BLOOR BIKE LANES

ASSESSING THE ECONOMIC IMPACT OF BIKE LANES IN THE PLANNING OF A 21st CENTURY STREET

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A Major Research Project

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Photographs, graphics, and maps by Anthony Leighton Galloro

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This is for the relationships, both friendly and academic, I've made throughout my two years with the School of Urban and Regional Planning.

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And thanks to my city, Toronto, for inspiring me to reimagine the spaces I'm part of.

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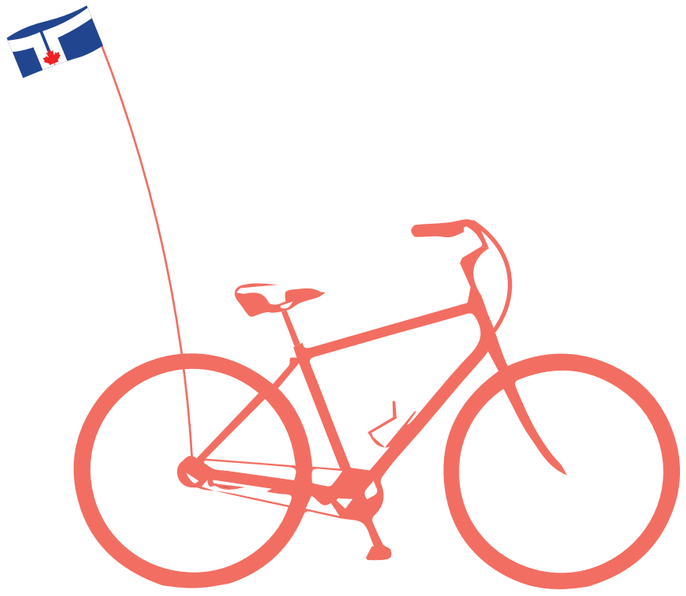
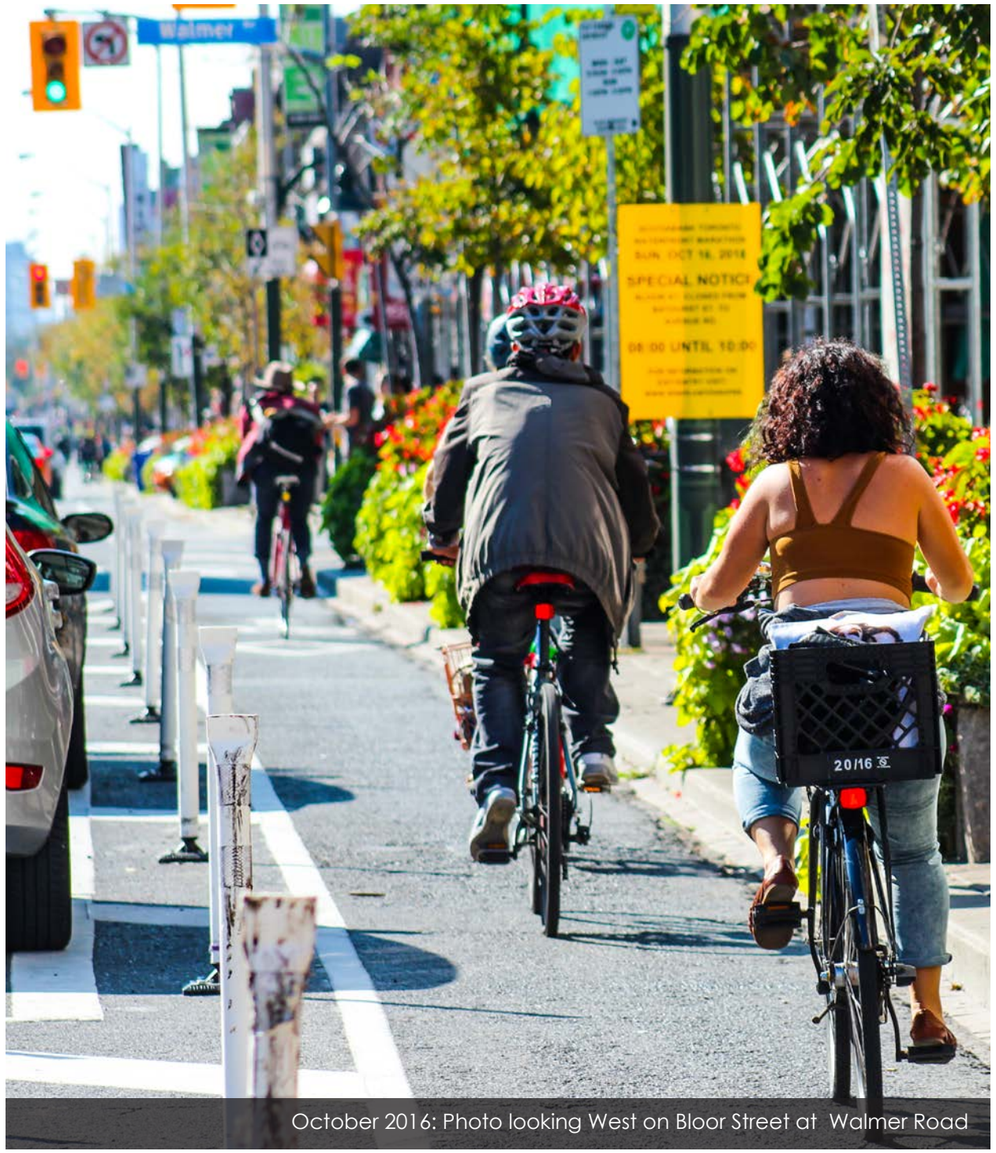


1.0 rationale

a timely project



October 2016: Photo looking West on Bloor Street at Walmer Road

Cycling and cycling-specific infrastructure are timely topics that addresses the mounting need for an improved and sustainable transportation network in Canadian cities (Litman & Burwell, 2006). The accompanying need for increased regulation and appropriate space in the public realm has resulted in cyclists gaining their right to access public space through the installation of bike lanes in cities like Toronto (Ellison, 2013). In 2016, the City of Toronto adopted the Cycling Network Ten Year Plan (hereafter: the Plan), a comprehensive roadmap directing the city towards a bicycle-friendly transportation grid. The Plan represents Toronto's commitment to building an integrated transportation network serving the needs of cyclists. The Plan's mandate is trifold: connect the gaps in the existing cycling network, grow the cycling network, and renew the quality of existing cycling routes (City of Toronto Transportation Services, 2016b). In addition, in 2016, Toronto City Council approved the Bloor Street Bike Lane Pilot Project, a one-year project along a major transportation corridor that includes Line 2 of the city's subway line. The Bloor Street Bike Lane Pilot is identified as a priority corridor in the Plan. As part of the evaluation, a major corridor study will assess the implementation of cycling-specific infrastructure across Bloor Street (City of Toronto Transportation Services, 2016a).

The City of Toronto Transportation Services will present the *Bloor Pilot Bike Lanes Evaluation Report* to City Council in Fall 2017; the evaluation report will in part assess the economic impact of bike lanes on the study corridor. While there is a growing base of grey literature that demonstrates the relationship between cyclists, bike lanes, and economic vitality, it is not as well documented in the academic literature. *Bloor Bike Lanes: assessing the economic impact of bike lanes in the planning of a 21st Century Street* synthesizes interdisciplinary research, exploring the role of bike lanes in a changing urban landscape through the context of Bloor Street.

This report speaks to a growing trend in bicycle ridership (Mitra et al., 2016) and acknowledges the value of bike lanes to the contemporary city. In Toronto's planning of a street network that facilitates movement, growth, dynamism, and interaction among diverse road users, this report contributes to this discussion by articulating the importance of bicycle-friendly streets. This is the primary objective of this report.

The Toronto Centre for Active Transportation (TCAT) in collaboration with the Toronto Cycling Think & Do Tank at the University of Toronto, have partnered to undertake a study evaluating the economic impacts of the Bloor Street bike lanes on local business (2015). This report speaks to their work by synthesizing existing and recent literature about the economic vitality associated with bike lanes.

2.0 introduction

Active transportation as a field of urban planning advocates for sustainable and equitable modes of transportation that get people moving (Lee, Sener, & Jones, 2017). Reclaiming the street for people and reducing a city's dependence on the automobile is reconfiguring the built form of public space (Furness, 2007; Ker & Tranter, 1997). While there are a wide range of benefits to humans and public space related to cycling, it is the associated economic impacts that are the primary focus of this report. Additionally, this report contextualizes the linkages between cyclists impacts on local business within a broader framework of urban sustainability, a concept expanded on in the subsequent section of this report.

Through provincial and municipal policy initiatives, urban design guidelines, and grassroots movements, cycling is complimenting Toronto's push for density, growth, and clean and healthy streets. The benefits of cycling are well identified; cycling alleviates congestion and pollution while addressing equity concerns by providing an accessible alternative to private transportation (Transport Canada, 2011). While recent policy initiatives support active transportation, the hierarchy of street users still exists; cyclists are vulnerable and positioned at the margins of the current automobile-oriented transportation network (Spurr, 2016c).

The City of Toronto has identified the need to expand its bicycle network, prioritizing cyclists and testing the implementation of an expanded network through the Bloor Street Bike Lane Pilot Project. The project assesses the cycling environment (including monitoring safety and measuring cyclist volume), monitors automobile congestion, and studies the economic impacts of a reconfigured street through a before and after economic impact study (City of Toronto Transportation Services, 2017). Toronto continues to redesign its street network to serve an increasingly diverse mode share through road diets—the reallocation of road space from automobile-use to widened sidewalks or bike lanes (Toronto Public Health, 2014). Road diets can result in reduced automobile speeds, improved mobility and access among different street users, improved safety, and improved livability and quality of life (Toronto Public Health, 2014). This report speaks to a body of knowledge that investigates the intersection of cycling, bike lanes, and economic vitality.

As Toronto grows, it is pertinent to consider neighbourhood vitality in the planning and re-planning of the city (Simpson, 2007). Balancing the different interests of users and uses of space within a cohesive and efficient transportation network can be restricted by the limited resource of street right-of-ways. This transportation network should cater to different types of vehicles and move people within a safe, efficient, and accessible system; bike lanes are an important component of this system (Hanson & Giuliano, 2004), a claim that is articulated throughout this report. However, neighbourhood vitality is subject to different components, one in which is economy (Dobilas & Battye 2005). This work demonstrates the impacts of urban cycling by focusing on the economic impacts of the infrastructure that supports cyclists. While cycling-specific infrastructure includes all infrastructure used by cyclists, this report focuses specifically on bike lanes.

Bike lanes should serve as safe commuter corridors for cyclists, facilitating the accessibility of neighbourhoods and their businesses to commuters, shoppers, visitors, and locals. Bike lanes have the potential to accommodate an increased capacity of street users, as cyclists require less space for movement and storage than automobiles carrying a similar number of travellers (Rissel et al., 2013). Redistributing road space away from automobile uses towards a cyclist-specific use has prompted researchers to question if there is an association between increased sales among retailers due to the increased capacity of the road network (Rissel et al., 2013). This report synthesizes the academic and grey literature evaluating this association. Ultimately, this report speaks to the proliferation of bike lanes as part of contemporary city planning. The Bloor Street Bike Lane Pilot Project serves as the base through which this conversation is articulated, a conversation that positions cyclists as a beneficial contingent to the city. The primary focus of this discussion involves the economic impacts of cyclists and bike lanes on local businesses.

October 2016: Photo looking West on Bloor Street at Walmer Road

3.0 21st century street

Urban sustainability, a guiding principle in facilitating how planners envision communities, has become increasingly important as Canada becomes increasingly urban (Press, 2017). According to Finco and Nijkamp (2001), urban sustainability is a multidimensional concept that links the sustainability of urban areas with environmental, economic, and societal issues. These dimensions do not exist in solitude; rather, they are interconnected and work synergistically (Finco and Nijkamp, 2001). By understanding different dimensions of the city within a holistic framework, objectives of urban growth, urban health, urban mobility, and urban economics can be addressed within a mutually supportive matrix. This exhaustive approach to city building ensures different dimensions in the city are supported in its planning.

In achieving urban sustainability, then, decisions should be made that acknowledge the different users and uses of space. In line with this, the New York City Department of Transportation (DOT, 2012) has adopted a concept to guide decisions regarding streets and public space. A *21st Century Street* is a concept that includes the sustainable planning of streets with safe and attractive options for all users; it is a street that develops public spaces that produce economic value and neighbourhood vitality (DOT, 2012). This holistic concept informs this report and serves as an overarching narrative that facilitates discussion regarding urban mobility, and particularly, the economic impacts of bike lanes. The 21st Century Street grounds this report in a framework that positions cycling as part of contemporary planning and city building (Krizec, 2007).

In the government-issued report *The Economic Benefits of Sustainable Streets* (2013), the DOT features six case studies of street redesigns that use cycling infrastructure as part of a model to stimulate economic vitality and support local business. The case studies are characterized by the development of dedicated bike lanes or the enhancement of existing bike lanes. All case studies demonstrate increases in economic performance among businesses over a two to three-year period and represent higher sales averages than their respective neighbourhood and borough. These trends appear to indicate a relationship between bike lanes and economic benefits, demonstrating how a sustainable model of the contemporary urban street could improve the economic vitality of a city. It is for this reason that the 21st Century Street is referred to throughout this report.

In making decisions about the type of space the city plans, a spectrum of public concerns and opportunities, diverse users, and diverse travel modes should be considered, working toward urban sustainability. In the development of a 21st Century Street, cities should engage all road users and stakeholders, forging connections in ways that are economically sustainable (Finco and Nijkamp, 2001). Acknowledging the role of the cyclist as an important part of urban sustainability is supported by contemporary planning.

October 2016: Photo looking West on Queens Quay at Lower Simcoe Street

June 2016: Photo taken from Chester Hill Lookout

In the 21st-Century, solving urban challenges has become the key to addressing global challenges: how can urban areas – where a majority of humanity now lives and an outsized share of economic activity takes place – accommodate population growth and expand economic opportunity all while improving public health, environmental sustainability and quality of life?

DOT, 2013, p. 7

4.0 methodology

The Toronto Centre for Active Transportation (TCAT), alongside the Toronto Cycling Think & Do Tank at the University of Toronto, are studying the economic impacts of the new Bloor Street bike lanes to local businesses. With funding from the Metcalf Foundation, the Bloor Annex BIA and the Korea Town BIA, TCAT is directing the study with support from Dr. Beth Savan at the University of Toronto (TCAT, 2015). Their work has provided the platform in which this report has been conceived, building on the existing knowledge base.

This report is informed by the following methodological approaches: *non-reactive research, secondary research, content analysis, secondary analysis,* and *case study analysis*. As outlined by Neuman (2006) in *Social Research Methods: Qualitative and Quantitative Approaches*, non-reactive research includes methodologies that are unobtrusive. Non-reactive observation was useful in conducting preliminary research on the Bloor Street Bike Lane Pilot Project, providing familiarity and context into studying the topic it lends itself toward. The Bloor Street bike lanes facilitated in understanding the relationship between bike lanes, local economies, and the city. As it provided a contextual platform, site observation was an important method in beginning to build this report. Observations included the use of the bike lanes and the reallocation of street space. Photographs of the new bike lanes created an image base that would assist in visualizing different aspects of this report. Photographs, maps, and graphics were an important tool used to help communicate the role of bike lanes.

Secondary research was the primary method used in formulating this report, as it is an appropriate substitute for primary research (Stewart & Kamins, 1993). A search for online literature was carried out between November 2016 and February 2017 using Ryerson University Library, Google, and Google Scholar search engines. Key search terms included: cycling, cycling infrastructure, urban cycling, modal share, cycling modal share, bike lanes, cycling economic impact, on-street parking, active transportation, and cycling behaviour. Academic articles, professional publications, and research studies informed the current state of knowledge regarding cycling and bike lanes.

