the flex street but consider infrastructure renewal on target to be a solid plan. As a taxpayer I feel I should own Dundas St. by now” (Dundas Place). The reasons for disapproving the project all stemmed from the cost, slated to be paid with public funds.

The comments generally approving and celebrating the streetscape project far outweighed the rejections. Most of the comments in this category were curt words of approval, like “an exciting adventure!” (Dundas Place) or “great idea!” (Dundas Place). Some even showed support for the flexible street concept, specifically submitting “love the idea of Flex Street!!” (Dundas Place). Despite the negative comments stemming from the use of public funds on this type of project, a supporter of the project said that the streetscape redesign is “an important project. Happy to see my property taxes used on this!” (Dundas Place). Overall, the public feedback for the future flexible street projects was positive, encouraging, forward-thinking, and supportive of making the project as good as possible. It has demonstrated that there is a desire for a street to be more than just a conduit for vehicular traffic, and that communities want an attractive and fun community gathering space for all users.

4.6.2 Public Feedback from Project Summaries

Records of public feedback could not be obtained for all flexible street projects in this study. For the remaining three active projects, summaries of the feedback from public consultation events were procured and analyzed. *Table 11* provides an overview of the public feedback topics identified through the summaries of public consultation events.

Project	Construction Impacts	Business Concern	Cycling	Streetscape	Pedestrian	Parking	Vehicular Lane Composition	Safety	Maintenance	Public Support
King Street	X									
Elgin Street	X	X	X	X	X	X	X	X	X	
Sackville Street										X

Table 11: Identified topics emerging from public consultation.

As this portion of analysis dealt only with reported summaries of the public feedback, there is a considerable lack of detail available to present as findings. Public feedback regarding concerns about the impact of construction was comprised of comments voiced by those who had economic interest in the downtown area – such as tourism representatives and business owners in the vicinity of the streetscape project (King Street). The general sentiment was concern about how the period of construction would negatively impact surrounding businesses and included requests for an expedited construction period (King Street). Some public feedback was about concerns for businesses – such as worries that rent, and taxes would increase after streetscape implementation (Elgin Street). Public feedback summaries revealed support for bike lanes to be included in the design, the pedestrian realm to have wider sidewalks, the wintertime maintenance of the streetscape, and improving the safety of certain intersections (Elgin Street). Looking to parking and the composition of vehicular traffic lanes, the summary of public feedback highlighted a variety of preferences on how little, how much, or where these roadway design elements should be (Elgin Street). In terms of streetscape elements, the community wanted more street trees and less ‘clutter’ along the roadway – with specific direction to bury overhead utility lines (Elgin Street).

In the instance of Sackville Street, the project design was said to have been “well received by those in attendance” at a public presentation. Although vague, it can be gleaned that there was general public support for the project. The public feedback summaries for these projects demonstrated aspects that residents wanted addressed through the streetscape redesign project to improve the community.

4.7 Chapter Summary

A variety of findings about flexible streets were made through analysis in this study. Through analysis, the flexible street concept was better understood and connections to other established streetscape design concepts were revealed. Based on the findings, the impetus for flexible street

projects, how such policies were mobilized in – and within, different Ontario municipalities, and public support for the streetscape redesign was found. The findings of this study are important as they provide insight into an emergent streetscape design approach aimed at improving how all individuals and nearby businesses interact with a streetscape.

Chapter 5: Discussion

5.1 Introduction

The following chapter is a discussion about the results of this study. The research question guiding this study was how did flexible streets emerge as a planning practice in Ontario? First, an overview of the key findings of the study will be provided. Next, key findings will be explored in depth with connections to existing literature and contemporary movements that impact the implementation of the flexible streets concept. These outcomes will be addressed through the lens of evolving beyond auto-centric planning practices and the increasing understanding of the importance of public space. This will be followed by the study limitations and areas of further research.

5.2 Summary of Key Findings

This study explored the flexible streets design concept that is being implemented in Ontario municipalities. The research was guided by the following objectives: i) understand how flexible streets are defined, ii) explore the policy and planning processes from which flexible street projects have emerged, iii) identify the historical roots of this emergent planning and design practice, and iv) assess public feedback regarding the flexible streets projects. Through this study it was concluded that a flexible street is a roadway in which the surface is even from storefront to storefront, includes ample space for all road users, and is a space that can be easily transitioned to a public plaza for events, patio spaces, or retail displays. From the analysis, five key aspects of what constitutes flexible streets were found to be: flexibility, safety, public and private gathering uses, equal use of space, and intentional design. The planning processes through which flexible streets are emerging were via direction in master plans or community improvement plans to revitalize the given streetscape. From this point, the actual flexible street design later emerges in the planning process as the preferred design for the streetscape. Flexible streets are proposed via more hyper-local plans versus municipality-wide plans such as an official plan due to the specificity of the project, as it is intended to benefit the immediate surrounding area.

This study determined that flexible street projects stem from the Shared Street Space concept popular in the United Kingdom and Europe. This finding helps to solidify flexible streets as an evolution in streetscape design approaches and as a distinct design concept. A mix of public and private planning entities have been involved with planning for flexible streets, demonstrating that the concept is not coming from a single source. The projects included in this study were all

conceptualized as flexible streets between 2014 and 2017, with references to inspirations from other existing flexible streets in Ontario, international examples - mainly Shared Street Spaces from the United Kingdom, and inspiration drawn from within the respective municipality. Due to a lack of information on some existing flexible streets in Ontario not being available, the exact timeline of flexible street policy mobility could not be determined definitively. Lastly, a variety of topics were identified through analysis of the public feedback from the design phase of the streetscape projects. Overall, the public supported making changes to how the respective streets looked and functioned. The public feedback highlighted the want for the streets to be used – in addition to a traditional transportation conduit, as a public gathering space for people, events, and for restaurants to use as patio space.

5.3 Flexible Streets as a Distinct Streetscape Design Concept

There are numerous streetscape design concepts guiding projects all over the world. Popular, well-defined and established streetscape design concepts include: Open Streets, Complete Streets, Shared Street Spaces, and the Woonerf (plural Woonerven) – which translates to ‘Living Streets’ in English. Determining how flexible street projects are unique compared to the aforementioned streetscape designs is important as this study sought to understand how flexible streets are defined. As flexible streets are a new idea and not yet covered within academic literature, differentiating this streetscape design approach from others is a critical step.

The five identified components of flexible street projects found through this study are important as, in combination, they distinguish the flexible streets concept from other streetscape design concepts. Other findings from this study - namely the implementation sites of these projects, the design features used, as well as the guiding strategies and project objectives, further differentiate flexible streets from other established streetscape design concepts. The starting point in understanding flexible streets as a distinct design concept is that all of the approaches to streetscape design highlighted in this study are premised on the move away from auto-centric urban streets (Collarte, 2012; PPS & Mobycon, 2017; Hui et al., 2018). In the case of Open Streets, the intended use is for the given street to become a temporary space for pedestrians, cyclists, and community events (Chaudhuri & Zieff, 2015). The aforementioned concepts are not the only approaches to streetscape design, the traditional design of roadways – prioritizing the efficient movement of vehicles, is still actively implemented in municipalities today.

5.3.1 Similarities with Non-Traditional Streetscape Design Concepts

Before looking to the differences of a flexible street that make it a unique design approach compared with other streetscape designs, the similarities of the concepts will be articulated. Regarding the notion of safety as a key part of the flexible streets concept – it was determined in this study that flexible street projects purport to increase safety for all roadway users through design provisions. The main avenue to attain this was identified as the intention to slow down vehicular traffic and maintain some semblance of separation between pedestrians and motorized vehicles.

Safety as a main driver of the design approach is a primary concern in other streetscape design approaches. For example, the Complete Streets concept is defined around the aim to make the streetscape safe for every type of user (Hui et al., 2018; McCann, 2005). Concerns about the safety of pedestrians, especially children, was a driving force leading to the concept of a Woonerf (Collarte, 2012). Further, the creation of Shared Street Spaces was also initiated through the aim to design a streetscape in which vehicles were slowed to support the safety of pedestrians and cyclists (Gilman, & Gilman, 2007; PPS & Mobycon, 2017). Open Streets are not premised on increased safety for pedestrians and cyclists. Instead, Open Streets arose from the realization that poor public health could be combatted by making space available for physical activity (Cohen et al., 2016; Chaudhuri & Zieff, 2015; Greene et al., 2017; Sarmiento, Torres, Jacoby, Pratt, Schmid & Stierling, 2010). As the flexible streets concept endeavours to make roadways safer, it has further established itself as a viable approach amongst popular design approaches that also seek to create streets that are safe for all users.

Another similarity discerned amongst flexible streets and other design approaches is that the design itself is intentionally carried out to facilitate the future use of the street. Beyond simply stating that the street should be used a certain way, through the flexible streets concept, the streetscape is designed and then implemented in a manner to allow the street space to function as intended. In fact, the actual design of the streetscape is integral in ensuring that the other components of a flexible street can be achieved. All of the streetscape design concepts involve a significant redesign of a traditional street to ensure the street functions as intended, except for the Open Streets approach. Open Streets involves the closure of a street – or network of streets, in order to host activities or make public space available to the surrounding community (Chaudhuri & Zieff, 2015). The Open Streets concept does not denote a change in the design of the street itself.

The last similarity identified amidst the concepts is the aspect of the street becoming a space that all road users can use equally, with ease. The data suggests that flexible street projects emphasize the street space being of equitable accessibility and adequate space allocation for all types of street

users. In articulating each project, the descriptions expressly state that the flexible street project in question will ensure that the roadway is shared by pedestrians, cyclists, and motorists. In addition, the flexible streets concept also articulates a concern for ensuring the safety of those with visual impairments and ensuring that those with a disability can use the streets without impediments. Ensuring that all users are able to use the street is similarly found across other streetscape design concepts. Complete Streets projects and policies emphasize the accommodation of all roadway users without compromising any type of user (Garrett & Cusack, 2014). While, Shared Street Spaces are defined as a streetscape design exercise that prioritizes the interests and individual responsibility of each user (Netherlands Knowledge Center qtd in PPS & Mobycon, 2017). This is important as it demonstrates a meaningful move towards streets and public spaces accessible to all.

5.3.2 Differences Between Non-Traditional Streetscape Design Concepts

Moving to what makes a flexible street distinct amongst other street designs. From this study, it was determined that once implemented, all the flexible street projects are to continue acting as a roadway for motorized vehicles. However, in addition to this, flexible streets are to be used as spaces for larger-scale events, celebrations, or uses other than a typical street. Beyond a space for events, this study concluded that the flexible street was also intended to function as a general public space for community members. This finding makes flexible streets different from Complete Streets and Shared Street Spaces, as these kinds of streets, although designed to be for more than just cars, are still fundamentally viewed as transportation conduits (Gilman, & Gilman, 2007; McCann, 2005). Woonerven are slightly different as they are primarily intended as a ‘front yard’ – or ‘living yard’, for the residents who live alongside, but are still accepted as a conduit for occasional vehicular traffic (Reid, 2015). The gathering space aspect of flexible streets is more akin to Open Streets, in which the street itself becomes a public gathering space where events can take place (Hipp et al., 2014). With flexible streets, it was found that the street is designed to easily be shuttered to vehicular traffic in order to create a public gathering space for events, celebrations, or simply to have increased public space available for a period of time. Further, this study determined that flexible streets involve designing the streetscape in a manner that allows for adjacent businesses to branch out into the space for patio seating or retail display - even when the roadway is open to vehicular traffic.

Lastly, a component of the flexible streets concept that makes it a distinct approach is that, as the name suggests, the design involves a level of flexibility. The flexibility of a flexible street is achieved through modular design features that can support a variety of uses. For example, a common

design feature employed in these projects are bollards that can be moved to either delineate parking spaces or pedestrian (sidewalk) space or removed entirely for larger public events when the entire roadway is closed to vehicles and open for pedestrians. This is unlike the other concepts, in which the design is static and intended support all uses constantly. Although also prioritizing all road users, the other design concepts are not intended to morph easily to support a different use – such as an event space for a national holiday. Flexible streets are distinct in that they are designed to be reconfigured often based on demand for potential uses. The flexible streets concept has proven a unique approach to streetscape design that is transportation-focused while also supporting the need for attractive public spaces. During the weekdays, a flexible street could operate as a shared space for cars, pedestrians, and cyclists to travel through the municipality. Due to the flexibility in use, on weekends parking spaces could be changed into restaurant patio space or the entire roadway could be closed to traffic and morphed into a public plaza-like space for community events.

5.3.3 Importance of Distinguishing Flexible Streets for Planning Professionals

The streetscape design concepts – Open Streets, Woonerven, Shared Street Spaces, and Complete Streets, have all been widely implemented. Stemming from their implementation are numerous positive findings, especially in terms of increasing safety by slowing vehicular speeds and reducing traffic collisions (Collarte, 2012; Canin Associates, 2014), the promotion of increased physical activity (Cohen et al., 2016), and facilitating a stronger sense of place (Karndacharuk, Vasisht & Prasad, 2015). As the flexible streets concept shares many similar aims as these design concepts, the successes that have arisen from these previous projects can provide rationale for this newer design approach being implemented in communities. Although unique, the flexible streets concept is not the first attempt to redesign a roadway to serve all modes equally or to facilitate more public space. Thus, despite the lack of research on the outcomes of flexible streets projects specifically, prior research on outcomes of related design concepts can serve as evidence of the viability of non-traditionally designed streets. Further, the contemporary perspective on roadway design is more so focused on ensuring that the design fosters more efficient multi-modal transportation (Shaheen, 2014). This suggests an institutional shift towards implementing roadways that support various functions within the immediate community, which will help to facilitate the continued implementation of flexible streets

As this study indicated, flexible streets policies have mobilized initially from Shared Street Spaces in the United Kingdom and then within the province of Ontario. The flexible streets policies

examined in this study were not directly transferred, rather, aspects of existing projects are aggregated and mobilized elsewhere. This is likely due to the context sensitive perspective generally encouraged for contemporary roadway design (Shaheen, 2014). Flexible street projects are context sensitive as each municipality and the surrounding area of a roadway is unique requiring specific design details.

The mobilization of flexible streets suggests that a range of municipalities – larger cities and smaller towns, have an interest in altering the built environment and move away from auto-centric streets. Having all been proposed in the last half-decade, the flexible streets included in this study indicate that municipalities are increasingly seeking new approaches to roadway redesign. Drawing inspiration from previous projects in Ontario and internationally, municipalities appear receptive of ideas that see streets significantly altered to support multi-modal transportation. Thus, professionals in the planning realm ought to be interested in new approaches to monitor the viability for implementation in other places as well. Despite the recent uptick in municipalities creating policies for flexible streets and initiating subsequent construction projects, it will take time to evaluate how the spaces are used by community members.

Professionals in the urban planning field ought to become interested in this new approach to streetscape design as there is a larger movement championing multi-modal transportation and viewing streets as public spaces in lieu of transportation conduits for vehicles. Knowing the specifics of the flexible streets concept is beneficial in operationalizing contemporary transportation planning and design ideals. In conclusion, the successes of past non-traditional streets, the overall movement of urban design authorities towards facilitating improved multi-modal transportation on streets, and municipalities adopting policies for non-traditional roadways has created an environment where new approaches to streetscape design will be well-received. Flexible streets are; therefore, another means of designing a public right-of-way that adequately supports transportation modes beyond the personal automobile.

5.4 Contribution to Urban Design Theory & Practice

Urban design is a practice within city planning that emerged in the United States in the 1950s and 1960s (Southworth, 1989). An influencing factor of the methods and goals of urban design are in response to the failures of federal urban renewal projects in the mid-20th Century “that often demolished too much of the city, leaving a barren urban landscape with no sense of place or community” (Southworth, 1989 p 369). At this same time, urban design also became an independent academic discipline and area of research (Araabi, 2018). However, despite the “distinguished

academic boundaries for urban design, practitioners are often involved in both architectural and planning projects” (Araabi, 2018 p 223-4). This combination of professional designations has influenced the perspectives on the practice of urban design. Based on the architectural tradition, the practice of urban design is “a creative process giving physical form to public spaces and is mainly, if not solely, done by the designer” (Araabi, 2018 p 210). The influences of urban planning see urban design practice as more procedural decision making, with the designer taking on a role that bridges collaborative efforts and research (Araabi, 2018). Lastly, theory within urban design denotes a means to understanding the urban form and the affects it has on a given society, being descriptive instead of prescriptive (Araabi, 2018).

The work of Araabi (2018) distilled the gap between theory and practice in urban design, as both aspects are not always operating synergistically. This research attempts to bridge the gap as it contributes to the academic body of literature regarding streetscape designs. At the same time, this research lends to design practice as it communicates specific design and planning details that comprise a conceptual framework for designing a street to achieve a specific outcome. Based on the research of this study, flexible streets were found to represent an emergent phenomenon in which streetscapes are intentionally designed to be modular in nature to support the variety of users and a host of potential uses.

5.4.1 A Distinct Urban Design Theory & Practice

This research contributes to urban design theory as it provides for an understanding of a practice - flexible streets, that is actively being implemented by practitioners. The design approach along with how it is currently justified, rationalized, conceptualized in Ontario municipalities is articulated through this research. This research aided in explaining the flexible streets concept implemented in practice and connecting it to existing knowledge in urban design. Flexible streets were found to be a distinct design concept, as detailed in Section 5.3, above. However, flexible streets are not a completely new idea. The concept borrows heavily from previous design concepts, especially Shared Streets and Open Streets. A lot of the design features like the curbless-cross section, use of bollards, and reprioritization of space is akin to the Shared Streets concept (Prelovskaya & Levashev, 2017). Yet, flexible streets were found to embody the purpose of Open Streets in using the streetscape as a vast public space and for pedestrians to meander and for community events (Chaudhuri & Zieff, 2015). Flexible streets combine aspects of well-established street design concepts that have been developed over time and are well-regarded in urban design theory and

practice. In addition, flexible streets are reflective of the larger movement within urban design towards flexibility in physical designs and in the mindset of practitioners.

5.4.2 Emphasis on Flexibility in Urban Design

The results of this study highlight a movement within urban design practice and theory. This study revealed a conceptual framework for designing a streetscape based on specific aims to achieve a space that can support diverse modes of transportation and uses. Very clearly – in name and intention, the flexible street design approach embodies the move within urban design that is championing flexibility. This emphasis on ‘flexibility’ in urban design is two-pronged, in one sense, the push for flexibility is in regard to how a designer thinks through problems and plans. As well, the call for flexibility is also intended for the actual design features implemented in the built environment. There is interest in both urban design theory and practice incorporating flexibility.

Flexibility in the designer’s own method is a more recent aim in urban design (Duarte & Beirão, 2011). The aim is for designers to produce plans that have the flexibility for future designs and changes to be made with more ease throughout the design plan’s process (Duarte & Beirão, 2011). Traditionally, urban design plans were “developed following methodologies aimed at the production of a single layout representing a rigid, definite solution” (Duarte & Beirão, 2011 p 879). However, considering the complexities of contemporary urban societies, a more flexible approach to urban design is now necessary (Duarte & Beirão, 2011 p 879). Overall, there is now support for taking a flexible approach to tackling urban design projects.