Content analysis was used to identify trends in topics covered by media sources (Neuman, 2007). This method included searching for news articles with Google News search engine using the key terms cycling, Bloor Street bike lanes, and bike lanes. Sources provided context into the prevailing attitudes surrounding bike lanes.

Secondary analysis was used to analyze existing statistics produced by independent studies and government agencies. Preliminary data for the Bloor Street Bike Lane Pilot Project was obtained from the City of Toronto Transportation Services (2016a; 2017) and Koehl and Caputo (2017). Data was used in this report to identify seasonal cyclist counts, identify ridership pre-bike lane installation compared to post-bike lane installation, and gauge public feedback. The City of Toronto collected data in May-June 2016, prior to the pilot installation, and twice during the pilot project in October 2016 and June 2017 using 24-hour video count technology (City of Toronto Transportation Services, 2017). Koehl and Caputo used manual counting as a method in collecting cyclist ridership in September 2016 and January 2017. Shortcomings of the data source will be identified in Section 8.0 Summary of Data.

Case study analysis provided a contextual role to this report, linking the economic impacts of bike lanes with site-specific examples. Calgary and New York City were selected based on criteria that included climate, planning context, and availability of literature. The case studies provided a contextual link to Toronto, serving as a precedent for the Bloor Street Bike Lane Pilot Project.

It is a challenge to find direct causation between bike lanes and their economic impact, as many separate factors are associated with business vitality including real estate development, demographic trends, and economic trends (DOT, 2013). Surveys and studies that link street design to changes in economic vitality have to control for these varying factors (DOT, 2013). Surveys are a tool used to attempt to understand the relationship between bike lanes and economic vitality (DOT, 2013), and are used to inform the existing knowledge base in this report.

This report articulates bike lanes within the language of contemporary planning. The concept of the 21st Century Street was adopted from the New York City Department of Transportation report *Measuring the Street: New Metrics for 21st Century Streets* (2012). The 21st Century Street is a street that produces economic value and neighbourhood vitality and is designed for all users of space. This concept grounds this work into something applicable to contemporary urban planning.

The following questions were developed to facilitate research, assisting in finding common themes. They are borrowed from The Economic Impacts of Cycling in Dense Urban Areas: A Literature Review (Arancibia et al., 2014). These questions facilitated a systemic literature review.

- Are cyclists good for business?
- Do the installation of bike lanes improve economic activity?
- How can transportation infrastructure best serve urban businesses?
- How accurate are current mode share perceptions among business owners?

A preliminary review of existing literature revealed that a discussion about bike lanes should involve the non-market benefits associated with cycling (i.e. safety, environment, bikeability). The contemporary city requires a multi-dimensional platform to understand the value related to the decisions in planning. While the objective of this report is to synthesize existing literature regarding the market benefits of bike lanes, the non-market benefits of bike lanes are also included in the literature review. The intent is to position bike lanes within a more comprehensive understanding.

While there is a distinction between painted bike lanes and protected bike lanes, this report focuses on the economic value of bike lanes in general. For consistency and clarity, the term "bike lane" refers to road space allocated exclusively to cyclists and is used in place of "bicycle lane," "protected bike lane," "dedicated bike lane," and "cycle track."

5.0 literature review

Contemporary research attempts to illustrate the relationship between bike lanes and economic vitality among local businesses. This literature review considers an analysis of academic journal articles, professional publications, geographically specific studies, and media sources that articulate a relationship between bike lanes and economic impacts. It also synthesizes relevant research regarding the reallocation of street space from automobile use (parking or traffic) to bike lanes to demonstrate the economic impacts.

Economics is the allocation of valuable resources; this includes non-market resources (safety, clean air, and aesthetic features) and market resources (money, labour, land) (Litman, 2014). Economic impacts are the increase or reduction in resource value (Litman, 2014). This review describes non-market resources and market resources relative to cyclists and bike lanes. That said, it is a challenge to find direct causation between bike lanes and economic impacts, as noted in section *4.0 Methodology*. In the report *Estimating the Economic Benefits of Bicycling and Bicycle Facilities: An Interpretive Review and Proposed Methods* (2007), Krizec affirms the difficulty of assessing the economic impacts of cycling and cycling-specific facilities. Citing the lack of a consistent framework from which to evaluate non-market benefits, Krizec acknowledges the challenge of attributing economic value to something for which there is no market value. This means that the non-market resources associated with cycling and bike lanes represent goods that are difficult to derive an economic value (Krizec, 2007).

This review is divided into two sections. The first section, *5.1 Non-Market Resources: Environment, Safety, and Bikeability*, describes the value of cycling and bike lanes to the environment, cyclist safety, and the bikeability of a street. The following questions create this component of the literature view:

- Is there a relationship between cycling and the environment?
- Is there a relationship between bike lanes and safety & bikeability?

The second section of this literature review, *5.2 Market Resources: Cyclists, Bike Lanes, and Business*, describes the economic impacts of bike lanes as well as the economic contributions of cyclists. This includes articulating the link between cyclists, bike lanes, and economic improvement. Research questions from The Economic Impacts of Cycling in Dense Urban Areas: A Literature Review (Arancibia et al., 2014) were used to assess this relationship and are presented below:

- Are cyclists good for business?
- Do the installation of bike lanes improve economic activity?
- How can transportation infrastructure best serve urban businesses?
- How accurate are current mode share perceptions among business owners?

Figure 5-0-1 Energy Consumption:
On 350 calories a cyclist can travel 16 kilometres, a pedestrian 5.6 kilometres, and an automobile 30.4 metres
Data from Transport Canada, 2011

5.1 non-market resources: environment, safety, and bikeability

Is there a relationship between cycling and the environment?

Urban transportation planners and policy-makers are considering cycling as a promoter of urban sustainability and health (Broach et al., 2012; Krizec, 2007), a mode of transportation that involves broader themes of urban sustainability. Litman (2014) illustrates the economic value of non-motorized transport, asserting that cycling can achieve transportation planning objectives like reduced traffic congestion, energy consumption, and pollution emissions. Literature consistently associates cycling with the environment (Liao et al., 2015; Metrolinx, 2008; Rissel et al., 2013; Sagaris, 2015; Transport Canada, 2011), suggesting that the environmental benefits of building bike lanes outweigh the costs of planning and construction as well as the reallocation of road space away from automobile users (Cavill et al., 2008; Rissel et al., 2013). Climate change mitigation, reduced greenhouse gas emissions, reduced noise, and reduced local area pollutants/improved air quality are part of the ecological discourse attributed to cycling.

A Transport Canada (2011) report titled *Active Transportation in Canada* serves as a resource guide for municipal and transportation planners in the pursuit of supporting active transportation alternatives in long-term planning and development. The report outlines the relationship between active transportation and energy consumption. Figure 5-0-1 demonstrates the relationship between active transportation and energy conservation, one that may be used for supporting the construction of bike lanes.

From an environmental perspective, researchers have demonstrated that the benefits of cycling are innumerable, suggesting that their positive impacts speak to broader objectives and principles of urban sustainability. Since literature associates environmental benefits with cycling, it could be suggested that infrastructure that supports cycling would also facilitate these benefits.

Is there a relationship between bike lanes and safety & bikeability?

Safety

How does the configuration and use of the street facilitate public health and cyclist safety? In the search for commonalities across literature, the association between built environment and public health and safety is a reoccurring connection (DOT, 2013; Pucher et al., 2011). Active transportation reduces health risks associated with physical inactivity (Anderson & Hall, 2014; Cervero et al., 2009; Litman, 2014; Rissel et al., 2013; Toronto Public Health, 2011; Transport Canada 2011), so building a transportation network that facilitates cycling is a pragmatic objective that improves public health (Litman, 2014).

Literature describes the connection between improved cycling infrastructure and the perceived and actual safety among cyclists (DOT, 2013; Broach et al., 2012; Lusk et al., 2011; Mitra et al., 2016). The perceived safety of bike lanes is addressed by Habib et al. (2014) in his article that focuses on bicycle demand in Toronto. Empirical data revealed that latent perceptions of bikeability and safety consciousness influence choice of biking; this

suggests that there is a statistically significant relationship between bicycle use and bike infrastructure attributes (Habib et al., 2014). Similarly, Tilahun et al. (2007) understands the value of cycling facilities in a study that assessed street design preference among cyclists. The study concluded that cyclists are willing to travel greater distances to access bicycle lanes, surrendering travel time in favour of the perceived safety and comfort the design provides. Additionally, Lusk et al. (2011) prove a statistically significant correlation between the actual safety impacts from improved cycling infrastructure. Based on the Montreal study which compared cyclist injury rates on bike lanes versus in the street, the observed bike lanes recorded a 28 percent lower injury rate than comparable corridors without bike lanes (Lusk et al., 2011).

Research has demonstrated the connection between bike lanes and the safety that results. While it is a non-market resource, safety contributes to the development of a diverse transportation network, one that is safe, efficient, and accessible. In assessing the economic impacts of bike lanes, safety is an important consideration in a city's development of the 21st Century Street.

Bikeability

"It is clear that more on-street bike lanes increase the good perception of the city's bikeability, comfortability of biking, and bikers' sense of safety. In bike related infrastructure policy development, the recommendation is to give priority to on-street bike lanes that are separated from other traffic." - Habib et al., p. 79, 2014

Bikeability refers to the possible relationship between route environments and cycling; this includes the perception of the route environment as a factor of cycling uptake (Wahlgren & Schantz, 2012). Contemporary research suggests that there is a relationship between built environment and cycling rates, where dedicated bike lanes encourage cycling (Habib et al., 2014; Mahmoud et al., 2015). For example, a recent report titled *Cycling Potential in the Greater Toronto and Hamilton Area* found a statistically significant relationship between built environment characteristics and cycling uptake, meaning that bike lanes, land use mix, traffic speed limits, and population density affect cyclist use (Mitra et al., 2016). Also reported was a 61% increase in cycling trips in the GTHA between 2001 and 2011, resulting in a 37% increase in cycling modal share (Mitra et al., 2016). The same data suggests that out of the 4.35 million trips taken daily in the GTHA daily, 33% are potentially cyclable (Mitra et al., 2016).

In the study *How Active Modes Compete with Motorized Modes in High-Density Areas: A Case Study of Downtown Toronto* (Mahmoud et al., 2015), the use of active transportation as a substitute for motorised modes of transit was explored. The study revealed that individuals with higher percentages of cycling infrastructure lengths relative to their trip distance were more likely to bike as their commuting mode. Within the study area, only 13% of trips that originated and were destined to the downtown area are by car. The remaining shares include walking (50%), cycling (6%), and transit (31%). This suggests that improvement in cycling-specific infrastructure like bike lanes could strengthen the cycling commuter share in Toronto.

How is this important to a discussion about economic impacts of bike lanes? Bike lanes provide a new point of entry into a neighbourhood, potentially expanding a consumer base from two sources: new cyclists and cyclists that have modified their routes to use protected infrastructure (Monsere et al., 2014). An expanded customer base may follow the installation of bike lanes. This claim is supported by Litman (2014), who understands non-motorized transportation as a tool that enhances the convenience, comfort, and affordability of access to destinations.

Bike lanes improve the safety of cyclists and can enhance the perception of the neighbourhood they intersect (Andersen & Hall, 2014; Bernier-Heroux & Ryan, 2012; Booth, 2015). This seems to indicate that bike lanes can serve as a model to enhance the desirability of a neighbourhood. Bike lanes work to market a neighbourhood's attractiveness to visitors; they increase the resource value of a neighbourhood by creating a new point of access, support tourism and retail, and facilitate the safety of users (Litman, 2014).

5.2 market resources
cyclists, bike lanes, and business

Are cyclists good for business?

Research studies demonstrate that cyclists contribute to local businesses, indicating a relationship between cyclists and spending (Bernier-Heroux & Ryan, 2012; Clifton et al., 2012; Fleming et al., 2013; Monsere et al., 2014; O'Connor et al., 2011; Popovinch & Handy, 2014). For example, a study in Portland revealed that cyclists spent more on average than drivers (Monsere et al., 2014). That said, different studies suggest different trends. For instance, a recent study in Davis, California confirmed that while cyclists spent less per average per trip than their auto-driver counters, they made more frequent trips and therefore contributed comparable spending amounts to downtown businesses (Popovinch & Handy, 2014). In the New York City Department of Transportation (DOT) report *Measuring the Street: New Metrics for 21st Century Streets* (2012), metrics, strategies, and goals are outlined to create a framework for planning the street to reflect contemporary planning values (these are outlined in section *7.2 New York City*). In the following examples, street enhancements have improved economic performance among local retailers, meaning the resource value captured by businesses has increased:

- The redesign of Union Square North, Manhattan included the creation of a protected bike lane and a pedestrian plaza. There are now 49% fewer commercial vacancies post-bicycle lane installation.
- The redesign of First Avenue and Second Avenue, Manhattan included the installation of a protected bike lane. A 177% increase in cyclist volume and 47% fewer commercial vacancies were recorded post-improvements.

Identifying direct causation between bike lanes and economic activity is a challenge to prove. However, these examples seem to indicate a relationship between street enhancements that reflect contemporary planning values (including the installation of bike lanes) and resulting commercial activity.

In the study *Bike Lanes, On-Street Parking & Business: A Study of Bloor Street in Toronto's Annex Neighbourhood* (Sztabinski, 2009), a public survey was used to determine the acceptability and potential economic impact of reallocating street space to cyclist or pedestrian use. The study found that pedestrians and cyclists visited the study area the most often and spent the most money per month (Sztabinski, 2009). As the study area overlaps the Bloor Street Bike Lane Pilot Project, these trends are useful in legitimizing the reallocation of on-street parking space to bike lanes along Bloor Street.

Do the installation of bike lanes improve economic activity?

Several geographically-based studies demonstrate the relationship between the installation of bike lanes and the improvement of economic activity (Jaffe, 2015; Krizec, 2007). A study by Rissel et al. (2013) assessed the economic impacts of cycling infrastructure in Sydney. The study concluded that, while car users generate more overall spending per hour than cyclists, cyclists generate more money per unit of public space (each square metre allocated to bike parking generated 31$ an hour, compared to $6 per square metre of car parking space) (Rissel et al., 2013). This seems to indicate that the reallocation of space from on-street parking to cycling-specific infrastructure could have positive economic gains.

A research report in Los Angeles revealed that sales tax revenue (an indicator of business success) was higher on a section of street that converted an automobile lane to a bike lane than the section that did not adopt a bike lane (McCormick, 2012). Likewise, a recent report about the economic impacts from converting on-street parking to bike lanes in a Seattle commercial corridor revealed a 400% increase in the sales index (Rowe, 2013). These trends are consistent with other literature that associates the introduction of bike lanes with economic activity. For example, in *Protected Bike Lanes Mean Business* (2014), the report is based on four themes, categories that demonstrate the economic growth produced by protected bike lanes (Andersen & Hall, 2014):

- Fueling redevelopment to increase real estate value
- Helping companies attract talented workers
- Making workers healthier and productive
- Increasing visibility and sales volume

While these themes do not prove that the installation of bike lanes cause an increase in economic value, they suggest a relationship between economic vitality and bike lanes.