Recently there has been a willingness from traffic engineers and the organizations issuing the design manuals to allow for flexibility in the application of roadway specifications (Toth & Goater, 2015). In the United States, this has been evidenced by the organizations closely associated with urban design and planning matters like the American Association of State Highway and Transportation Officials (AASHTO), National Association of City Transportation Officials (NACTO), Institute of Transportation Engineers (ITE), and the Federal Highway Administration (FHWA) officially express support for practitioners incorporating a flexible approach to public facility design (Federal Highway Administration, 2013). Since 2011, NACTO has published street design guides that provide flexibility to cities interested in building context-sensitive streets (NACTO, n.d.). Other design guidelines by the AASHTO, NACTO, and ITE have been formally recognized by the FHWA as ensuring a level of flexibility in designing facilities for all road users that are safe and enjoyable (Federal Highway Administration, 2013). This is a clear change from the

traditional approach to street design which involved rigidly following numerical design parameters (Shaheen, 2014). Changes to the AASHTO's *A Policy on Geometric Design of Highways and Streets* (the 'Green Book') were made in order to "encourage the design of roads that are more in line with the social, economic, and environmental needs of communities" (Toth & Goater, 2015). Overall, there is support – and encouragement, for practitioners to incorporate flexibility into their personal approach to designing public spaces.

Within urban design practice and theory, there has also been the move towards designing spaces to be modular in form. Internationally research has been undertaken about the universal design of public facilities, with particular focus on building facilities and environments (Siu & Wong, 2015). An example is a public pavilion in China designed with modular spaces and features that the public can interact with or alter (Wang, Yan, Xie, and Fu, 2019). Similar to the planning profession's acknowledgment of the importance of streetscapes, within urban design there is an understanding that "in addition to meeting transportation needs, streets are frequently used as social spaces for meeting and gathering and for engaging in commercial, cultural and political activities" (Siu & Wong, 2015 p 589). The design of flexible street furniture – including signage, bollards, seating, trees, guardrails, tactile ground surface indicators, and garbage bins, has become "one of the most important considerations for meeting the diverse needs of the community as a whole and satisfying the needs of different groups and individuals" (Siu & Wong, 2015 p 617). Street furniture design is important as this study found specific street furniture items to be a key design feature of flexible streets. Further, these items were intended to aid in the flexibility of the streetscape, making this important for ensuring the spaces be flexible for different users and uses. Lastly, data in this study highlighted that street furnishings, especially public seating and trees, were deemed desirable design features by residents. This demonstrates the importance of designing street furnishings – and streets in general, to be flexible to help meet the needs and wants of the public.

Thus, "flexibility is no longer simply equal to 'multi-function' or 'bend', but is a key to meet diverse and continuously changing urban needs: the need to improve the visual appearance of environment and represent the image of city; the need to change the function of street in fast and low-cost way; the need to facilitate the management process; and the need to ensure the safe, universal and sustainable use of street furniture" (Siu & Wong, 2015 p 618). Flexible streets, as detailed in this study, are part of the change that is seeing streets evolving "from serving fixed and limited needs to fulfilling more diverse and dynamic functions" (Siu & Wong, 2015 p 618). Flexibility in urban design projects is a more recent perspective shift as "with the rising public expectations of a better living

environment and streetscape, it is essential to design street furniture that is sufficiently flexible to serve various, diverse and changing needs” (Siu & Wong, 2015 p 618).

5.5 Downtown and Main Street-like Location of Flexible Streets

The data indicated that flexible streets are being proposed and implemented in the formally delineated downtown area of municipalities. In combination, the objectives of flexible street projects – events capacity, modal equality, street space for businesses to use (patios), plus the strategies guiding these projects suggest that flexible street projects are used as a means to encourage the community’s interest in the downtown area. Until World War II, the Main Street of a municipality served as a social and commercial hub for the surrounding community (Toth, 2014). In recent decades, Main Streets have dwindled due to the proliferation of suburban development, shopping malls, big box stores, and online shopping (Alter, 2020; Toth, 2014). Other challenges faced by Canadian downtowns were rising real estate values, increased rent, and increased property taxes (Alter, 2020). In turn, the revitalization of Canadian downtowns has been a concern for planners and municipal governments, due to dwindling public funding yet the continued need for upkeep and development (Janigan, 2013).

Based on findings from this study, flexible streets are being implemented in the areas where Main Streets used to thrive. It suggests that Main Streets-type roadways – typically the principal street of a downtown, flanked by various residential, retail, dining, commercial, and civic uses (Toth, 2014), are influential in facilitating a flexible street. The other street design concepts have been relegated to different street types. For example, a Woonerf is intended to be applied to residential streets (Collarte, 2012) while Shared Street Spaces can be applied to both residential and commercial street types (Collarte, 2012). Open Streets can be carried out on many types of urban thoroughfares but are not permanent fixtures. Lastly, Complete Streets are applied widely. Complete Streets can be implemented on busy urban arterial streets with a variety of public transportation modes, along with space for bicycles, pedestrians, and private automobiles (Hui et al., 2018) or, on rural roads where a paved shoulder acts as space for pedestrians and cyclists (McCann, 2005 & Hui, 2018). The implementation of flexible streets on Main Street-type streets in the downtown of a municipality further distinguishes the concept as unique from other existing concepts.

One project in this study, Sackville Street, was an outlier to this finding as it was implemented outside of the official downtown area. It was noted that the Sackville Street project area is surrounded by downtown-like land uses such as retail, restaurants, civic institutions (public

library), and housing. This suggests that for the flexible streets concept, it is the mix of land uses surrounding that have an impact. Public feedback indicated that community members wanted the street space to be surrounded by viable businesses, which would act as an additional draw to the area. Thus, it is of key importance that the flexible street project be surrounded by land uses that can make use of the increased space, either for expanded patios or retail space, or by facilitating community events.

5.5.1 Implications of Public Space Projects

As Canadian downtowns and Main Streets declined in the second half of the 20th Century, renewal efforts began in the 1980s and continue presently (Canadian Urban Institute, 2013). Such revitalization is ongoing as many “downtowns are economically and geographically efficient places to absorb new [population] growth” (Canadian Urban Institute, 2013 p 21). There is a growing preference to locate in a downtown area to be closer to work, walk to access necessities, have more opportunities for recreational activities and entertainment options (Canadian Urban Institute, 2013). The focus on revitalization is because downtowns “play a critical role in offering this increasingly desirable ‘urban’ living environment to future generations” (Canadian Urban Institute, 2013 p 21).

The proliferation of flexible streets is an instance of the larger “revival of urbanity with an emphasis on urban form and resurgence of mixed-use places, and investment in urban infrastructure such as urban transportation, public space, smart technology, and so on” (Mehta & Bosson, 2018 p 1). With this, there has been particular interest in the role that streets play in affecting the quality of public space and social life (Banerjee, 2001). The focus on revitalizing public space “has translated into a growing desire for public life, albeit consumptive, visible in increasing street side cafes, restaurants, and also other pop-up destinations and the rethinking of the street as a friendlier place for bicyclists and pedestrians” (Mehta & Bosson, 2018 p 2). Prior research has indicated that “there is an increasing trend of a café culture especially with the younger urban population and the retirees who are returning to city life with the means to consume and be in public space” (Heath 2016; Massis 2015 ref in Mehta & Bosson, 2018 p 1). Results from this study found that a considerable want of community members was for the expansion of existing café patios or the increase in restaurants situated within the vicinity of the flexible streets.

Design aspects such as street trees for shade, sidewalk widths, articulation of building facades, and street furnishings “have also been associated, either through empirical research or anecdotally, with creating streets that support social behaviors” (Mehta & Bosson, 2018 p 11).

Ideally, public rights-of-way are able to facilitate a variety of uses by many different people (PPS, 2016). It has been demonstrated that streets have “the structure and capacity to be a complex public space—an interchange for access, travel, commerce, leisure, sociability, and survival” (Mehta & Bosson, 2018 p 12). Yet, prioritizing the physical aspects of the street and mobility “is insufficient as it disregards other social, political, and economic roles of the street” (Mehta & Bosson, 2018 p 12). Since “public spaces harbor so many uses and users—or fail to do so—they are also where a staggering cross-section of local and global issues converge” (PPS, 2016).

The planning process itself – even placemaking practices - often replicates inequalities and is exclusionary (Koh, n.d.). Thus, it is important to question revitalization efforts or large-scale public space projects, such as flexible streets, through a critical lens. In terms of aims to ‘activate public space’, often the people who are already active in those spaces are forgotten and may not have another place to go (Koh, n.d.). In other instances, the needs of those outside the immediate scope of particular public infrastructure projects may be disregarded. For example, consider the pedestrianized plazas and expanded bike lane network promoted under the Bloomberg administration in New York City – these European design trends “may not register as a priority for poor New Yorkers of color who have more pressing needs: housing, employment, education and poverty alleviation” (Trujillo, 2016).

Planners and urban designers are influential in perpetuating “particular visions of the good life that are often coded in racial and class terms—sipping a craft cocktail at a sidewalk cafe versus brown bagging a forty on the corner” (Koh, n.d.). This “ability to define an activity as desirable or undesirable, or define a ‘great place’ or a ‘sketchy place’ is a form of power that planners exert unthinkingly” (Biddle, 2014 ref in Koh, n.d.). Such renderings of these visions of good public life have troubling and far-reaching consequences. Namely, gentrification, which typically causes a myriad of issues.

Revitalization efforts can, and do, end up being agents of gentrification (Kennedy & Leonard, 2001). The term gentrification describes,

a process of neighborhood change that includes economic change in a historically disinvested neighborhood — by means of real estate investment and new higher-income residents moving in - as well as demographic change - not only in terms of income level, but also in terms of changes in the education level or racial make-up of residents (Urban Displacement Project, n.d.).

The impacts of gentrification have changed over time, “gentrification is no longer about a narrow and quixotic oddity in the housing market but has become the leading residential edge of a much larger

endeavour; the class remake of the central urban landscape” (Smith, 1996 p 39 qtd in Doucet, 2014 p 126). A particular issue with public spaces is that “consumer taste for gentrified spaces is, instead, created and marketed, and depends on the alternatives offered by the powerful capitalists who are primarily interested in producing the built environment from which they can extract the highest profit” (Gotham 2005, p. 1114 qtd in Doucet, 2014 p 127). It is a phenomenon in which the effects are viewed by some as a good thing, while others assert that it is harmful (Chong, 2017). In the past, alterations to streets – such as adding bike lanes, although intended as a means to expand the network for active transportation modes and promote environmentally-friendly transportation options, have been associated with gentrification (Dooling, 2009; Quastel, 2009; Checker, 2011; and Immergluck & Balan, 2017). The call to make more environmentally friendly lifestyle choices has spurred gentrification “as middle- and upper-income residents reject classic forms of suburbanization in favor of residential choices that afford them access to low-carbon infrastructure and mixed-use urban density” (Rice, Cohen, Long, & Jurjevich, 2019 p 2). In turn, it has been ascertained that in areas of existing or increasing wealth there is a partiality towards increased public investment in cycling infrastructure (Flanagan, Lachapelle, El-Geneidy, 2016). This highlights a potential risk of flexible streets, which is that they become a force of gentrification and displace surrounding businesses and alienate the public space from some members of the community. Overall, implementing flexible streets are perceived to cause some undesirable traffic consequences and have the potential for causing harm via gentrification.

5.6 Equity of Public Space

The intention of designing a streetscape that is of equitable usability for all types of users was determined as a key aim of the flexible streets concept. In terms of equality, the data indicated that users with disabilities were explicitly mentioned, and design features intentionally chosen to improve the street experience for users. Specifically, pedestrians with visual impairments were identified as a critical consideration for the flexible street’s design. This is also an issue raised through the literature, which is concerned with the experiences of those with disabilities in public spaces (Syaodih & Aprilesti, 2020; Edwards, 2009; Havik, Melis-Dankers, Steyvers & Kooijman, 2012; and Keeffe, Lam, Cheung, Dinh & McCarty, 1998). Prior research has found that many people who have a disability experience more difficulty in traversing the built environment as public spaces are often not accessible (Syaodih & Aprilesti, 2020). Further, certain changes to streetscapes purported as forward-thinking are not actually inclusive to those who have a disability (Edwards, 2009). This indicates that

just because a project may appear forward thinking – such as a flexible street, it does not mean that all community members are necessarily benefitting.

The Shared Street design approach was demonstrated to hinder the ability of people with visual impairments to safely navigate through the space (Havik, Melis-Dankers, Steyvers & Kooijman, 2012). As the results of this study indicated, the flexible street concept was born out of the Shared Street approach, these streetscape design concepts share key characteristics, namely the curbless cross-section and intention for users to share the space. Recommendations were made to help remove impediments for the visually impaired, which stemmed from the lack of curbs or other tactile cues along the roadway, insufficient guidance paths, and absence of delineated parking spaces (Havik, Melis-Dankers, Steyvers & Kooijman, 2012). The recommendations to create shared spaces more conducive to those with visual impairments were found to be addressed by the flexible streets approach. Despite being curbless, flexible streets entail the use of tactile surfaces and designated parking areas – factors that are determined to aid those with visual impairments navigate themselves or with guide dogs. All intersection and mid-block crossings were demarcated with tactile cues and the use of bollards also helps in creating a sense of comfort space away from vehicles.

Thus, it is an outstanding finding that for some flexible street projects it is explicitly mentioned that the project aims to facilitate the safe and enjoyable use by those with impaired vision. The use of tactile walking surface indicator (TWSI) plates is one way that the design approach has considered all future users of all abilities as it helps those with visual impairments safely and independently navigate public spaces, which is noted as important (Keeffe, Lam, Cheung, Dinh & McCarty, 1998). It is important that the intention of equitable use by all users including people with all disabilities is expressly acknowledged and attempts made to make public spaces accessible. Results of this study did not indicate an explicit mention of design considerations made for equity-seeking groups beyond those with visual impairments. Of course, groups other than those with visual impairments also face challenges navigating public rights-of-ways and ought to be considered for inclusion when designing public spaces. Given this study's results and findings from other research, flexible streets have the potential to be a fully equitable approach to streetscape design that considers the abilities of users and what is needed to make the space accessible for all.

5.7 Are Flexible Streets Great Streets?

The framework put forth by Allan Jacobs in *Great Streets* (1993) is widely used by urban designers to assess the success of a streetscape, or to determine what will make a streetscape great.

The requirements and contributing qualities of Great Streets will be used as an evaluative framework for understanding the design features selected for the flexible street projects in this study. This will help to legitimize the design features of flexible streets based on prior research and best practices. The following is a qualitative assessment of the flexible streets concept based on the design features employed and the intended functioning of the streetscape.

5.7.1 Places for People to Walk with some Leisure

As initially indicated in the descriptions of the proposed streetscape projects, flexible streets are premised on being places where all road users can share the space. This means that the street environments are specifically designed to improve the experience of pedestrians. Many of the design features used for flexible streets were about enhancing the pedestrian experience, in particular – narrowed traffic lanes, which translated to wider sidewalks, mid-block cross overs, and tactile paving treatments. These are significant streetscape changes that endeavour to make the street more viable for leisurely walking.

5.7.2 Physical Comfort

Physical Comfort can be achieved through features that protect individuals from the natural elements (Jacobs, 1993). Trees were introduced and enhanced along the flexible street project areas. As Jacobs notes, trees are important in providing physical comfort as they provide shade during sunny summer days and some protection from wind and precipitation during other parts of the year (1993).

5.7.3 Definition

The edges of a street – the building frontages and roadway surface, contribute to the Definition of a street (Jacobs, 1993). A major aspect of this requirement is the building height-to-street width ratio, which is ideal at a ratio of at least 1:4 (Jacobs, 1993). This study did not perform any observations of the flexible street project areas nor did the plans and design for the projects discuss this matter. Thus, the building height-to-street width ratio is unknown. However, a key component of Definition is the ‘floor’ of the street. The flexible street projects all entailed significant changes to the entire surface between building fronts, clearly defining the street space. Street trees and planters lining the right-of-way also help to define each flexible street, as these are features Jacobs identified as contributing the definition of a street (1993).

5.7.4 Qualities that Engage the Eyes

Qualities that Engage the Eyes of street users are achieved through moving surfaces – such as trees or signage. Due to the downtown and Main Street-type areas that flexible streets are implemented on, the surrounding mix of uses and signage can be considered as contributing to visual complexity. Further, flexible streets add to engaging qualities as they include tactile and coloured or patterned paving treatments as well as trees, which all add additional visual interest. Having more patio areas and merchant displays moved out into the streetscape for people while maintaining calmed vehicular traffic also are qualities that engage the eyes.

5.7.5 Transparency

This has to do with windows, doors, and evoking interest in what is going on inside the buildings (Jacobs, 1993). As the flexible streets are all within downtown neighbourhoods on Main Street-type streets, there is a lot happening along the streets. It can be argued that as flexible streets endeavour to provide sidewalk space for restaurant and café seating and opportunities for merchants to use the space, it contributes to the transparency by allowing people on the street some inkling of what kinds of places are operating along the street.

5.7.6 Complementarity

The design of the road surface is a significant force of the complementarity of the flexible street projects. The data in this study suggested that a main design aim of each flexible street project was to create a cohesive street space communicated through design features and overall themes. Otherwise, the scope of this study did not lend to investigating the design details of the buildings flanking each flexible street. Thus, no conclusive claims on this matter can be made.

5.7.7 Maintenance

The maintenance of a street involves both the cleanliness and rate of vacancies as well as the state of repair of the design materials used. This requirement of a great street is not able to be commented on as in-person observations were not part of this study's scope nor are all the flexible street projects completed as 2020. Further, the plans and policies assess for this study did not include commentary on how the street space would be maintained post-completion.

5.7.8 Quality Design

The design of flexible streets is clearly of high quality. The details demonstrate a distinct design treatment and careful consideration of how the streets' design features can facilitate the intended future uses. As flexible streets are intended as multifunctional spaces, the workmanship and materials intended for the construction of the project were of a quality to ensure this. Overall, the flexibility of the space via modular design features, the details like coloured and tactile paving surfaces, and overarching design themes like the use of river rocks as public seating are evidence of design detail and quality.

5.7.9 Qualities That Contribute to Great Streets

Additional qualities that make for a great street are outlined by Jacobs (1993). These qualities are Trees, Beginnings and Endings, Many Buildings Rather Than Few; Diversity, Special Design Features: Details, Places, Accessibility, Density Helps, Diversity, Length, Slope, Parking, Contrast, and Time. Again, as this study did not seek out information about the surrounding land uses or designs of the structures surrounding the flexible street project, some of these contributing qualities cannot be definitively assessed as a contributing quality. Due to the scope of this study, the qualities of Slope and Density Helps cannot be commented upon.