In the New York City DOT report *The Economic Benefits of Sustainable Streets* (2013), indicators of economic vitality are used to evaluate street redesigns and their resulting economic performance. Indicators include retail sales, retail rents, office rents, and commercial property values. The subsequent projects are featured in the DOT report. They represent walking and cycling enhancements that appear to have improved economic vitality among local retailers, meaning that resource value captured by businesses has increased:

- A street redesign of Vanderbilt Avenue, Brooklyn included the conversion of automobile space to a dedicated bike lane, the creation of pedestrian safety islands, traffic calming, and enhanced streetscaping. Retail sales along Vanderbilt Avenue post-improvements were up 39% for the first year, 56% for the second year, and 102% for the third year. This represents sales that are 22% higher when compared to the neighbourhood average.
- A street redesign of Ninth Avenue, Manhattan included the installation of a parking-protected bike lane by converting an automobile travel lane and the addition of pedestrian safety islands. Retail sales along Ninth Avenue post-improvements were up 17% for the first year, 47% for the second year, and 49% for the third year. This represents sales that are 10% higher when compared to the neighbourhood average.
- A street redesign of Columbus Avenue, Manhattan included the narrowing of street lanes to install parking-protected bike lanes and the creation of pedestrian safety islands. Retail sales along Columbus Avenue post-improvements were up 14% for the first year and 20% for the second year. This represents sales that are 8% higher when compared to the neighbourhood average.

These trends suggest a relationship between bike lanes, cyclists, and positive economic impacts. Improvements to the design of the street and the reallocation of road space to include active transportation users are consistent with economic improvement, and bike lanes appear to be central to this pattern. In the planning of the 21st Century Street, bike lanes seem to have a constructive role in facilitating economic vitality.

How can transportation infrastructure best serve urban businesses?

Cyclists and bike lanes are a contentious topic in city planning (Greenburg, 2016; Spurr, 2016a; Spurr, 2016b). In 2010, Vancouver businesses contested the reallocation of street space from 170 on-street parking spaces to a protected bike lane (Klingbeil, 2016). Resistance since the installation has dwindled, where a sea of change has marked downtown businesses that now embrace cyclist culture and capitalize on the growing market (Griffin, 2016).

In contemporary city planning, how can transportation infrastructure best serve urban businesses? Reported by the Santa Barbara Independent, the distance traveled by drivers under 30 years of age dropped from 21% to 14% of the share between 1995 and 2009 (Booth, 2015). A shift in urban infrastructure to reflect this trend has seen cities like Pittsburg invest in cycling-specific infrastructure to ensure their businesses remain competitive—"Bicycle-friendly infrastructure became a symbol for their commitment to making the city attractive to younger people" (Booth, 2015). Similar initiatives in Minneapolis and Memphis have occurred, where cycling-specific infrastructure is being developed to cater to a growing demographic while strengthening business improvement (Booth, 2015). Minneapolis has reported $200 million in new development along a new bike corridor called the Midtown Greenway, suggesting that bike lanes increase property values (Booth, 2015). This is especially relevant to Toronto, as it could encourage cold climate cities to reallocate existing street space to bike lanes.

Bike lanes support cyclists and serve as a point of entry to a neighbourhood and its businesses. The hesitation that accompanied the recent installation of a bike lane on 7th Street Avenue in Calgary was partially dispelled when stakeholders, Calgary Economic Development, and the Calgary Chamber of Commerce cited benefits of bike lanes to include higher sales for businesses, decreasing employer health care costs, and attracting and retaining labour (Klingbeil, 2016). Calgary City Council recently voted to make the 7th Street bike lane permanent, citing improvements in economic vitality for local businesses (City of Calgary Transportation Department, 2016).

Transportation infrastructure should cater to different types of vehicles, moving people within a safe, efficient, and accessible system that concurrently responds to the economic vitality of businesses. Contemporary city planning calls for transportation infrastructure to respond to commuter patterns. It is how this movement is facilitated that is critical to meeting objectives of urban sustainability.

How accurate are current mode share perceptions among business owners?

Mode share perceptions among business owners can differ from reality; business owners over-estimate how many customers arrive to their business via automobile (Jaffe, 2012; Jaffe, 2015). This claim is supported by a study of downtown Dublin, where it was reported that merchants overestimate how many customers arrive by automobile, in some cases between 30% and 100% (O'Connor et al., 2011).

Arguably, an inaccuracy among business owners may be a factor in the controversy that follows the reallocation of road space from automobile use to bike use. For example, the Commercial Drive Business Society in Vancouver released survey results indicating that 83% of business and property owners do not support the city's proposal to build separated bike lanes on Commercial Drive (Commercial Drive Business Society, 2016). With greater understanding of the actual impacts of bike lanes on local businesses, there may be less reluctance among business owners in a city's planning of a 21st Century Street.

October 2016: Photo looking East on Bloor Street at Huron Street

North American urban cyclists are a desirable demographic for local businesses. They are skilled, selective, loyal, and spend more money where they shop than their driving counterparts.

Arancibia, 2011, p. 6

February 2017: Photo looking East on Bloor Street at Clinton Street

There's been a sea change in the attitude about cyclists and frankly the value that the cycling community and the cycling consumer is bringing to the marketplace…Businesses are responding by making it clear they're catering to them.

Gauthier, CEO Downtown Vancouver BIA, 2016 | Quoted in Klingbeil, 2016

October 2016: Photo looking East on Bloor Street at St George Street

context

This section provides an overview of the Bloor Street Bike Lane Pilot Project by positioning Bloor Street within its larger planning framework. It includes the following: the policy framework applicable to cycling and bike lanes (particularly in the context of Bloor Street), the local business context of the neighbourhood articulated through a summary of the Business Improvement Areas, and an overview of the Bloor Street Bike Lane Pilot Project. Outlining context is important in understanding the diverse framework from which the Bloor Street Bike Lane Pilot Project is enabled. Ultimately, this section rationalizes urban cycling in Toronto's planning of a more complete street—a 21st Century Street.

Bloor Street is a major east-west thoroughfare intersecting the heart of Toronto. The corridor is lined mostly by two-storey and three-storey buildings, featuring mainly retail at grade and apartment units above. This pattern is consistent between Shaw Street to Spadina Avenue. Between Spadina Avenue and Avenue Road, larger built form marks the corridor, with the University of Toronto and the Royal Ontario Museum representing notable landmarks. A rapid transit subway line (Line 2, TTC) runs beneath the study area. The following illustrates important aspects of Bloor Street in understanding the interaction between cycling and economic impacts within a comprehensive framework. It should be noted that while neighbourhood demographics and larger economic processes are important, it is beyond the scope of this report.

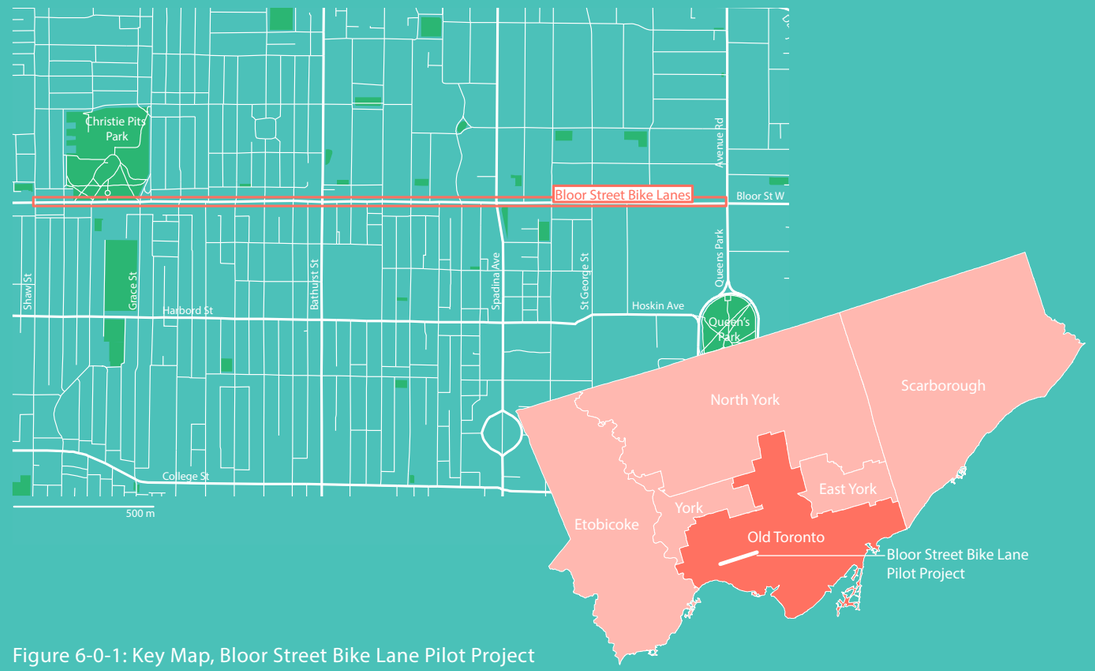


Figure 6-0-1: Key Map, Bloor Street Bike Lane Pilot Project

6.1 planning & policy framework

This section describes the planning and policy framework surrounding cycling and bike lanes in Toronto. It begins with provincial policies that provide an overarching direction for bike lanes, then narrows to municipal policies and neighbourhood plans. This policy framework is critical to understanding the bike lanes on Bloor Street, as it provides a sound planning platform and rationale for its installation. Planning policies do not necessarily articulate the link between bike lanes and the economy, however, this section serves as justification for the proliferation of cycling-specific infrastructure in Toronto.

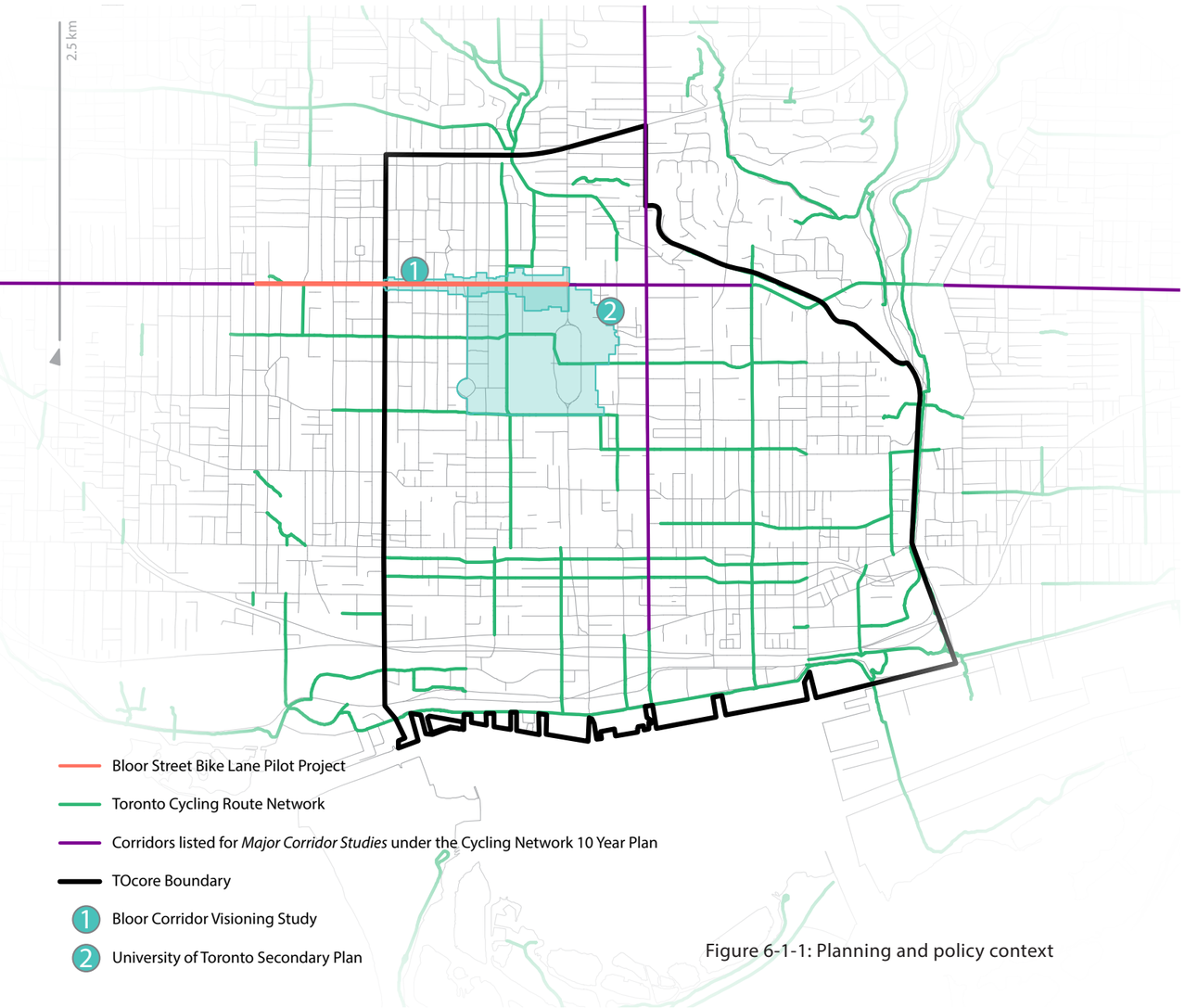


Figure 6-1-1: Planning and policy context

GROWTH PLAN FOR THE GREATER GOLDEN HORSESHOE, 2006
(Ministry of Infrastructure, 2013)

Under the jurisdiction of the Ministry of Infrastructure, the Growth Plan directs the provision of complete communities. These are neighbourhoods that are well-designed, offer transportation choices, diverse housing, mixed employment, and access to stores and services. Section *3.2.3 Moving People* places emphasis on the proliferation of transportation. Relative to bike lanes, the Plan outlines the following:

Section 3.2.3.4:

3. Municipalities will ensure that pedestrian and bicycle networks are integrated into transportation planning to:
a. provide safe, comfortable travel for pedestrians and bicyclists within existing communities and new development

b. provide linkages between intensification areas, adjacent neighbourhoods, and transit stations, including dedicated lane space for bicyclists on the major street network where feasible.

This policy direction certainly speaks to the Bloor Street Bike Lane Pilot Project, advising municipalities to create a cycling network that aligns with mass transit. The bike lanes on Bloor Street conform to Ontario's intent to build a comprehensive and diverse transportation network, one that provides safe and integrated access.

THE BIG MOVE | METROLINX, 2008
(Metrolinx, 2008)

At the regional scale, Metrolinx is a provincial authority mandated to create a strategic plan for a regional transportation system. *The Big Move: Transforming Transportation in the GTHA* outlines a vision of the future, indicating that in 25 years 20% of commuter trips will be taken by walking or cycling supported by a bicycle network six times in size. To accommodate the direction under the Big Move, the development of bike lanes (accompanied by a behavioural shift that embraces cycling) should occur. Most relevant to the context of this report is *Section 4.0, Strategy #7 Build Communities that are Pedestrian, Cycling, and Transit-Supportive:*

Big Move #7:

7.8. The transportation system shall be planned, designed, built and operated to create pedestrian-, cycling-, and transit-friendly communities, and to ensure connectivity between places and along corridors that support the uban structure and intensification objectives of the Growth Plan for the Greater Golden Horseshoe.

The Bloor Street Bike Lane Pilot Project is an important step in the direction of this provincial policy. Approving the Bloor Street bike lanes will be a testament to planning objectives that seek a diverse, efficient, and safe transportation network.

TORONTO OFFICIAL PLAN, 2015
(City of Toronto, City Planning, 2015)

At the municipal level, the Toronto Official Plan supports policies outlined by provincial mandates. In *Chapter 2.4- Brining the City Together: A Progressive Agenda of Transportation Change,* the Official Plan recognizes the need for a behavioural shift in order to improve public health.

Section 2.4.1:

Given the health benefits of physical activity, active forms of transportation will be encouraged by integrating and giving full consideration to pedestrian and cycling infrastructure in the design of all streets. Neighbourhoods, major destinations, transit facilities and mobility hubs throughout the City.