In terms of Trees – majority of the flexible streets included street trees and other plantings, which, as identified by Jacobs (1993), provide oxygen, shade, and protection from lanes of vehicular traffic. There was no explicit mention of features – gates, fountains, or special buildings, that serve as the Beginnings and Endings to flexible streets (Jacobs, 1993). However, the use of patterned and tactile paving treatments used for flexible streets provide visual and sensory cues about where the street begins and where it ends. The diversity and number of buildings along a street are a contributing factor to Great Streets as their uniqueness provides interest (Jacobs, 1993). The downtown-type areas that flexible streets were found to be implemented within are understood as mixed-use areas with different building types and a variety of businesses, meaning that there is Diversity in uses and are Many Buildings Rather Than Few.

When it comes to Special Design Features: Details, Jacobs explains that “details are the special seasonings of a great street” (1993 p 301). It was identified that flexible streets utilize many of the design features that are considered important for a street - benches, tree canopies, paving treatments, and lights were included in the design plans for the projects. The existence of Places – a clear ‘break’ located along a street like a plaza or park (Jacobs, 1993), were not noted in any of the

flexible street project designs. The flexible street concept does not expressly preclude the possibility for small parks or plazas to be situated adjacent to the streetscape. The Accessibility of the street - ensuring that all users can easily get to the street and that the street facilitates the unimpeded movement of users to locations along it and beyond it, is a contributing quality (Jacobs, 1993). Flexible streets are predicated on equalizing the priority hierarchy of users by making ample space for all types of users. The use of tactile paving surfaces and the curbless cross-section of flexible streets further adds to the Accessibility of the space for disabled persons who may use mobility aids or those with visual impairments using navigational aids. The Diversity of uses situated along a street is also a contributing factor that makes certain streets superior (Jacobs, 1993). This study did not explore the surrounding land uses of each flexible street; however, the finding that flexible streets are implemented in downtown Main Street-type areas suggests that there is a diversity of uses along flexible streets. The objectives to enhance opportunities for nearby businesses highlights that flexible streets are intended for areas that are already flanked by a diversity of uses. Further, the streetscape itself is intended to facilitate a diversity of uses.

When it comes to the Length of the street, Jacobs does not provide a definitive minimum or maximum, rather it is about ensuring the entirety of the street is interesting (1993). Flexible streets were found to be a variety of lengths, as each project is context sensitive. Due to the design themes and features employed along flexible streets, the spaces are made interesting. This also lends to the Contrast of flexible streets in comparison to traditionally designed streets. The curbless cross-section of flexible streets are considerably different from traditional streets while the design themes and features give the spaces a special feel. Parking along the flexible streets was a contentious issue as evidenced by the public feedback on the topic. Parking spaces were maintained along the flexible streets and could also be used as additional pedestrian space, or space for a restaurant patio or retail display. Thus, flexible streets are not necessarily inundated with parking spaces, which is a positive contribution towards a great street (Jacobs, 1993). Finally, the matter of Time – streets with a vast history and numerous iterations of surrounding land uses are deemed most desirable (Jacobs, 1993). The flexible streets included in this study are relatively new, with two completed in 2019 and the remaining three nearing completion for the end of 2020 or early 2021. Despite the newness, these streets can still be great according to Jacobs (1993).

5.8 Streets as Public Spaces Post-2020

In the midst of conducting research and compiling information for this thesis, significant shifts on the local, national, and global scale occurred. These shifts have fundamentally altered ideas around public space and how people experience public space. The year 2020 has been wrought with challenges and occurrences that have affronted the status quo of how societies have been carrying on and how planning practices have been carried out. In this past year, of particular significance pertaining to public space is the COVID-19 global pandemic and the resurgence of the Black Lives Matter (BLM) movement.

5.8.1 Impact of the Global Pandemic on Street Design

The onset of the COVID-19 pandemic spurred a global reckoning of space, specifically public space, for people has been made far more urgent than previously. When the COVID-19 pandemic was first a significant threat in Canada and the United States. People were relegated to their homes and public health measures were communicated to the public. A particularly staunch directive was to keep a 2-meter (6 feet) distance between each other while outside of the home. Quickly, it became apparent that urban centers in Canada and the United States were not constructed to facilitate any sort of distancing measures for this public health crisis.

Meli Harvey – a planner and architect in New York City, created Sidewalk Widths NYC at the onset of the coronavirus pandemic in March of 2020 (Moynihan, 2020). The interactive project allows viewers to see which of New York City’s some 13,000 miles of sidewalks are wide enough for proper social distancing (Moynihan, 2020). The Sidewalk Widths NYC revealed that, in fact, many of the city’s sidewalks – primary pedestrian transportation conduits, are not wide enough to facilitate safe social distancing (Moynihan, 2020). While the lack of space for people in public was suddenly being grappled with, urban streetscapes became the center of focus.

Despite lockdown orders and suggestions, it quickly became apparent that essential works still needed to commute, and people still needed to venture out for essential supplies (Bliss, 2020). Hence, urban streets were as important as ever. In order to combat this, local governments rapidly took action to facilitate the safer movement of people by “striping new bike lanes, retooling traffic signals, suspending transit fares, closing some streets to vehicle traffic, and taking other temporary transportation measures” (Bliss, 2020). In early April of 2020, a handful of large cities – such as Portland, Minneapolis, and Calgary, had “temporarily stopped or limited access to vehicles on certain corridors in order to help walking, biking, and outdoor respite-taking happen in accordance with

social distancing guidelines” (Bliss, 2020). Many other cities have followed suit with closures on streets in Boston, Berkeley, Calif., and Oakland (Diaz, 2020). Globally, there was a call for wider sidewalk space and cities like Bogotá, Mexico City, and Berlin expanded cycling networks to create more space for bikes, which had become a popular transportation mode during pandemic-riddled times (Bliss, 2020).

Popular voices in the urban planning realm, like Janette Sadik-Khan, have publicly lamented that some “Covid-19 emergency actions could serve as testing grounds for more lasting change, and that in a few cases, cities could make them permanent” (Bliss, 2020). A proponent of the ‘new urbanism’ movement, Jonathan Berk, spoke highly of the potential for future public space and street redesign for a less auto-centric urban environment (Diaz, 2020). The general sentiment about the COVID-19 pandemic’s impact on public space was that it served as a means in “showing urban residents what’s possible when you have this ‘blank canvas’ of street space to utilize for walking, biking, running, playing games with neighbors and just enjoying as a new, public neighborhood open space” (Diaz, 2020). Well-known Canadian urbanist, Brent Toderian has also spoken extensively about how COVID-19 has impacted planning practices moving forward. One of the main points he has made is that “the pandemic has revealed for everyone what some of us have been struggling with for a long time: Cars have taken up so much space. There’s not a lot of room left over for people” (Roberts, 2020).

The flexible streets concept is important to consider within this new context as the design approach is predicated on the express objective to make streets into viable public spaces. COVID-19 has forced the re-consideration of how cities are planned-out and how much public space can be available. Major cities like Toronto have been pressured to re-think the design of streetscapes as it is now clear – with sidewalks crowded with pedestrians and cyclists without designated bike lanes while streets are virtually empty of cars, that auto-centric design is failing communities for a host of reasons (Alter, 2020). The design of a flexible street supports the new need for social distancing, outdoor dining space, and an entire pedestrianized plaza-like setting if need be. Moreover, the flexible streets concept allows street space to easily be maneuvered into expansive public space. This could help in avoiding slow-moving highly politicised process that made it initially difficult to make necessary space for pedestrians, like experienced in Toronto in the early days of the pandemic (Bozikovic, 2020).

5.8.2 Urban Streets as Sites of Racial Injustice

Another significant moment in 2020 has been the re-ignition of the BLM movement. The movement has long advocated for the Black community who have been disproportionately targeted, and murdered, by police officers (Amnesty International, 2019). In 2020, the BLM movement was reignited once again following the deaths of George Floyd and Breonna Taylor by police officers. This resurgence in the BLM movement saw people questioning embedded racism in more than just American and Canadian police forces, people also began reflecting on how racism has influenced other parts of contemporary society – namely the planning profession and how racialized people experience public spaces.

As Sandberg & Rönnblom pointed out, norms and values of the past have impacted spatial planning practices, which have continued influence on how an individual is viewed and moves through a city (2016). It is no secret that Black, Indigenous, and people of colour (BIPOC) have long been discriminated against through policies and laws stemming from racist beliefs. Looking specifically at the planning profession, racism has been perpetuated through planning in terms of ‘certain’ neighbourhoods being in closer proximity to environmental hazards, having a lack of security measures in place – or are over-policed, less access to transportation modes, more time spent travelling from a home to an employment center, and more difficult access to nutritious food in the neighbourhood (Threadcraft, 2015). Such “landscapes offer a whole scene in which certain material and discursive boundaries are constructed and seem stable, such that power hierarchies are evident and uncontested, and that particular arrangements of values, aesthetics and behaviour are considered normal or natural” (Lefebvre, 1991 qtd in Trudeau, 2006 p. 422). This calls into question who is making decisions about the planning and design of municipalities.

It is through the politics of belonging (and exclusion) in a society that “play a significant role in the production of social spaces such as landscapes and place” (Trudeau, 2006 p. 423). This has become a central focal point in contemporary times as the Black Lives Matter movements has further spurred reflections into all institutions in the ways they perpetuate racism and racist practices. The planning practice has begun to reckon its past participation in promoting racism. Through BLM, planners are now being asked to reflect on their perspectives and ‘who’ their designs and plans support. It has been made clear that public space is not a neutral space. Author and award-winning placemaker, Jay Pitter has detailed how “anti-Blackness is profoundly spatialized and clearly tethered to land use, amenity use, public space enforcement, safe streets, mobility and housing” (Pitter, 2020

p. 3). Pitter asserts that “the public realm and built environment are not simply a backdrop to the current civil unrest; urbanism has contributed to the racial inequities inciting it” (2020 p. 3).