According to the *Land Use Plan* in the Toronto Official Plan, the Bloor Street Bike Lane Pilot Project falls within the land use designation *Mixed Use Areas.* As per to *Chapter 4.5- Mixed Use Areas,* mixed use areas intend to foster complete communities by giving people the opportunity to depend less on their cars and create transit-oriented districts in areas that are animated and attractive. This policy direction is important to positioning the Bloor Street Bike Lane Pilot Project in a sound planning framework, justifying its reallocation of road space.

Refer to Figure 6-1-2 for the Land Use Plan relative to Bloor Street Bike Lane Pilot Project area.

UNIVERSITY OF TORONTO SECONDARY PLAN, 2015
(City of Toronto, City Planning, 2015)

While policies here are targeted specifically to the University of Toronto campus, the Secondary Plan considers the relationship to the greater neighbourhood and the provision of cycling-specific infrastructure.

Section 3.1.3 Access, Circulation, and Safety:

b. Reduction of conflicts between motorized vehicles, bicycles, and pedestrians in the University of Toronto Area will be encouraged. All levels of government will be encouraged to reduced any such conflicts, particularly on Queen's Park Crescent and Spadina Avenue.

Additionally, the Plan calls for increased cycling-specific infrastructure throughout the greater neighbourhood.

Section 3.1.4 Pedestrian and Cycling Facilities states:

b. Adequate bicycle routes and secure bicycle parking spaces will be distributed throughout the University of Toronto Area.

Refer to Figure 6-1-1 for a planning and policy context map, including the boundaries of the University of Toronto Secondary Plan.

TORONTO COMPLETE STREETS GUIDELINES, 2017
(City of Toronto, 2017)

The Toronto Complete Streets Guidelines provides a comprehensive framework to assist in meeting city-wide objectives, improve the access, design, and use of streets, and implement the vision of Toronto's Official Plan. Specifically, cycling is weaved through many sections of the report, calling for a resurgence of cycling-specific infrastructure (including bike lanes) to encourage cycling rates, promote safety, increase health, foster good design, and decrease congestion. The guidelines appear to erode hierarchical divisions between different street users, planning for the inclusion of all users in a safe and equally-planned street.

Most useful to this report, criteria for implementing cycling-specific infrastructure includes:

Section 5.1 Cycling Design Principles:

Design for both present and future users: Cycling ridership numbers will grow if a cycling facility is provided on a street that was previously uncomfortable for cycling. Where cyclist volumes are growing, consider widening the cycling facilities.

Supply adequate bicycle parking and Bike Share access:
Support and encourage cycling through Toronto's bike sharing system - Bike Share Toronto, and a convenient and adequate supply of bicycle parking, including multi-unit corrals especially in mixed use, institutional, and commercial areas.

These specific guidelines suggest two important factors. First, cycling-specific infrastructure, including bike lanes, promotes cycling. A well-planned city is one that articulates this link, building a bike network that considers both current and potential users. Second, cycling-specific infrastructure should coincide with commercial corridors, a guideline that seems to indicate a link between cycling and spending.

CYCLING NETWORK TEN YEAR PLAN, 2016
(City of Toronto Transportation Services, 2016b)

The City of Toronto Cycling Network Plan is a comprehensive plan that outlines the City's investments in cycling from 2016-2025. Acting as the primary policy guiding the direction of cycling-specific infrastructure in Toronto, the Plan mandate is trifold: connect the gaps in the existing network, grow the network, and renew the network quality. Within this matrix, the Plan identifies eight priority corridors in which Major Corridor Studies would be undertaken to assess the implementation of bike lanes. Bloor Street from Dundas Street West to Sherbourne Street is a corridor identified in the Plan. The Bloor Street Bike Lane Pilot Project lies within this corridor.

Refer to Figure 6-3-1 for a map of the Toronto Cycling Network, including the eight cycling priority corridors identified in the Cycling Network Ten Year Plan.

March 2017: Photo looking South on Bloor Street at Devonshire Place, University of Toronto

TOcore, 2016

(City of Toronto, 2016).

TOcore is a municipally initiated study of Downtown Toronto which provides a comprehensive assessment of growth, land use, economy, mobility, open space, housing, community facilities, and culture. In *Phase 1: Taking Stock, Transportation Summary Brief*, TOcore outlines emerging priorities for the City of Toronto. Section 4.0 Cycling identifies opportunities to strengthen the existing cycling network. This includes the development of cycling facilities over major rapid transit corridors, with specific mention to Bloor Street.

Refer to Figure 6-1-1 for a planning and policy context map, including the boundaries of TOcore.

BLOOR CORRIDOR VISIONING STUDY, 2009

(City of Toronto, City Planning, 2009).

At the neighbourhood scale, the City of Toronto adopted the Bloor Corridor Visioning Study in 2009 to create a development strategy that would protect existing residential neighbourhoods while intensifying the corridor according to Official Plan guidelines. The goal was to create a coherent urban design concept for the Bloor Corridor between Avenue Road and Bathurst Street, among other objectives. The report provides the framework from which community priorities, policies, and urban design guidelines will be achieved. While there is no particular focus on bike lanes, the report asserts that development of bike lanes should be coordinated with sidewalk widening efforts.

Refer to Figure 6-1-1 for a planning and policy context map, including the boundaries of the Bloor Corridor Visioning Study.

The aforementioned policies do not necessarily demonstrate the relationship between bike lanes and their economic impacts to market resources. However, they empower planning by addressing objectives of city-building, encouraging a shift in travel behavior through an improved transportation network. It can be asserted, then, that while economic vitality is of notable consideration, the economic impacts of the Bloor Street Bike Lane Pilot Project to local businesses should not solely determine its fate. The legitimacy of the Bloor Street bike lanes is grounded in a planning and policy framework that justifies the reallocation of road space for cyclist use.

Policies are the foundation of sound planning. Planners depend on the appropriate policy framework to plan for the 21st Century Street. This policy framework should be comprehensive, addressing the multidimensional realities of the contemporary city. This means that planners would benefit from a stronger articulation of the relationship between bike lanes and economic vitality in policy. This would further legitimate the installation of bike lanes as well as dispel uncertainty from business owners, providing a comprehensive planning framework to support municipal and provincial objectives.

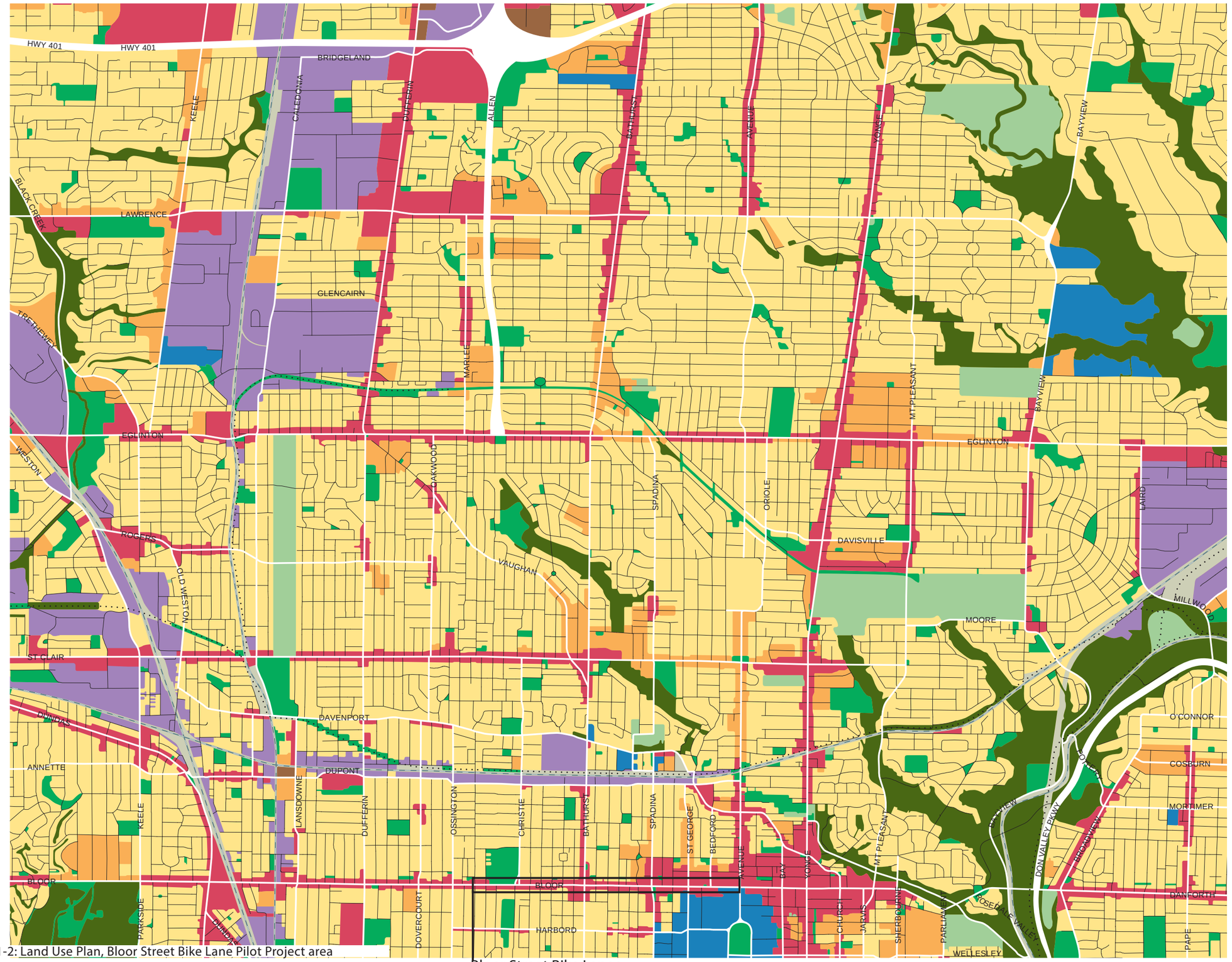


Figure 6-1-2: Land Use Plan, Bloor Street Bike Lane Pilot Project area

Bloor Street Bike Lanes

TORONTO OFFICIAL PLAN

MAP 17
Land Use Plan

July 2015

Land Use Designations

- Neighbourhoods
- Apartment Neighbourhoods
- Mixed Use Areas

Parks and Open Space Areas

- Natural Areas
- Parks
- Other Open Space Areas (Including Golf Courses, Cemeteries, Public Utilities)
- Institutional Areas
- Regeneration Areas
- Employment Areas
- Utility Corridors

- Major Streets and Highways
- Local Streets
- Railway Lines
- Hydro Corridors

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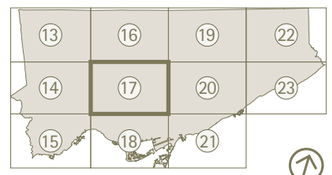
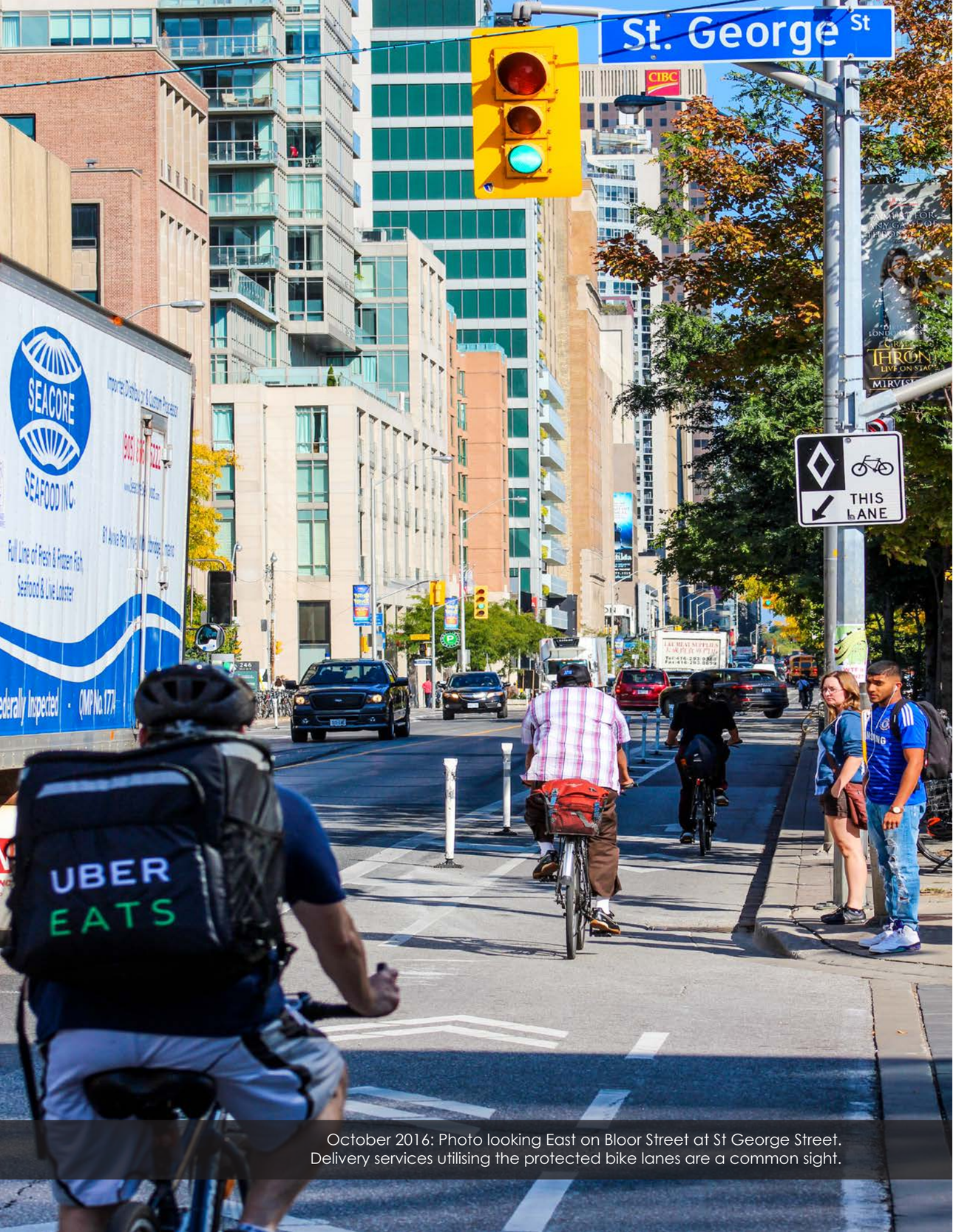
TORONTO City Planning Division



Key Map

Not to Scale



October 2016: Photo looking East on Bloor Street at St George Street.
Delivery services utilising the protected bike lanes are a common sight.

bloor street bike lanes &

business improvement areas

6.2

Neighbourhoods in Toronto are a strong marker of the city's identity; a collection of vibrant cultural districts propel a dynamic commercial landscape. In the report Measuring Neighbourhood Vitality (2005), indicators are explored relative to evaluating the success of neighbhourhoods in Toronto. A comprehensive assessment of the different components of a neighbourhood are reviewed in order to create a multi-dimensional framework of neighbourhood strength and vitality (Dobilas & Battye, 2005). A strong neighbourhood is defined as inclusive, safe, vibrant, and cohesive (Dobilas & Battye, 2005). These are suitable pillars to the foundation of a neighbourhood, combining principles of urban sustainability with the planning of complete communities. There is no specific mention of cycling in Measuring Neighbourhood Vitality, however, economics and mobility are fundamental indicators of neighbourhood vitality.