The Complete Streets movement, which emerged in the early 2000s and was championed largely due to the dismal state of pedestrian and cycling infrastructure (McCann, 2005), is premised on ensuring that streets are designed to be safe for all road users (Hui et al., 2018). Yet, “the complete streets approach largely focuses on the physical characteristics of the street and continues to reinforce the myopic reading and understanding of the street as a conduit for movement where mobility is still the sacred objective, making travelers the main beneficiaries” (Mehta & Bosson, 2018 p 12). However, the approach is criticized for not being inherently safe for keeping all people safe via infrastructure alone (Ismail, 2020).

The Vision Zero safety plan has been adopted by many municipalities in seeking to reduce all injuries and deaths from traffic collisions in communities (Ismail, 2020; Trujillo, 2016). To address this aim beyond built environment modifications, often it is coupled with an increase in traffic enforcement to monitor dangerous behaviours (Ismail, 2020). This is problematic, particularly for BIPOC communities, as advocates of increased policing of traffic “ignore the fact that police already disproportionately stop drivers of color - and young Black men in particular - for the pettiest offenses: dark tints, cracked windshields, and rear-view mirror decorations” (Trujillo, 2016). More urgently, increased traffic enforcement programs are troubling as many documented police murders of Black people initially began under the guise of traffic enforcement (Ismail, 2020). Many reports in previous years have indicated the disproportionate impact that police brutality and discrimination have on Black communities (Maynard, 2018). Overall, by “encouraging increased ticketing in communities that are notably marginalized along the lines of race and class – because those are where the highest rates of vehicular death and injury are – plays a significant role in destroying trust and exacerbating inequalities” (Ismail, 2020). Many of these issues are also exacerbated by gentrification – as discussed previously in this chapter, as displacement and increasing criminalization made BIPOC to feel unwelcome in public spaces (Koh, n.d.). Deeply embedded racism and uncontested racist practices have precluded BIPOC from moving “freely through public spaces — whether driving, walking or just living” (Maynard, 2018).

In combination, the COVID-19 pandemic and the BLM movement have really highlighted the issue of public space. While too many have purported the ‘opportunity’ of COVID-19 in terms of more street space needed for patios and appropriate social distancing, what is forgotten by mainstream planners is that BIPOC do not experience the public realm as most white people do.

Keeping in mind that contemporary planning decisions will exacerbate visible and invisible boundaries for future inhabitants (Sandberg & Rönnblom, 2016), decisions made during COVID-19 to help slow the spread of the virus, will have lasting impacts. All of the ‘exemplary’ patio spaces and pedestrianized streets – although good planning projects, are typically still relegated to a select area of cities and thus more so ‘for’ selective groups of people. While downtowns are getting expansive patios, and larger sidewalks, in many cases, there are other neighbourhoods that are still lacking basic infrastructure (Badger, 2020). These events have forced everyone, especially those involved in city planning to re-think how public spaces can truly benefit all community members. It is critical to interrogate decisions about which infrastructure projects are implemented where in a municipality. In terms of flexible streets, this study concluded that these projects are constructed primarily in the downtowns of Ontario municipalities. It must be considered that innovative and exciting projects such as flexible streets may in fact be diverting attention and resources away from under-served neighbourhoods lacking adequate public infrastructure.

5.8.3 Significance for Planning Profession

It is harmful to continue viewing the COVID-19 pandemic as an ‘opportunity’ to live out long-desired pedestrianized streetscape uses (Butler, 2020). Viewing COVID-19 as an aid for planning practices – like more patio space, is dismissive of the fact that BIPOC communities have been hardest hit by COVID-19, with Black and Indigenous people in the United States disproportionately dying from the virus compared to all other groups (APM Research Lab, 2020). In Canada, similar findings have been made. Analysis by Toronto Public Health found “that people living in areas that have the highest proportion of low-income earners, recent immigrants and high unemployment rates had higher rates of COVID-19 cases and hospitalizations” (McKie, 2020). In Montreal North – an impoverished borough of Montreal, the community has been particularly hard hit by COVID-19 (McKie, 2020). A multiplex of intersectionality’s has led to BIPOC communities being disproportionately impacted by the COVID-19 pandemic. In turn, this has yet again brought to light the divides that the planning professional has facilitated by excluding BIPOC communities (Storring, 2020a). Specifically, as many cities across the world began to implement temporary programs or permanent changes to the streetscape to support social-distancing or outdoor dining in downtowns or affluent neighbourhoods (Storring, 2020b), other parts of those cities were left with inadequate infrastructure – even prior to COVID-19 (Badger, 2020). As the flexible streets in this study were revealed to be implemented in downtown areas, it is key to consider how only select

cohorts of a community may be able to benefit from this improved public space. Thus, potentially further driving divides experienced by BIPOC and communities with lower socio-economic status.

Acknowledging this disproportional reality is critical in moving forward in a truly meaningful way for future planning endeavours. Pitter states, in her open letter to Canadian urbanists, *A Call to Courage*, that “acknowledging complicity in systemic racism and harms enacted across time is overwhelming. However, an unnamed issue cannot be reconciled. Transformation cannot occur without radical truth telling followed up with courageous action” (2020 p. 3). The COVID-19 pandemic has demonstrated to all citizens that available public space is important for communities – something that many planners have known and championed for a long time. Specifically, city streets have been the focus area for how to make more space available to residents. This of course, relates to flexible street projects as they are urban streets and places intended to function as public spaces.

5.9 Public Perceptions of Changing Streetscapes

A large collection of public feedback was assessed for this study. Through this, perceptions about flexible streets were unearthed. The participants at public information sessions showed a lot of interest in the streetscape redesign projects for a number of reasons. The reasons included the potential for improved safety of pedestrians and cyclists amidst automobiles, establishing a sense of place for the community, and the opportunity to use the street space for community events. This suggests that communities are interested in innovative and different ways of designing public spaces that foster uses beyond simply a transportation route for automobiles. Many community members expressed excitement about potential opportunities for local businesses and for *people* to be able to use the space in their municipality. Such perceptions were reflected in the literature, especially the notion of streets acting more as public spaces than spaces for automobile (Kent, 2015). As well, the larger movements of increasing safety (Hui et al., 2018; McCann, 2005; Collarte, 2012; Gilman, & Gilman, 2007; PPS & Mobycon, 2017) and promoting more opportunities for physical activity and community events (Cohen et al., 2016; Chaudhuri & Zieff, 2015; Greene et al., 2017; Sarmiento, Torres, Jacoby, Pratt, Schmid & Stierling, 2010) evidenced by the impetus for the non-traditional design approaches referenced in this study.

Despite the overwhelming support of the streetscape redesign projects, there were concerns raised about changing how the given streets functioned. A concern raised by community members through public feedback was in regard to the potential for increased traffic on surrounding streets. As well, the availability of parking in front of businesses and the potential need to park on other streets

was a common concern about the streetscape redesign projects that was brought forth through public feedback. Due to the modular use, which may mean that the flexible street is shuttered to automobile traffic at certain times, and a calmed traffic flow, it is a likely reality that motorists will increase on other surrounding streets. This was a concern of community members, deemed undesirable for the individuals who live on surrounding streets and those who normally drive through the downtown. Thus, although creating a different public space in one area, there is the potential for unintended consequences for other spaces in the municipality.

Other concerns were about safety – namely, the dangerous interactions observed between automobiles and VRUs. Much concern stems from the reliance on automobiles. So many cities are auto centric and almost require that residents have a car to get around. Thus, this may be why there is such backlash and concern over the prospect of eliminating parking or traffic lanes, and temporarily closing the street to vehicles makes navigating more difficult for drivers. This of course, is not often the case as usually other modes of transportation are negatively impacted by the presence of automobiles, often with considerable safety implications (Vanlaar et al., 2016). As identified, there was support for flexible streets is due to the assumption of improved safety conditions for VRUs.

As discussed in Section 5.3.3, non-traditional roadway designs are gaining attention because of successful outcomes and changes to the AASHTO's *A Policy on Geometric Design of Highways and Streets* (the 'Green Book') that “encourage the design of roads that are more in line with the social, economic, and environmental needs of communities” (Toth & Goater, 2015). This has occurred more recently there has been a willingness for traffic engineers and the organizations issuing the design manuals to allow for flexibility in the application of roadway specifications (Toth & Goater, 2015). As noted, since the 1960s, design movements prioritizing safety and space for VRUs have been championed (Curl, Ward Thompson, & Aspinall, 2015; Collarte, 2012). This, in combination with the findings that make the design of flexible streets distinct, demonstrate that they are a genuinely unique approach to street design, not simply a fad.

5.10 Limitations and Areas of Future Research

Although this study made several findings about flexible streets, there were limitations that impacted the study. In the first phase of data collection, which involved determining a complete list of flexible street projects in Canada, a limitation was the possibility that some projects were not identified and ultimately not included in the list. There were no other viable alternatives to finding all flexible street projects in Canada – manually searching the municipal website of every municipality in

Canada for mentions of such projects would not have been a good use of time or efforts. The next limitation was that documentation for all identified flexible street projects in the study area could not be procured, thus some projects in Ontario were not included. Although able to provide solid data for analysis, a policy document can only provide so much insight into a project and ‘why’ certain aspects were chosen. The public feedback for the design of the projects was not comparable. This made it a challenge to analyze and communicate succinct findings. To combat this, the public feedback data was parsed out and like data sets were analyzed.