Measuring the success and vibrancy of the neighbourhoods that the Bloor Street Pilot Project intersects is outside the scope of this report. However, acknowledging the different commercial neighbourhoods that are impacted by the new bike lanes is important, since a strong neighbourhood relies on vibrancy, economics, and mobility (Dobilas & Battye, 2005). It is for this reason why a discussion about neighbourhood vitality intersects with a discussion about the impacts of bike lanes to local businesses.

Commercial neighbourhoods in Toronto are, in part, supported by Business Improvement Areas (BIAs), neighbourhood associations with a common vision; to foster economic vitality among local businesses. BIAs are based on a public-private business partnership model and are supported by the City of Toronto (City of Toronto BIA, 2017). The Bloor Street Bike Lane Pilot Project intersects four BIAs and are presented subsequently. The economic impacts on the BIAs, and the businesses in which the associations represent, are critical to the success and vibrancy of the Bloor Street corridor. The following section provides context about the makeup of the Bloor Street Bike Lane Pilot Project corridor, lending to a position that understands neighbourhood vitality alongside economic vitality.

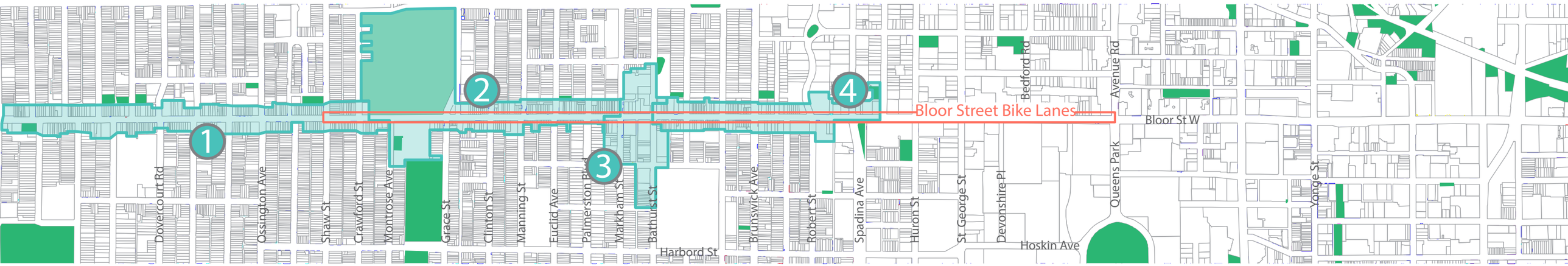


Figure 6-2-1: BIAs within the Bloor Street Bike Lane Pilot Project area

1 Bloorcourt Village BIA

Bloorcourt Village BIA was established in 1979, and features hundreds of businesses, including professional services, food services, health and beauty, arts and entertainment, and specialised retail. The BIA's vision has accelerated in recent years, with a Clean Streets Initiative launching in 2014 and an ongoing beautification project initiating in 2015. Additionally, the Bloorcourt Streetscape Project initiated in 2010, with an intent to create a high quality pedestrian experience in the development of a successful commercial district (Bloorcourt Village Urban Design Strategy, 2010).

2 Korea Town BIA

Korea Town BIA was established in 2004 and features mainly two-storey buildings, with ground floor retail positioned beneath mostly residential units. According to the Korea Town BIA, there are 133 businesses in the BIA, with the majority of services consisting of restaurants and hair salons. That said, the corridor features a variety of businesses, including grocers, bars, health shops, medical practices, cultural centres, and specialised shops. Much of the retail branding is East Asian, specialising in Korean and other East Asian products and services.

3 Mirvish Village BIA

Mirvish Village BIA is a neighbourhood dedicated to cultural diversity in the proliferation of arts, food, and entertainment (Mirvish Village BIA, 2017). Created in 2005, the neighbourhood features a diversity of retail, with specialised shops, professional services, art galleries, and an enclave of restaurants and patios. While the future of the immediate neighbourhood is uncertain with its namesake anchor store under redevelopment, the BIA is committed to embracing the redevelopment as a new marker in city-building; "Mirvish Village marks a bold and necessary shift in city-building: a comprehensive purpose-built community for rental apartments and innovative Retail" (Mirvish Village BIA, 2017).

4 Bloor Annex BIA

The Bloor Annex BIA was established in 1995, and represents nearly 200 businesses along the Bloor corridor (Bloor Annex BIA, 2017). Two and three-storey buildings with retail at grade and residential units above define the prominent profile of the neighbourhood. A range of services exists, but food services and restaurant patios make up a large part of the visible profile of the neighbourhood. A large student demographic is evident along the corridor, due to the BIA's proximity to the University of Toronto.

overview

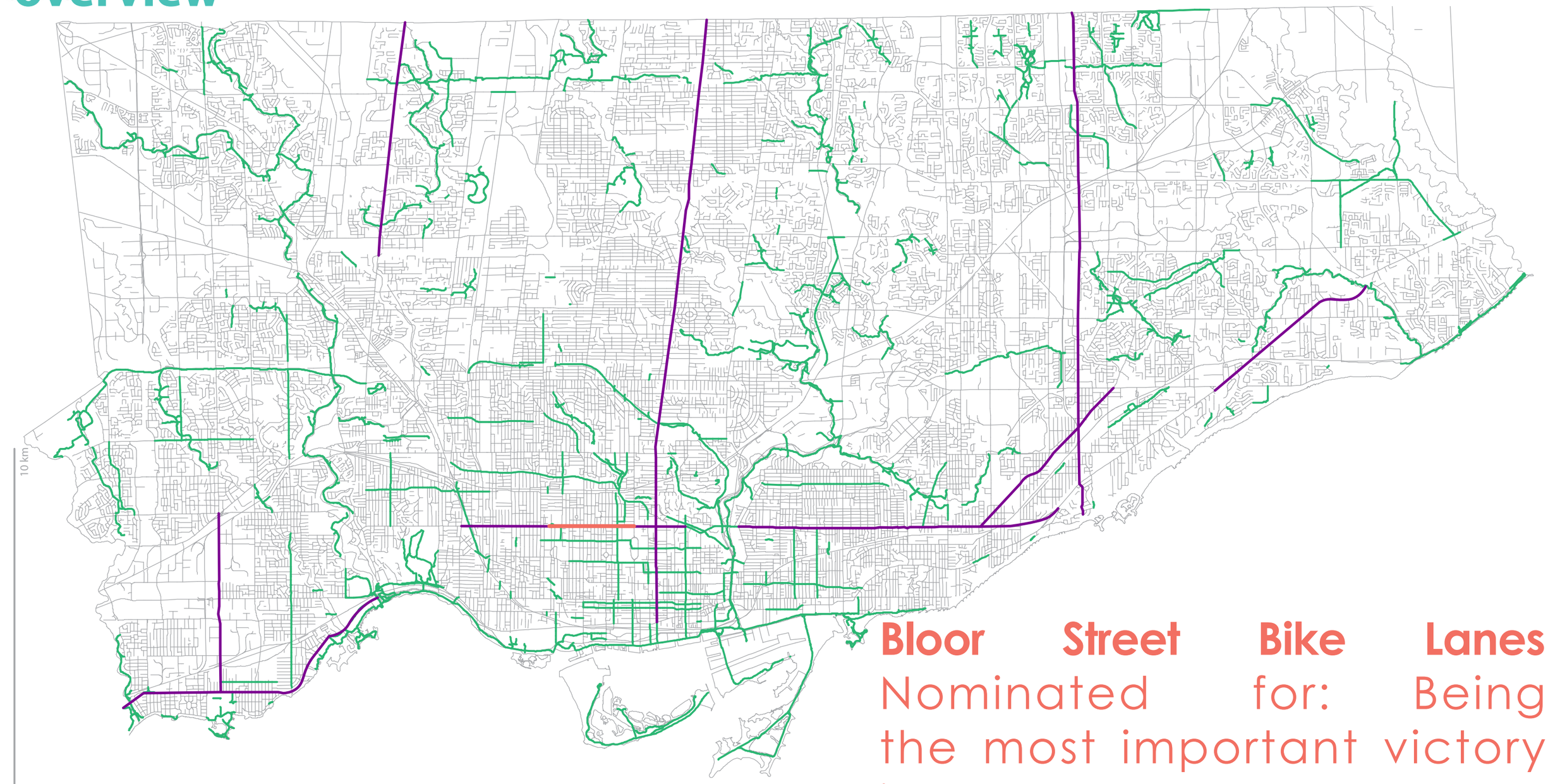


Figure 6-3-1: City of Toronto Cycling Network

Bloor Street Bike Lanes

Nominated for: Being the most important victory in the battle towards creating a real cycling network in Toronto.

Thorne, 2016

In May 2016, the Toronto City Council approved the Bloor Street Bike Lane Pilot Project, a vote that represented the City's move toward a bicycle-friendly transportation network. The protected bike lanes run east-west on both sides of Bloor Street West from Avenue Road to Shaw Street, and maintain one lane of traffic in either direction. The project assesses the cycling environment (including monitoring safety and measuring cyclist volume), monitors automobile congestion, and studies the economic impacts of a reconfigured street through a before and after economic impact study (City of Toronto Transportation Services, 2017). A Bloor Pilot Bike Lanes Evaluation Report will be presented to City Council in Fall 2017.

Reflective flex-posts (cylinder pylons) divide cyclist space from vehicular traffic lanes. Additionally, the creation of on-street parking in some sections of the corridor act as a buffer between the bike lanes and traffic. Refer to Figure 6-3-4 for an example of the street reconfiguration executed along Bloor Street. The installation of the bike lanes reallocated street away from automobile use, including the reduction of on-street parking by 59%. Within the pilot study area, there are ten municipal parking lots with 879 paid spaces. Refer to Figure 6-3-3 for further detail regarding parking.

In 2009, the Toronto Centre for Active Transportation (TCAT) released *Bike Lanes, On-Street Parking & Business: A Study of Bloor Street in Toronto's Annex Neighbourhood*. The report studied merchant and patron opinion about the reallocation of street space from on-street parking to bike lanes or widened sidewalks. 61 merchants and 538 patrons of Bloor Street were interviewed. Additionally, the study analysed parking usage data. In brief, the report estimated that 10% of patrons drive to the Bloor Annex neighbourhood, and during peak periods, no more than 80% of paid parking spaces are in use. Reassuring to advocates of bike lanes, patrons arriving by bicycle and by foot visit the most often and contribute the most economically. The report concluded that the availability of on-street parking does not coincide with the economic health of businesses.

While the TCAT study was released eight years ago and was specific only to the Bloor Annex Neighbourhood, a new study assessing the economic impact of bike lanes on Bloor Street is underway. This study focuses on the relationship between local business activity and the reallocation of street space in favour of bike lanes and will be carried out by the Toronto Centre for Active Transportation in partnership with University of Toronto. Sponsors include the Metcalf Foundation, Bloor Annex BIA, and Korea Town BIA (City of Toronto Transportation Services, 2017).

Data collection along Bloor Street is ongoing, and preliminary results will be summarized in section *8.0 Summary of Data*. In the interim, public opinion and speculation from business owners along Bloor Street regarding the economic impacts of bike lanes have surfaced. For example, three months into the Bloor Street Bike Lane Pilot Project some Korea Town businesses feared a financial impact. The Toronto Star reports that Ave Maria, a Latin grocer in Korea Town, as well as Doug Miller Books have each suffered a 40 percent decline in sales (Spurr, 2016a). Other sources report losses in sales as much as 70 percent (Greenburg, 2016). As noted, finding direct causation between bike lanes and economic impacts is a challenge, with various forces contributing to economic vitality. While the reported data about the state of businesses along Bloor Street may or may not a result of the bike lanes, they are of noteworthy consideration.

Figure 6-3-2: Key map, Bloor Street Bike Lane Pilot Project

Figure 6-3-3: On-street parking within the project area was reduced by 59 percent, from 276 to 114 paid spaces

February 2017: Photo looking West on Bloor Street at Walmer Road. On-street parking is maintained in some sections of Bloor Street, like the segment pictured here, creating a protected bike lane.

But no one –in Toronto anyway– ever, ever, ever wants to give up their precious on-street at-your-front-door parking spot.

This is where Toronto is gutless and why the Bloor bike lane pilot project is a hero with a caveat.

Thorne, 2016

March 2017: Photo looking West on Bloor Street at Manning Avenue. Certain segments of the Bloor Street bike lanes are not protected by flex-posts or automobile parking. This photo illustrates how painted bike lanes do not always prevent automobiles from obstructing a cyclist's path. It may also indicate the potential need for increased on-street parking to serve local businesses.

Figure 6-3-4: Google Street View capture looking East on Bloor Street at Palmerston Boulevard. The image on the left was captured in July 2016, just before the installation of the dedicated bike lanes. The image on the right was caputred in August 2016, just after the installation of the bike lanes. Illustrated is the reallocation of road space and the reduction of parking. Note the difference between the flex-post protected bike lanes on the north side of the street and the parking-protected bike lanes on the south side.

7.0 case studies

The Bloor Street Bike Lane Pilot Project is informed by the data that will support its permanent implementation. Since data collection is ongoing, case studies serve as a platform in understanding the impacts of reallocating street space from automobile use to bike lanes. Selected cities provide a contextual base in framing the value of bike lanes to contemporary planning. The following question ties the role of case studies with this report:

- How can best practices and lessons learned from other cities inform Toronto's understanding of cycling and the economic impacts of bike lanes?

This report has assessed the economic impacts of bike lanes, including non-market benefits such as safety and bikeability, as well as market benefits such as local business vitality. Case studies present an opportunity to extract common themes of economic vitality. This section uses two North American cities that were selected for climate, planning context, availability of literature, and design similarities to Toronto's Bloor Street bike lanes. These criteria are important, as the case studies provide a contextual link to Toronto, serving as precedent and a potential indicator for the Bloor Street Bike Lane Pilot Project.

New York City and Calgary have both invested in recent road diets that included the reallocation of street space away from automobile use to protected bike lanes. Figure 7-0-1 compares relevant information between cities, illustrating patterns of similarity. This rationalizes case study selection and provides a base into understanding the role of bike lanes to Bloor Street.

Figure 7-0-1 Case study matrix

	Toronto	Calgary	New York City
Population | City	2 731 571	1 239 220	8 550 405
Area | City	630.21 km2	825.56 km2	783.84 km2
Density | City	4334.4/km2	1501.1/km2	10 908.4/km2
Köppen climate Climate	Humid continental	Humid continental	Humid subtropical
Average January high/low	-0.7°C | - 6.7°C	-0.9°C | -13.2°C	3.5°C | -2.8°C
Average July high/low	26.6°C | 18°C	23.2°C | 9.8°C	28.9°C | 20.4°C
Average annual precipitation	831.1 mm	418.8 mm	1268.5 mm
Avergae annual snowfall	121.5 cm	128.8 cm	65.5 cm
Study corridor	Bloor Street	Centre City Cycle Track Network	First and Second Avenue | East Village
Zoning | Land Use	Commercial-Residential | Mixed Use	Centre City | Mixed Use	Commercial-Residential | Mixed Use
Year bike lane installed	2016	2013-2016	2010
Infrastructure Type	Parking Protected Bike Lane | Flex-post Protected Bike lane	Parking Protected Bike Lane | Flex-post Protected Bike lane | Curb-protected Bike Lane	Parking Protected Bike Lane | Flex-post Protected Bike lane
Study	Ongoing	Comprehensive Evaluation Program, 2015	East Village Shoppers Study, 2012

7.1 calgary

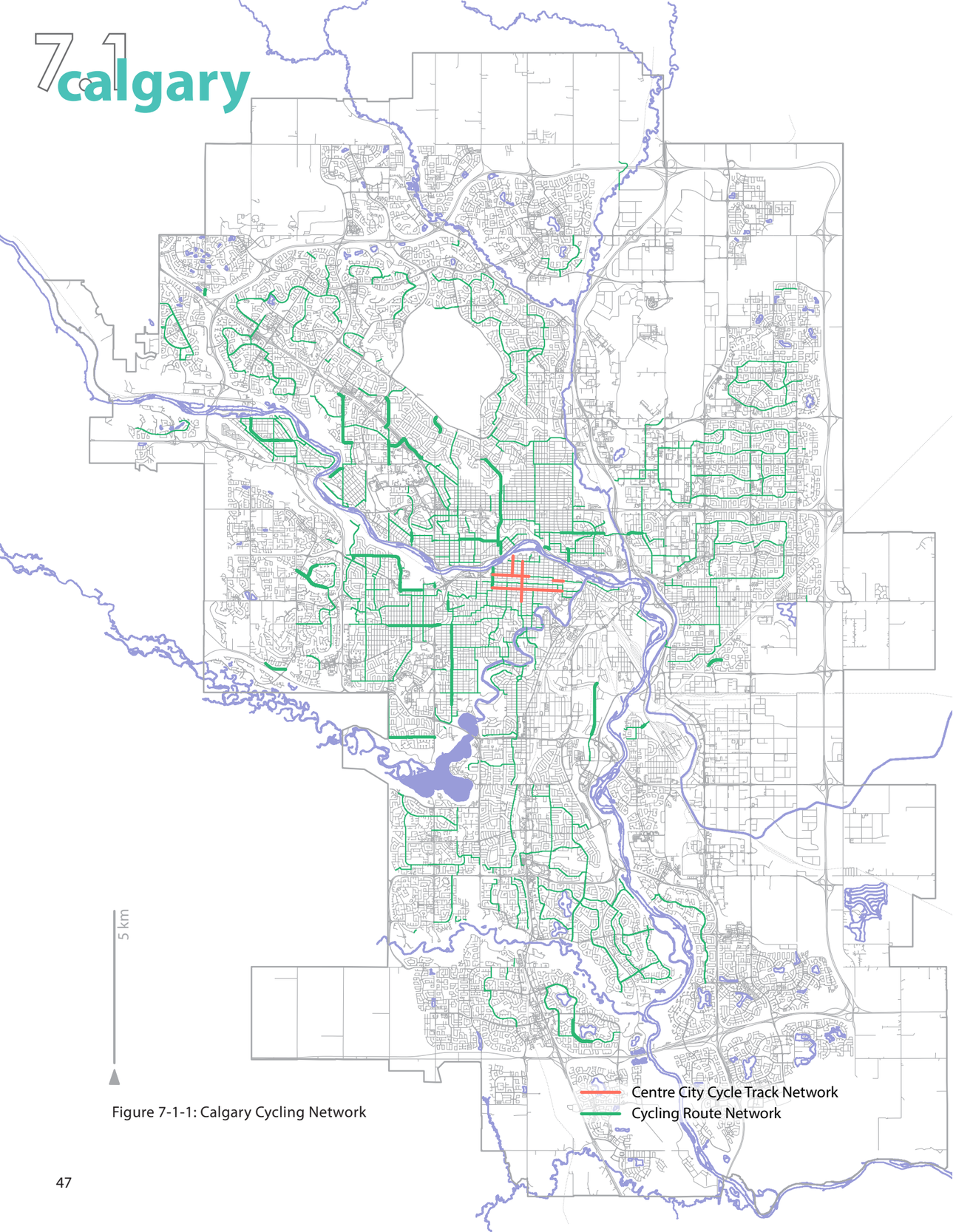
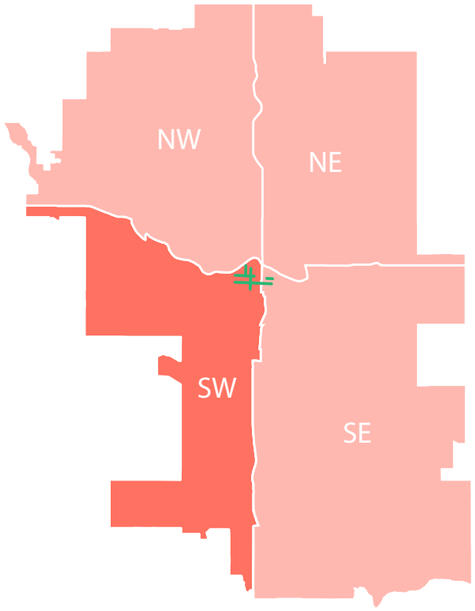


Figure 7-1-1: Calgary Cycling Network



Calgary has made recent planning decisions in updating their built environment to encourage active transportation, reallocating street space for cyclists. Prior to 2013, Calgary had no dedicated bike lanes on its streets (City of Calgary Cycling Strategy, 2011). As a response to an arguably antiquated view of street design, the City of Calgary Transportation Department initiated the Cycling Strategy in July 2011, a plan that envisioned the Centre City Cycle Track Pilot (Mishra, 2015). The plan sought to build a network of bike lanes (referred to as cycle tracks) in the downtown to diversify transportation options for road users (City of Calgary Transportation Department, 2016). The city's first cycle track opened in June 2013 on 7 Street SW between 1st Avenue and 8th Avenue. The pilot project has since grown to include three additional cycle tracks, creating an integrated network of bike lanes in the core that spans 6.5 kilometres (Mishra, 2015). Refer to Figure 7-1-2 for a map of the cycle network, including individual routes. The ambitious plan represents partial fulfillment of the City's commitment to build 30 kilometres of cycle track by 2020 (City of Calgary Cycling Strategy, 2011). In a precedent setting vote in December 2016, Calgary City Council approved the Centre City Cycle Track Pilot (Anderson, 2016). This decision is important for creating a diverse transportation network, one that aligns the street with contemporary urban planning objectives.

METRICS FOR SUCCESS

As part of the Centre City Cycle Track Pilot, the City committed to assessing the design, use, and impacts of the cycle network. In January, 2015, a Comprehensive Evaluation Program was approved by City Council to study the network. In this assessment, various metrics were developed, indicators intended to measure the success of the pilot project.

The following performance measures were part of the evaluation plan (City of Calgary Transportation Department, 2016):

- Satisfaction
- Safety
- Bicycle volume
- Peak period travel time for automobiles
- Unlawful sidewalk riding and wrong way riding
- Economic vitality: merchants along route
- Economic vitality: pedestrians along route
- Demographics: age and gender

These measures position bike lanes within a holistic model, acknowledging the multidimensional role of cycling to urban sustainability. This seems to indicate that while the economic impacts of reallocating road space away from automobile use are important, they are just one indicator in a larger group of indicators that must be weighed in the planning of the city. This interpretation articulates the relationship between cycling, bike lanes, and economic vitality through the framework of urban sustainability.

Data collection occurred throughout the pilot project. Briefly, data was collected in various ways, including telephone survey, collision data, automated counters, GPS for vehicle travel times, manual counts, and in-person surveys (City of Calgary Transportation Department, 2016).

CONTEXT

Geographically speaking, the Centre City Cycle Track Pilot represents a similar planning context to the Bloor Street Bike Lane Pilot Project. The cycle network intersects downtown Calgary, connecting businesses, office towers, residences, the University of Calgary Downtown Campus, district parks, and mass transit. Thus, a comprehensive network has given downtown Calgary a new point of access, one that connects people with everyday places. Within this network are five City of Calgary Business Improvement Areas (BIAs). The role of BIAs include improving the physical environment of public spaces in commercial neighbourhoods, improving economic development, and supporting policies and practices that support economic vitality (City of Calgary BIA, 2017). Similar to Toronto, BIAs function as a supportive role in the sponsorship of economic vitality. The cycle network appears to stitch together the BIAs, providing another point of access to these commercial districts. Refer to Figure 7-1-2 for a map of the relevant BIA districts.

INTERSECTION OF BIKE LANES & BUSINESS VITALITY

The Centre City Cycle Track Pilot performed a road diet that reallocated street space away from on-street parking and vehicular traffic lanes. Planners of the pilot project understood the intersection of cycling and the success of businesses in designing the road reconfiguration. For example, on-street parking loss was reduced by the creation of angled parking on 1st Avenue SW, as well as the addition of parking in front of businesses along 7th Street SW during off-peak hours (Mishra, 2015). Additionally, bike parking was strategically placed in front of businesses (Mishra, 2015). This suggests that the economic contributions of both automobile users and cyclists were considered in the planning of the Centre City Cycle Track Pilot.

The cycle network uses a variety of methods to delineate cycling space from automobile space. These include flex-posts, curbs, automobile parking, and planters. While the design of bike lanes is outside the scope of this report, it is a useful concept to note since the Bloor Street Bike Lane Pilot Project has also adopted all three strategies to delineate space. Refer to Figure 7-1-3 for an image of the Centre City Cycle Track Network.

While the network of bike lanes may signify a win for cycling, there has been some resistance from the business community (Fletcher, 2016). This resistance is possibly based on speculation, lack of understanding, or actual economic detriments. This appears to be a trend among business owners, justifying the need for greater data, literature, and planning policy that articulate the relationship between bike lanes and economic impacts to local businesses.

IMPACTS

Since the implementation of the Centre City Cycle Track Network, ridership along the corridors has tripled; 2016 witnessed the greatest increase in cycling into the downtown (City of Calgary Transportation Department, 2016). Interestingly, the highest ridership occurred where cycle track routes are closer together, a model of network building that Toronto could consider. This trend is consistent with the literature presented earlier; bike lanes encourages use. While individual cycle tracks indicate different impacts, Figures 7-1-3 illustrates various ridership statistics that the new cycle network has accomplished.

Additionally, data was collected to assess the economic impacts to local business. While data is presented in Figure 7-1-3, it should be noted that significant economic shifts have occurred in Calgary since the implementation of the Centre City Cycle Network Pilot (Fletcher, 2016; City of Calgary Transportation Department, 2016). This means that finding direct causation between bike lanes and economic impacts is difficult.

WHAT CAN TORONTO LEARN?

The City of Calgary has improved their active transportation options for the inner city in a short time, initiating a plan for a comprehensive bike lane network. Their ambitious planning trajectory is rooted in a cycling strategy that positions cycling within a holistic formula. Calgary's limited data that illustrates this economic relationship is likely rooted in the economic downtown the City faced. However, there is evidence of a culture shift, one that encourages businesses to adapt to cyclists in order to remain competitive and desirable (refer to pull quote on the following page). That said, the economic impacts of bike lanes should continue to be studied to develop a comprehensive understanding of the value of bike lanes to the city.

1 Kensington Business Revitalization Zone
2 Calgary Downtown Association (CDA) Business Improvement Area
3 17th Avenue Retail & Entertainment District
4 4th Street South West Business Improvement Area
5 First Street Improvement Area
6 Victoria Park Business Improvement Area
7 Chinatown District Business Improvement Area
8 Inglewood Business Revitalization Zone

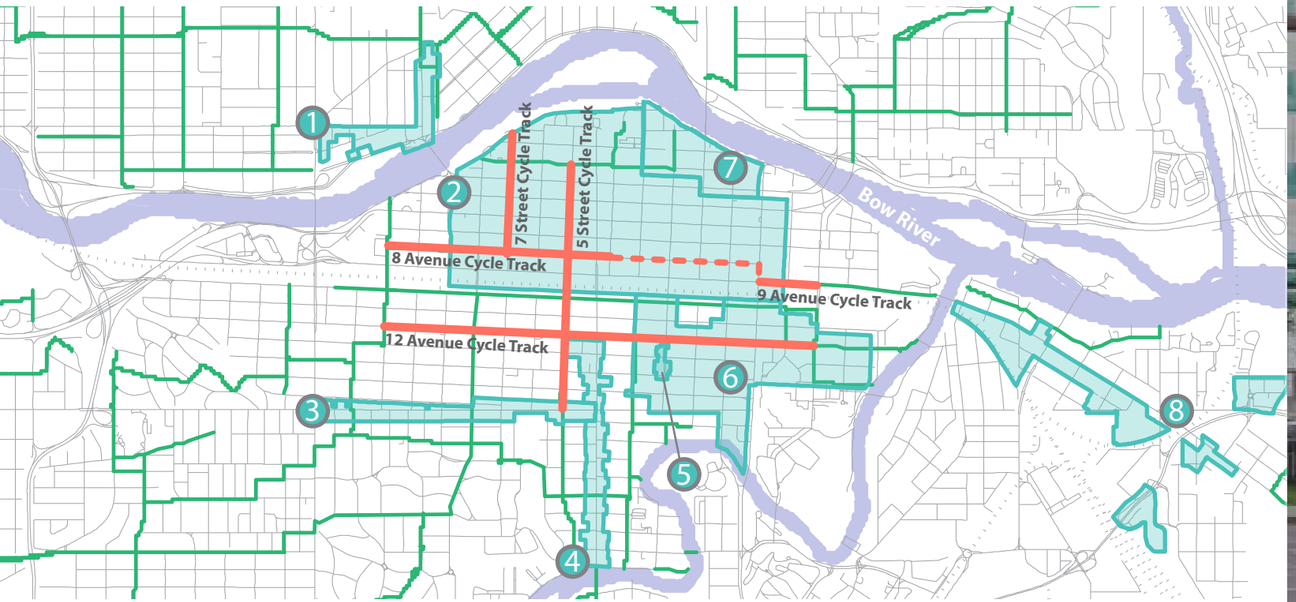


Figure 7-1-2: Centre City Cycle Track Network & Business Improvement Areas

The café offers a 'Cyclists Welcome' loyalty card for a discount on their order.

"We saw and embraced what the community was participating in, which was an active lifestyle and very active use of bike lanes."

Karen Kho of Alforno Bakery & Café, Calgary | Quoted in Klingbeil, 2016

Data and Image source: City of Calgary Department of Transportation, 2016

130
net increase of parking stalls

1.2 million
bike trips
between June 2015 and November 2016

67 %
of Calgarians support the project

90 seconds
longest delay to drivers

Figure 7-1-3: Key findings, Centre City Cycle Track Pilot Network

Average number of customers per day reported by merchants:

Cycle Track	2014	2016
12 Avenue	70	71
5 Street	113	94
8 Avenue	116	86
Stephen Avenue	148	117

7.2 new york city

In 2010, New York City reallocated street space from automobile use to bike lanes along 1st and 2nd Avenues, two thoroughfares connecting the East Village with the rest of Manhattan. In what is now considered Manhattan's first complete street (DOT, 2013), the East Village bike lanes positioned the value of the cyclist alongside the automobile through the redistribution of public space. Seven years later, the bike lanes serve as precedent for other corridors in New York City seeking a similar treatment in street design (DOT, 2013).

METRICS FOR SUCCESS

In their planning of the 21st Century Street, the Department of Transportation created goals to address contemporary urban challenges. Their principle goal is to design for all users of the street (DOT, 2012). In planning the city, the DOT considers issues of traffic congestion, accidents, inadequate transit and cycling networks, and inhospitable pedestrian environments (DOT, 2012). To address these issues, the DOT adopted criteria for informing the design and planning of complete streets, a guide that has facilitated their approach to city-building. The following metrics represent contemporary planning values used to plan for and evaluate streets in New York City:

- Safety
- Access/ Mobility
- Economic Vitality
- Public Health
- Environmental Quality
- Livability/ Quality of Life

As demonstrated in Calgary, these measures articulate urban mobility through a holistic perspective, one that understands the multidimensional role of cycling. These indicators were developed to plan and measure the performance of the East Village bike lanes and the street transformations that followed. The DOT has developed a trajectory for building streets for all users, balancing the economic vitality of businesses alongside the safety, health, and accessibility of the city. A diverse transportation network includes the proliferation of bike lanes.