In terms of the research methods used, the limitations were as follows. First, it is important to note that throughout the analysis process, there is always the possibility of mistakes caused by human errors. These mistakes can be caused by the researcher’s personal bias, erroneously interpreting the data, or because of researcher’s fatigue (Bengtsson, 2016). As a means to increase the validity of content analysis, it is suggested that “at least two investigators should perform the analysis separately and then discuss their results and obtain consensus” (Bengtsson, 2016 p 11). This was not a possibility due to time and workload constraints during the time of research. Although having another investigator perform the analysis is a form of triangulation, an additional form of triangulation is to use a variety of different sources or methods for data collection to further confirm results (Catanzaro, 1988; Patton, 2002; Rolfe, 2006 ref in Bengtsson, 2016). For this study, different sources of data were included.

A last – and major, limitation of this study was the COVID-19 pandemic. Specifically, the onset of the pandemic precluded the use of key informant interviews as a data collection method for this study. The key informants would have been planners involved in the planning and policymaking related to the flexible street project in each municipality. Key informant interviews would have allowed for deeper explanations and data collected about the flexible street projects. Further, direct observation of how the flexible streets were being used would have led to a better understanding of how the concept is operationalized. However, due to the COVID-19 pandemic, travel was deemed a risky behaviour and observation of each flexible street in this study could not be conducted. Although, to note, observation would have been limited as most flexible streets investigated in this study were not planned for completion until the very end of 2020, the same time this study concluded.

An initial finding of this study was that there is a distinct lack of research about flexible street projects. Thus, there are many aspects available to examine through future research. This thesis focused on what the flexible streets concept is, where it came from, and how it has moved elsewhere. Future research on this topic should focus on the behaviour outcomes related to flexible streets. For

example, are people walking longer distances in the space? Are more people coming to the area for events? How have businesses been impacted? Generally, how are people using the space should be examined in future studies. Future research should also look at the experience of practitioners in implementing flexible street projects. For example, how is the concept being communicated to the public to garner support? What are the challenges in implementing flexible streets in light of engrained transportation practices and traffic engineering codes that may preclude this design? As well, what has proven successful in the programming of flexible street projects? Lastly, research on Flexible Streets in different localities should be conducted to further trace the policy mobility of the concept and to understand which projects are considered exemplary and why. This would assist in building an understanding of how flexible streets lend to public health, public safety, economic development, sense of place, and impact automobile traffic congestion on other streets.

5.11 Chapter Summary

This study was able to discern a variety of information about the flexible streets concept through analyzing a collection of flexible street projects in Ontario, Canada. The definition and description of a flexible street was determined through this study, which was then compared against established design concepts to highlight the uniqueness of the flexible streets approach. The results of this study also revealed that flexible streets projects are promoted by policymakers because such a design is expected to have positive impacts for the greater community – specifically, for creating a sense of place in the municipality, supporting local businesses, use as an events space, and make the roadway more equitable for all modes of transportation. It supported a discussion on streetscapes in light of the COVID-19 pandemic and the BLM movement in terms of how planning practitioners ought to approach public space projects in the future. Overall, previous research supports aims of flexible streets and highlights areas that may require more attention, such as ensuring continued inclusion of people with disabilities in the decision-making process. As flexible streets continue to emerge across Ontario – and elsewhere, more research needed to evaluate use, behaviour impacts, the extended policy mobility, and to determine how practitioners view implementation.

Chapter 6: Recommendations & Conclusion

6.1 Outline of Chapter

The purpose of this study was to discern knowledge about the flexible streets design concept. Through the findings of this study, a number of recommendations emerged that are aimed at planning practitioners. This chapter provides recommendations related to the implementation of flexible streets in Canada as these projects are more than just a transportation conduit and can be used to improve the surrounding area and community. The chapter concludes with a summary of this thesis and conclusions about this study.

6.2 Policy & Practice Recommendations

This study primarily endeavoured to determine what a flexible street project is comprised of and how the related policies have mobilized elsewhere. In addition, a number of objectives guiding the exploration of this research topic resulted in other findings about flexible streets. The following are recommendations based on the findings of this study.

6.2.1 Practitioners' Familiarity with Flexible Streets

The literature review identified the leading streetscape design concepts used in the move away from auto-centric roadways. Currently, the well-known concepts are the Woonerf, Shared Street Spaces, Complete Streets, and Open Streets. This study found similarities and differences between flexible streets and the established design approaches, which aided in distinguishing the flexible streets concept as a unique approach. This leads to the first, and quite obvious recommendation, which is for practicing planners from both public and private organizations to become familiar with the flexible streets concept and the examples of it being implemented.

While this thesis focused on a number of projects in the province of Ontario that implemented the flexible streets concept, projects constructed via this design concept were identified across Canada. Additionally, in looking at the mobilization of flexible streets, streetscape projects deemed inspirational – or particularly exemplary flexible street projects, were identified through this study. Since there are other completed flexible streets in Ontario and elsewhere in Canada, practitioners should make an effort to observe and learn more about how these projects are utilized and what was deemed successful.

Support for the move away from auto-centric design is gaining massive momentum. Prioritizing automobiles on roadways has had negative effects on the safety of pedestrians and cyclists (Rifaat et al., 2012; Vanlaar et al., 2016), and made it difficult – if not impossible, for those with disabilities to traverse the built environment (Syaodih & Aprilesti, 2020). The emergence of the flexible streets design approach has demonstrated that there is a viable way to continue the move away from auto-centric roadways, ensure equal usability by all community members of all abilities, along with supporting economic development and revitalizing the downtown.

Although at times problematic, there has more recently been widespread support from municipal leaders across Canada in altering the use of streetscapes to address social-distancing requirements necessitated by the COVID-19 pandemic. Cities like Guelph have shuttered entire swaths of streets to facilitate outdoor ‘dining districts’ to support downtown restaurants (CBC News, 2020). Other major cities across Canada have shut down streets to cars so pedestrians and cyclists could move about more freely (Forani, 2020). In the Waterloo Region, Council approved a motion to allow for temporary expansions of the cycling network amidst the pandemic (Brown, 2020). This indicates that there is currently – and likely moving forward, a need for streetscapes that can support social distancing and various uses.

By having familiarity with the flexible streets concept, planning and design practitioners will be better prepared to follow through with another obvious recommendation – that the flexible streets approach to streetscape design be applied to appropriate roadways. By knowing what flexible streets entail and the ways a streetscape could be modified for different uses, planners will be able champion the implementation in municipalities. This knowledge is important as planners working on Community Improvement Plans, Master Plans, or Area Plans could think beyond the land uses and transportation networks, to consider the details of the streets. Neighbourhoods could be re-imaged through the addition of a flexible street, allowing a street space previously reserved for automobiles to be a usable public space or, a space for businesses and patios when not in-use as a transportation route for automobiles. Knowing more about the flexible streets concept is important for planners as practitioners need to be forward-thinking and aware of new approaches to re-imagining the built environment.

6.2.2 Consider Implementation in All Sized-Cities

The data from this study showed that flexible streets are being implemented in smaller towns like Midland, and larger cities like Ottawa. Most urbanized centers have a Main Street-type

throughfare. As indicated, these types of streets are where flexible streets were deemed most appropriate. Further, public feedback assessed in this study reflected common concerns and reasons to support redesigning the given street. Community members were concerned about dangerous interactions between motorized vehicles and pedestrians in addition to the availability of parking spaces. Yet, there was strong support for wanting the particular street to be redesigned in a manner that would draw people into the particular neighbourhood. Community members expressed interest in local businesses being supported through the built environment and that the updated public right-of-way could provide more adequate space for all users. Lastly, there was a considerable amount of excitement about the potential for community events held in the updated streetscape. These concerns and interests were found across the variety of project locations in this study.

The study revealed that flexible streets are being implemented in a range of municipalities across Ontario and that communities have similar concerns and reasons to support redesigned roadways. Therefore, flexible streets are not relegated only to certain sized cities. Flexible street projects should be considered for implementation in all sizes of urban settlements as the guiding strategies and purported objectives can be applicable in many settings. Further, the flexible street design allows for the space to be used enjoyably by more transportation modes and potentially as a gathering space for public events. It is thus recommended that the flexible streets design approach be considered for implementation in all sizes of municipalities as it can offer benefits for community members.

6.2.3 Flexibility in the Application of Flexible Streets

Although it was found that flexible streets are typically implemented in the downtown areas of municipalities, it is recommended that streetscapes outside of the downtown area are also considered as sites for implementation. This study included the Sackville Street project that is located outside of the official downtown area in London, Ontario. However, given the findings about flexible streets, there are certain attributes surrounding the right-of-way that should be present to support the design approach. As this study identified, streets that are of the traditional Main Streets variety are where flexible street projects are typically implemented. Such streets are surrounded by plenty of retail, residential, dining options, and civic institutions (Toth, 2014). The Sackville Street project was found to have these attributes, demonstrating the viability of the flexible streets concept being applied outside of a downtown context. This project poses as a potential example that flexible streets, although suited to and commonly implemented in the downtown, can be implemented in other areas

of a municipality. Main Streets-like streets outside of the official downtown area exist in many municipalities. For example, the primary street running through Wortley Village in London, Ontario and Belmont Village in Kitchener, Ontario is of this type and could be an idyllic location for a flexible street.