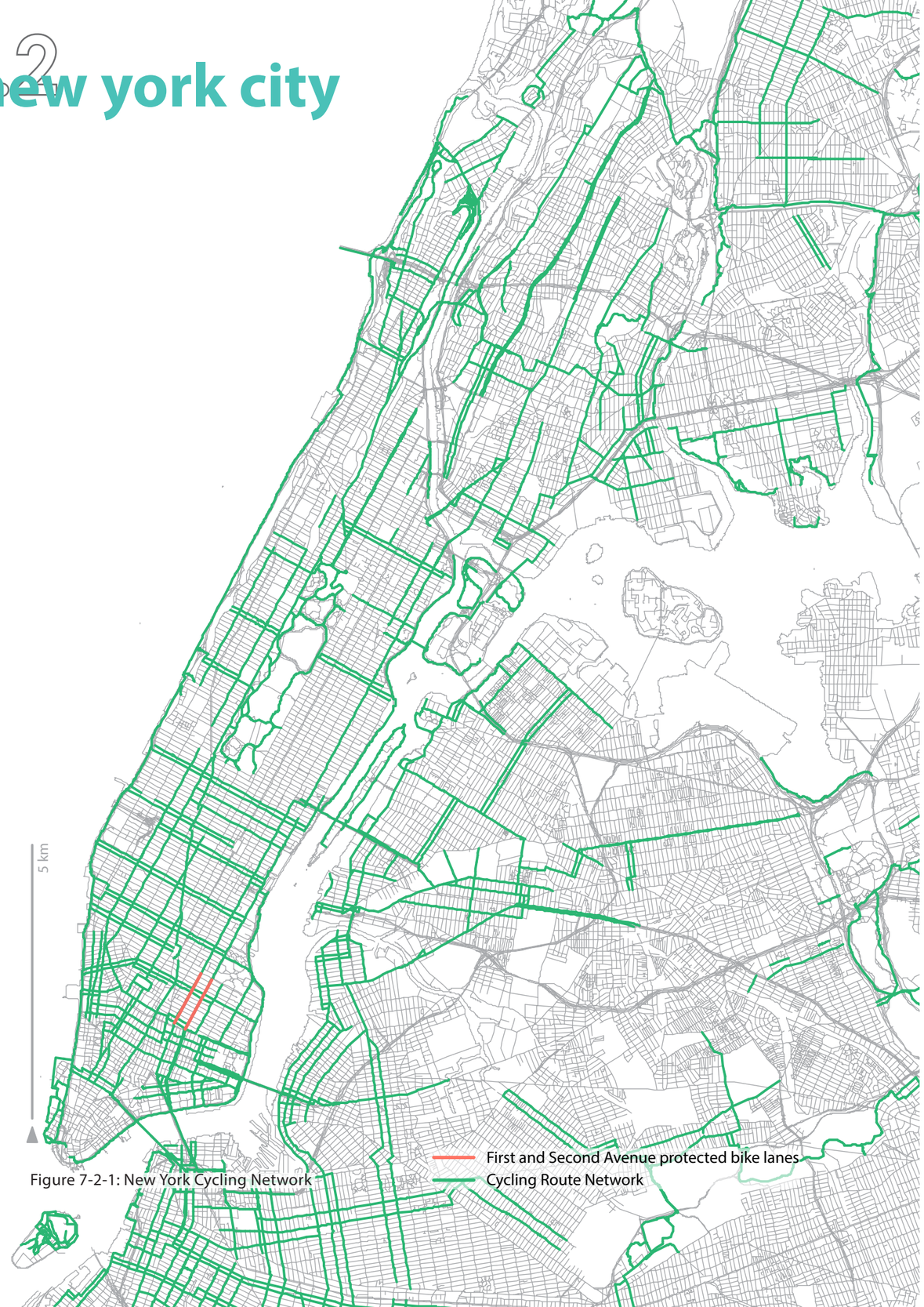


Figure 7-2-1: New York Cycling Network

CONTEXT

The East Village bike lanes run along arterial corridors that are marked mostly by mid-rise residential buildings with ground floor retail. The parking-protected and flex-post protected bike lanes are unidirectional, with the 2nd Avenue bike lane operating South, and the 1st Avenue bike lane operating North. As illustrated in Figure 7-2-1, the East Village bike lanes connect to a much larger bike network, providing seamless access into and out of the East Village. Several Business Improvement Districts (BIDs) are in close proximity to the East Village bike lanes, including Chinatown, Lower East Side BID, and SoHo Broadway BID. These commercial-cultural corridors forge a geographic relationship based on proximity; the East Village bike lanes contribute to a transportation network that connects important commercial districts in Lower Manhattan.

INTERSECTION OF BIKE LANES & BUSINESS VITALITY

The road diet of 1st and 2nd Avenues included the removal of on-street parking in favour of bike lanes and a dedicated busway (Bernier-Heroux, & Ryan, 2012). Similar to the Bloor Street Bike Lane Pilot Project, some on-street parking was maintained, creating parking-protected bike lanes. In other sections of the corridor, flex-posts serve as a guard between cyclists and traffic lanes. Despite a reduction in both on-street parking and traffic lanes, the East Village has since seen 47% fewer commercial vacancies (DOT, 2012). This statistic possibly suggests the potential bike lanes have in serving the economic interests of local businesses while enhancing the experience of cyclists.

IMPACTS

The East Village Shoppers Study (Bernier-Heroux, & Ryan, 2012) was completed in 2012 assessing public perception, usage, and economic impacts to local businesses. Surveys among 420 pedestrians were carried out to identify travel and spending patterns among residents and visitors of the East Village. Figure 7-2-4 illustrates both the average per capita and aggregate spending habits by transportation mode. A relationship between active modes of transportation and high spending habits exists in the neighbourhood that are comparable to automobile user spending habits. It suggests that investments in bike lanes could result in sustained or increased spending among local businesses. This is supported by the fact that 61% of survey respondents are more inclined to ride a bike to the neighbourhood with the addition of the protected bike lanes (Bernier-Heroux & Ryan, 2012).

WHAT CAN TORONTO LEARN?

Bike lanes are installed to encourage cycling in a safe and efficient platform within a diverse transportation network. The economic impacts of bike lanes, while not necessarily a driver of their installation, are an important factor in their legitimacy. Neighbourhood vitality is strengthened when bike lanes are acknowledged for their role in contemporary city-building, positioned alongside local business vitality, safety, health, and bikeability. For example, in a survey assessing public perception about the East Village bike lanes, 73% of respondents indicated that the bike lanes have a positive or very positive impact on the neighbourhood and community, including businesses (Bernier-Heroux, & Ryan, 2012). Understanding bike lanes as an enabler of community and economic vitality can support city planning in achieving objectives.

37%
decrease in injuries from crashes

47%
fewer commercial vacancies

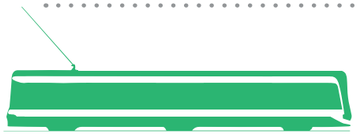
177%
increase in cycling volume

Figure 7-2-2: Key figures, East Village bike lanes.
Data source: NYC DOT, 2012

Image from Google Street View, 2017

Figure 7-2-3: New York Cycling Network & Business Improvement Districts

East Village bike lanes, NYC DOT 2012

	Average Per Capita Spending	Total Aggregate Spending
	$163	$16 485
	$158	$20 335
	$143	$2145
	$111	$16 507

Values represented in USD
Values represent weekly spending habits

Figure 7-2-4: Spending habits by mode user
Data source: East Village Shoppers Study, 2012

It behooves local business owners to continue to support amenities like protected bike lanes, bike parking, pedestrian safety improvements and reliable public transit.

Bernier-Heroux & Ryan, 2012, p. 4

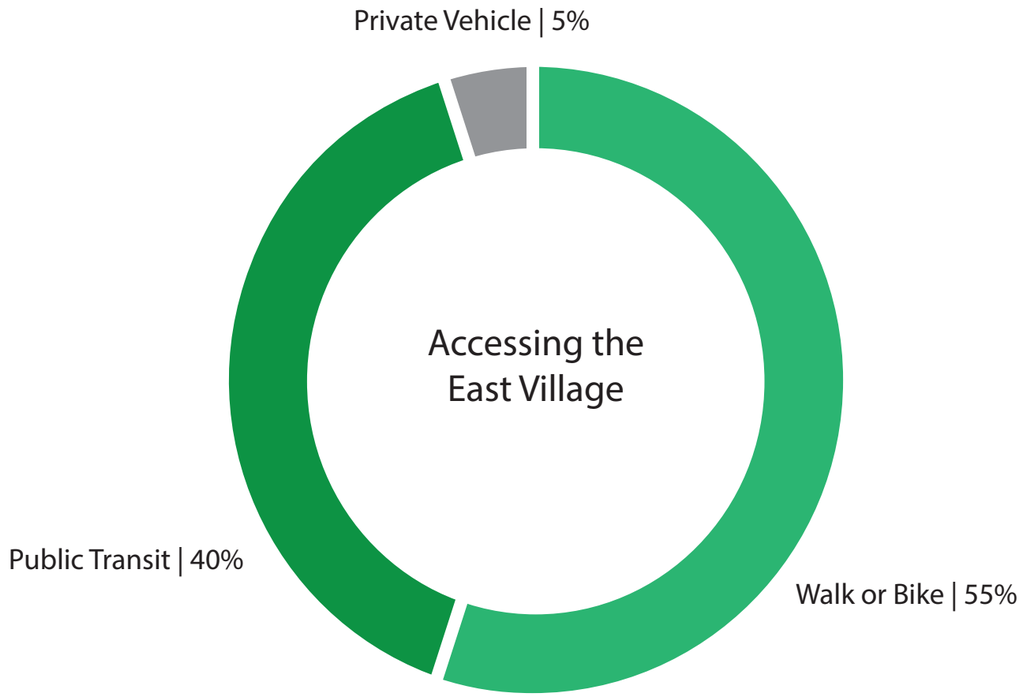


Figure 7-2-5: Access to the East Village post-bike lane installation
Data source: East Village Shoppers Study, 2012

8.0 summary of data

The merit of the Bloor Street Bike Lane Pilot lies in its ability to study the effectiveness of the infrastructure, leading to improvements that could improve all street users and impacted businesses. City planning requires that decisions are based in sound reasoning; this is especially true for decisions that involve the reallocation of street space away from the automobile and into the jurisdiction of the cyclist. In the planning and evaluation of the Bloor Street Bike Lane Pilot Project, the City of Toronto has adopted four indicators of success (City of Toronto Transportation Services, 2017):

- Public perception
- Effect on business
- Effect on motoring environment
- Effect on cycling environment (including cyclist volumes and safety)

These indicators inform a larger objective–to create a complete street that plans for contemporary planning objectives, including urban growth, urban health, urban mobility, and urban economics. This section summarizes the data available as of March 2017, including parking utilization, automobile travel times, public perception, and cyclist counts. It should be noted that the City of Toronto is undergoing a "near miss" study to assess safety of the corridor in partnership with the Transportation Research Institute at the University of Toronto and Miovision (City of Toronto Transportation Services, 2017).

PARKING UTILISATION

As referenced earlier, the pilot project has reduced the availability of on-street parking by 59 percent, from 276 to 114 paid spaces. A 2009 study revealed that at peak times, no more than 80 percent of all paid parking spaces were in use (TCAT, 2009). The Toronto Parking Authority is currently reviewing on-street parking and off-street parking use. They conducted a survey of utilization rates, hourly parking rates, and hours of operation of businesses in Summer 2016 with the goal of accommodating short-term parking to serve local businesses along Bloor Street (City of Toronto Transportation Services, 2016a). A follow up study will be conducted in Summer 2017.

PUBLIC PERCEPTION

The City of Toronto initiated an online Feedback Survey to assess public opinion to the reconfigured street design of Bloor Street. 10 800 surveys have been completed since the pilot project commenced. This seems to indicate that the majority of users of Bloor Street are in favour of the bike lanes. Figures 8-1-1 and 8-1-2 highlight trends of public opinion.

EFFECT ON MOTORING ENVIRONMENT

Preliminary data from the City of Toronto revealed that since the installation of the Bloor Street bike lanes, traffic volumes have decreased by 22 percent, from 24 500 to 20 000. Likewise, there has been no recorded significant impact to traffic volumes on the neighbouring east-west corridors of Dupont Street and Harbord Street.

Automobile travel distance times have increased both ways along Bloor Street. From Bay Street to Ossington Avenue, the following increases in travel times have been recorded:

Eastbound:	Morning Peak: 4 minutes
	Midday: 3 minutes
Westbound:	Evening Peak: 8.5 minutes
	Midday: 2.5 minutes

As a response to these findings, the City has committed to operational improvements along the corridor. This includes signage, signal timing, physical improvements to demark the bike lanes, design strategies to facilitate turning vehicles, turn restrictions, and changes to parking and loading (City of Toronto Transportation Services, 2017).

64% of 1,530 survey respondents who are local residents & businesses support or accept that the bike lanes on Bloor Street provide a safer and more comfortable environment for cyclists, with acceptable trade-offs in motorist traffic flow and parking convenience

92% of the 8,100 respondents who bike agree

34% of the 2,300 respondents who drive (and do not bike) agree

73% of the 810 respondents who walk (and do not bike or drive) agree

63% of motorists surveyed feel comfortable driving next to cyclists along Bloor Street compared to 14% surveyed in 2015 prior to the pilot installation

Figure 8-0-1: Public Perception
Source: City of Toronto Transportation Services, 2017

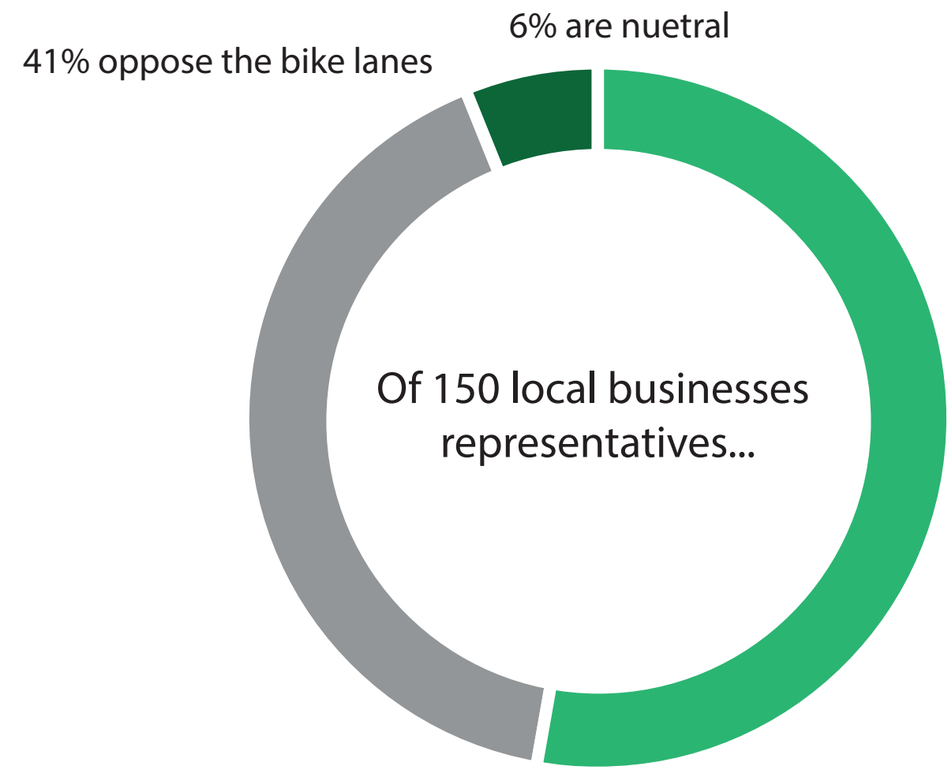


Figure 8-0-2: Spending habits by mode user
Source: City of Toronto Transportation Services, 2017

CYCLIST VOLUME

This report uses two data sources for cycling counts. The first source is by the City of Toronto Transportation Services, including *Bloor Street Bike Lane Pilot Project - Performance Evaluation and Additional Information* (2016) and *Update Bloor Street Bike Lane Pilot Project* (2017). The second source is Koehl and Caputo (2017) of the Torontoist.