6.2.4 Equity-based Placemaking & Flexible Streets Projects

A final recommendation stemming from this study is to ensure that an equity-based approach is included when moving forward with flexible streets projects in the future. Incorporating equity-based placemaking into one's planning practice is a key directive from Jay Pitter in *A Call to Courage for planners in Canada* (2020). She writes that,

equity-based placemaking builds on pluralism and recognizes power relations within communities and the place-based histories of exclusion and socio-spatial dynamics that shape the character of public spaces. An equity-based placemaking approach explicitly acknowledges that urban design is not neutral; it either perpetuates or reduces urban inequities (Pitter, 2020).

As flexible streets are ultimately public spaces, this is a critical standpoint to lead from. It is incumbent on each planner to carry out their work in an equity-based manner.

In moving forward with public space projects – of which flexible streets are, it is imperative that truly equitable practices are carried out. Simply making a ‘nice looking’ public space will not necessarily ensure that every community member can share in the joy of using the space. The fact that a 2018 inquiry by the Ontario Human Rights Commission found that in Toronto, a Black person is 20 times more likely to be shot dead by a police officer than a white person demonstrates that public space is not inherently safe for all (Amnesty International, 2019). The Commission's report also found that Black communities in other Canadian cities – Halifax, Vancouver, and Ottawa, were disproportionately carded or stopped by police forces (Amnesty International, 2019). With this in mind, attention is now geared towards the widespread transformations of public streets into public spaces amidst the coronavirus pandemic. Destiny Thomas, a Black transportation planner and community organizer, writes that,

if we want to see streets filled with joy and true low-stress access to quality of life, we have to be willing to disrupt what has been the default mode in urban planning — one that centers whiteness and silences Black and Brown people and low-income communities (Thomas, 2020).

In order to combat this, Thomas asserts the importance of adhering with the planning process and engaging in participatory decision-making (Thomas, 2020). Overall, it is critically important for all

planners to understand the intersectionality of planning decisions and to be personally committed to ensuring that all community members are meaningfully considered when implementing a public space project.

6.3 Summary & Conclusion of Thesis

The guiding research question of this study was: how did flexible streets emerge as a planning practice in Ontario? This study sought to explore the flexible streets concept through flexible street projects in Ontario, Canada to determine what the design concept entails, where it has originated from, and moved to. By studying the collection of flexible street projects currently in the province of Ontario, much was gleaned about the concept itself and how it is implemented. The objectives sought through this study were: i) understand how flexible streets are defined, ii) explore the policy and planning processes from which flexible street projects have emerged, iii) identify the historical roots of this emergent planning and design practice, and iv) assess public feedback regarding the flexible streets projects. Through this research, it was determined that the flexible streets approach is aimed at creating streets with an even surface from storefront to storefront, including ample space for all road users, and are spaces designed for the easy modification to different uses - such as a public plaza for events or other non-transportation uses. Further, that the concept denotes five key aspects be met for every streetscape project – flexibility, safety, public and private gathering uses, equal use of space, and intentional design. The flexible streets concept has proven a unique approach to streetscape design that is transportation-focused while also supporting the need for attractive public spaces. During the weekdays, a flexible street could operate as a shared space for cars, pedestrians, and cyclists to travel through the municipality. Due to the flexibility in use, on weekends parking spaces could be changed into restaurant patio space or the entire roadway could be closed to traffic and morphed into a public plaza-like space for community events.

It was recognized that flexible streets are closely linked with the Shared Street approach to roadway design that is more common in the United Kingdom. A main difference between the two concepts is that Shared Street Spaces are typically applied to both residential and commercial street types (Collarte, 2012) while flexible streets are relegated to the downtown area of municipalities along Main Street-type streets. Another key difference is that Shared Streets are fundamentally a transportation channel - albeit with more equal space given to all users, while flexible streets are intended to be modified for uses beyond a transportation conduit, such as for community events. Lastly, this research identified that the use of the flexible streets concept cropped up in Ontario in

2014 with subsequent projects deemed a flexible street up until 2017. This study found the flexible streets concept to be still somewhat new, having primarily mobilized inspiration from streetscape projects in the Ontario cities of Kitchener, Toronto, and Guelph as well as in Mountainview, California.

The findings demonstrate that flexible streets are a unique concept being implemented in both larger and smaller municipalities in Ontario. Flexible streets policies seek to create streetscapes that are equitable for numerous users and uses beyond that of a traditional roadway for automotive traffic. These projects were proposed under the overarching strategies to create an attractive space, foster a sense of place, spur localized economic development, and modal equality. The objectives of the flexible street projects sought pedestrian-friendly and safe design, accessibility, capabilities for events and community celebrations, improved economic opportunities for businesses, revitalization of the downtown area, and intentionally shifting from auto-dominated roadways. Public feedback about the projects was overall positive and highlighted that community members wanted more uses, activities, events, and interest-provoking elements for their public streets.

The findings from this study offer learning opportunities about this emergent streetscape design concept. It has highlighted notable aspects about flexible streets that could be used in future projects aiming to create equitable streetscapes. As societies move away from auto-centric streetscape design, and towards the establishment of streets that prioritize public space for social-distancing and other transportation modes, it is imperative that planners approach these projects through an equity-based lens and meaningfully endeavour to create a place that is for all community members.

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Appendix A

Positionality Statement

As I have undertaken qualitative research through this master's thesis, it is important that I reflect on my position as a researcher approaching this work. To begin, I am of mixed-European (primarily Irish) ancestry and both sides of my immediate family have lived in Canada for over three generations. During much of this time, my family has lived in the province of Ontario, Canada in the southern and central regions. I grew up in a rural setting slightly north of the City of Barrie, Ontario. Although outside of the urban center, I attended schools in Barrie from Kindergarten to Grade 12. As well, majority of my friends and work opportunities were located within the city. This meant that I had a unique experience of growing up in both a rural and urban context – which has provided me with a unique perspective and insights on various topics.

In terms of socio-economic status, I grew up in a working-class household with a stay-at-home mom. However, many of my close friends and family members were from middle- or upper-class backgrounds, of which values I was also exposed to while growing up. This has resulted in a mixed upbringing filled with both challenges and privileges. Between my mom and dad, there is one high school diploma – but I will not reveal who's it is as I don't want to publicly out someone for being one credit short of a diploma. Being the oldest of two daughters, this put me in a position, with my parents support and encouragement, to be the first person in my family to attend a post-secondary institution. Indeed, in June of 2016 I walked across the stage at the University of Western Ontario (UWO) to receive my honors degree, becoming the first person in my family's lineage to have attended and graduated from post-secondary school.

While I was completing my undergraduate degree at Huron University College (affiliate university of UWO), I was exposed to a variety of viewpoints and life experiences. During this time, I became very aware of how one's socio-economic status, race, gender, sexuality, and ability can help or hinder their experiences in life. My academic background is in Political Science with much of my additional courses in Women's Studies. Through both course work and friendships, I learned about intersectionality and try to approach all things from an intersectional standpoint. I became interested in urban planning matters through a political science course about cities and municipal governing structures taught by Dr. Neil Bradford. In this class I was exposed to the work of many urban thought leaders purporting the importance of urban settlements. It was at this time that I learned about the urban planning profession and felt as if I had found my calling. After graduating from UWO, I worked in the tech industry for a number of years in sales and marketing roles. While working, I

almost worked my way into the middle-class, but alas, I decided to go to graduate school. This decision has impacted my financial position yet bestowed immense privilege upon me.

Since moving out of my parents' house at 18, I have lived in the urban centers and downtown-areas of two mid-sized Ontario cities. Living in urban centers has allowed me to more easily take public transit and to walk to my desired destinations. Due to being able-bodied and able to afford rent in downtown locations, I have grown a fondness for walking as my preferred mode of transportation. Thus, began my fascination with cultures of walking versus driving an automobile as a preferred mode of transportation. Trying to understand why walking – or cycling, is more common and accepted mode of transportation in different cities and by only some people is something I ponder often.

I first learned about flexible streets while living in London, Ontario in 2018. An urban designer at the City of London had explained the concept of the project to me, which I thought was incredibly cool. The flexible street project in London was interesting to me as it sought to significantly alter the street in a way I had never seen or heard of before. In my opinion, one of the most fascinating things about urban planning and design is how the built environment impacts and can change the behaviours of users. Once situated in the graduate planning program at the University of Waterloo, I decided to conduct my master's thesis research on flexible streets. I undertook this research as many people had never heard of what a flexible street was before. As many are aware, there is a strong car-culture in most Canadian municipalities and much of the country's development pattern has been auto-centric. Thus, I am personally interested in planning and design projects that seek to change this.

As a result of COVID-19 pandemic, it was not viable to conduct key informant interviews for the research contained in this thesis. It is my hope the future research on flexible streets involves interviews with practitioners in order to learn more about the implementation and operationalization of these streetscape projects. In conducting this research, I have attempted to understand flexible streets from an intersectional perspective. It would be all too easy for me, given my background and interests, to purport the greatness of this new design concept as it provides opportunity for a more attractive public space and use for fun community events. As a white woman with a privileged educational background and some class privilege, I could easily glaze over the fact that people unlike me may have a different interpretation and experience in these types of public spaces. That is to say, I feel comfortable in public spaces and frequenting the types of businesses that surround some flexible streets – everything from dive bars, upscale dining establishments, expensive coffee shops, home

goods stores, to convenience stores. It has been important for me to approach this work – about public spaces, in a curious manner, not in a manner of purporting an approach that is a cure-all for the challenges posed by traditional roadways in urban centers. Nor did I approach this work based on assumptions about how all community members interact with public spaces. As I move from an academic-setting to entering the workforce, I endeavour to continue developing an equity-based approach to my professional work in order to channel my passion about urban planning in a meaningful way.