These sources used different methods of data collection. The City of Toronto collected data in August 2015 and May-June 2016, prior to the pilot installation, and twice during the pilot project in October 2016 and June 2017 using 24-hour video count technology (City of Toronto Transportation Services, 2017). A potential shortcoming of this method of data collection is that seasonal patterns are not considered, particularly winter data. Koehl and Caputo used manual counting in September 2016 and January 2017. A potential shortcoming of this method of data collection was that September data was extrapolated to arrive at the January daily average.

It is important to note that the figures presented in this section illustrate separate data sources, (with different methods of data collection) alongside one another. It is acknowledged that this is not the most precise presentation of data, however, for the scope of this report, the figures are intended to illustrate overarching trends of the Bloor Street Bike Lane Pilot Project. It is for this reason that the subsequent figures are shown.

Cycling ridership is up along Bloor Street post-bike lane installation. The City of Toronto has reported a 36% increase in cyclists using Bloor Street; of this ridership, 25% represent new cyclists, while the remainder represent cyclists who have diverted from neighbouring routes (City of Toronto Transportation Services, 2017). This translates to an overall higher proportion of cyclists using the Bloor Street corridor compared to pre-installation (Figure 8-0-4). Figure 8-0-3 illustrates the modal share breakdown of commuters in Toronto, a graphic intended to provide some context to the figures represented on Bloor Street.

There is an obvious correlation between months with warmer weather and cycling volume. That said, winter weather and cycling are not mutually exclusive, and Koehl and Caputo have attempted to defeat the myth that cyclists and winter do not mix by collecting data in January 2017. The fact that the ratio of automobiles to cyclists in January 2017 is higher than in August 2015 suggests that bike lanes encourage use, even during winter.

Refer to Figures 8-0-5 and 8-0-6 additional information regarding seasonal cyclist volume.

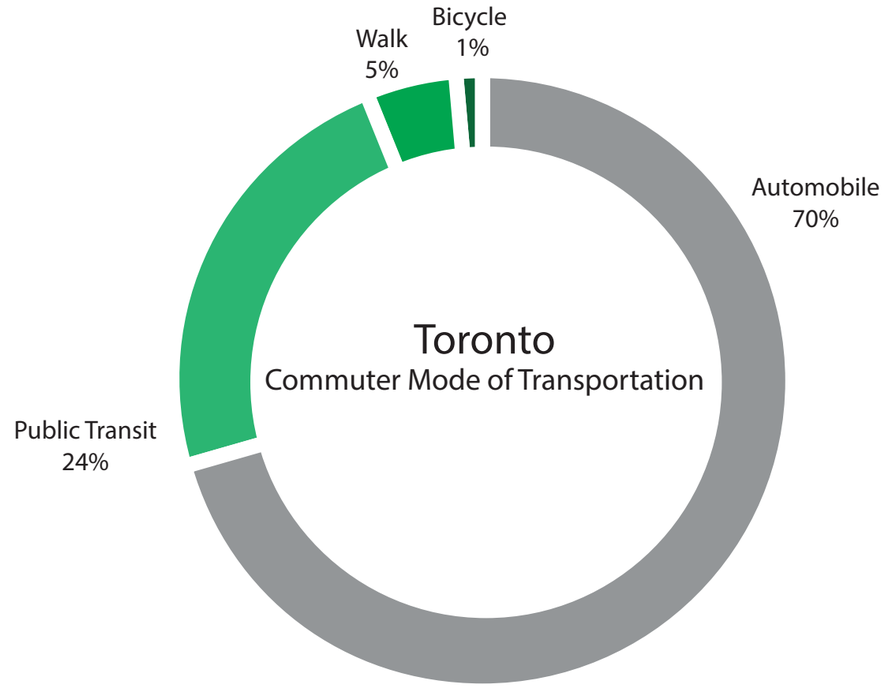


Figure 8-0-3: Data illustrates local employed population 15+ with a usual place of work by mode of transportation, Toronto CMA
Source: National Houshold Survey, 2011

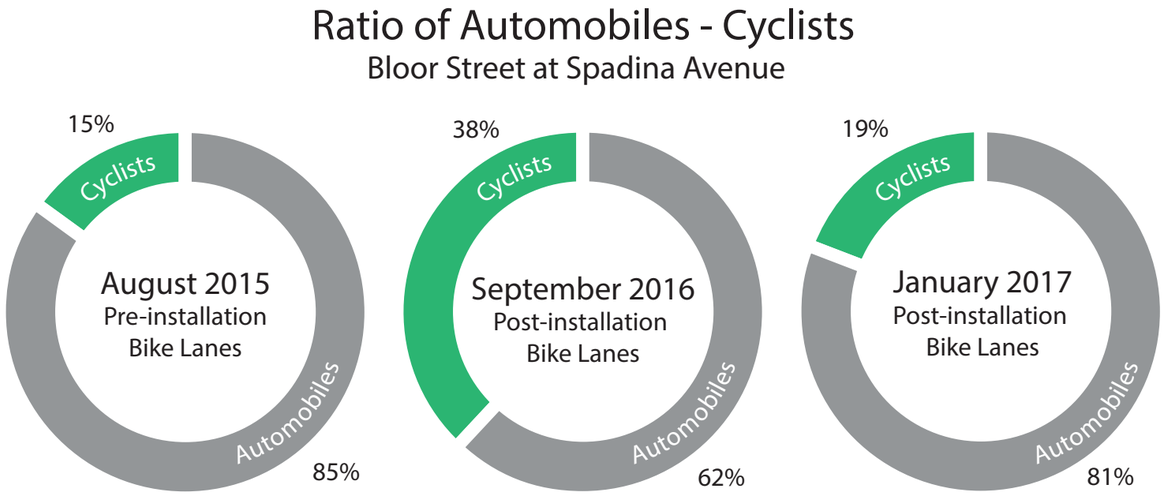
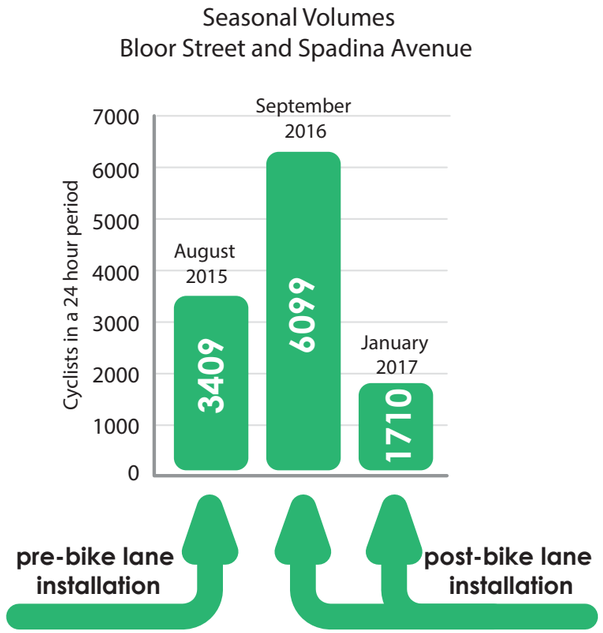


Figure 8-0-4: Distribution of cyclists to autombiles

* August 2015 data recorded over a 24 hour period on Bloor Street at Spadina Avenue (City of Toronto Transportation Services, 2016a).
* September 2016 data based on a 24 hour period on Bloor Street at Spadina Avenue (Koehl and Caputo, 2017).
* January 2017 automobile figure based on data collection on January 25, 2017 on Bloor Street at Spadina Avenue (Koehl and Caputo, 2017).
during 08:00 and 09:00. Cyclist figure based on cyclist data collection from 16 January to 27 January, 2017 between 08:00 and 09.00 (Koehl and Caputo, 2017).



* August 2015 data recorded over a 24 hour period on Bloor Street at Spadina Avenue (City of Toronto Transportation Services, 2016a).
* September 2016 data based on a 24 hour period on Bloor Street at Spadina Avenue (Koehl and Caputo, 2017).
* January 2017 data based on an average of counts from January 17 to 27, 2017 on Bloor Street at Spadina Avenue during 08:00 and 09:00. Septmeber 2016 data was extrapolated to arrive at the January daily average (Koehl and Caputo, 2017).

Figure 8-0-5: Seasonal cyclist volume

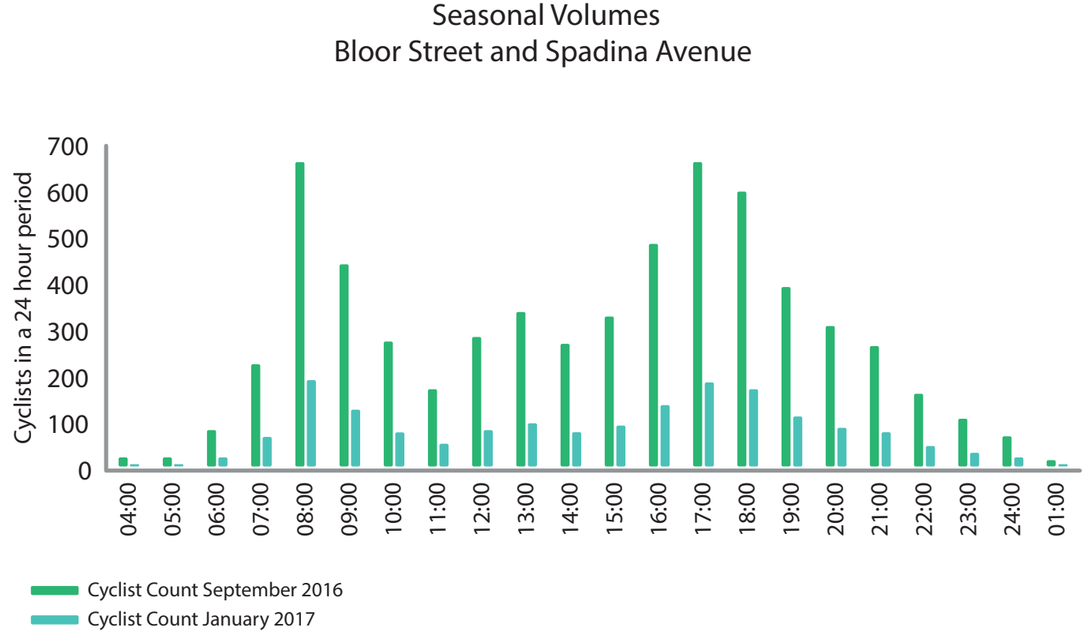


Chart Source: Koehl and Caputo, 2017.

Figure 8-0-6: Hourly comparison of seasonal cyclist volume

March 2017: Photo looking West on Bloor Street at Euclid Avenue

9.0 conclusion

March 2017: Photo looking East on Bloor Street Euclid Avenue

9.1 summary of findings
& looking forward

Transportation diversity is important to the city, as the benefits of active transportation are increasingly recognized in land use planning decisions (Litman, 2014). This report has demonstrated the relationship between bike lanes and economic impacts in an attempt to understand the value of bike lanes to the contemporary city. The Bloor Street Bike Lane Pilot Project provided a lens to understand the multi-dimensionality involved in a street diet within a broader framework of urban sustainability.

The following summarises the most important findings of this report:

1. Cyclists are good for business, with comparable spending patterns to automobile users.

2. The installation of bike lanes appear to result in increases in economic activity and cyclist volume. The reallocation of street space from automobile use to cyclist use is a common practice, and numerous contexts have reported positive economic impacts to local businesses after bike lane installation.

3. Preliminary data suggests that the Bloor Street bike lanes have increased cyclist volume considerably, and are well received by cyclists, drivers, and local business owners.

4. Transportation infrastructure should reflect a diversity of users and uses of space. Bike lanes enhance an efficient, safe, and accessible transportation network. They also contribute to the safety, health, and bikeability of the city.

5. Provincial and municipal policy and neighbourhood planning guidelines include the importance of cyclists and cycling-specific infrastructure, but do not consider their economic impacts on the local business landscape.

The Bloor Street Bike Lane Pilot Project is nearly halfway through its lifespan before Toronto City Council votes on its permanence. This report is carried forward through the following questions:

1. What does the eventual outcome of the Bloor Street Bike Lane Pilot Project mean for the changing conversation regarding active transportation and cycling-specific infrastructure in Toronto?

2. What are the economic impacts of the Bloor Street bike lanes to local businesses?

3. How have the Business Improvement Areas along Bloor Street responded to the bike lanes?

4. How has the reallocation of road space on Bloor Street from on-street parking to bike lanes impacted or changed the consumer base of local businesses?

5. Can the Bloor Street Bike Lane Pilot Project be used as a precedent for similar road diets in Toronto?

As the City of Toronto awaits data on the impacts of cyclists and bike lanes on the Bloor Street retail landscape, this report has illustrated two important claims. First, cyclists (and the infrastructure that supports them) are good for business. A synthesis of literature has demonstrated that cyclists are contributors to the retail landscape and the vitality of a neighbourhood. The reallocation of road space from automobile-use to bike lanes is an efficient use of space as it enhances the diversity of the city's transportation network. This adds choice, access, safety, and efficiency to the existing mobility network. Second, this report has also determined that, while the economic impacts of bike lanes to local businesses are important, it should not solely determine the legitimacy of the Bloor Street bike lanes. Bike lanes speak to a larger conversation of urban sustainability and contribute to the contemporary planning of the city.

9.2 final recommendations

1. City Council approve the Bloor Street Bike Lane Pilot Project as a permanent fixture to Bloor Street:

This recommendation is informed by a comprehensive literature review and is justified on four accounts. First, cyclists and bike lanes are good for business. Cyclists contribute to the local retail landscape. Second, protected bike lanes increase the actual and perceived safety of cyclists, resulting in an increased volume of cyclists. Third, bike lanes support municipal and provincial objectives in facilitating active transportation in urban settings. Finally, the Bloor Street bike lanes arguably represent an efficient use of space. For example, the installation of protected bike lanes along Richmond and Adelaide Streets in Toronto saw an increase in person capacity, despite a reduction in automobile lanes (City of Toronto, 2017). For these reasons, it is recommended that the Bloor Street Bike Lane Pilot Project be made permanent.

2. The Bloor Street Bike Lane Pilot Project should learn from its trial run:

The data collected regarding automobile travel time, cyclist safety and opinion, and feedback from local retailers should be reflected in the design of the bike lanes. Design changes would cater to the needs of automobiles and local retailers while not compromising the use of the bike lanes for active transportation users. Examples include increasing on-street parking where feasible, prioritizing traffic signals to increase automobile travel time, and installing more flex-posts to prevent drivers from illegally occupying bike lanes.

3. The Bloor Street Bike Lane Pilot Project be expanded West to Dundas Street West and East to Sherbourne Street:

This recommendation is supported by Toronto's Cycling Network Ten Year Plan, a plan that seeks to connect the gaps in the existing network, as well as expand the existing network.

4. Provincial and municipal policy regarding cyclists and bike lanes should include economic impacts to local businesses:

The economic impacts of cyclists and bike lanes should be included in policy, demonstrating the importance of transportation diversity to the business landscape of the city. This would position bike lanes within a sound and comprehensive planning framework. Policy should enable the planning of space to include a diversity of users in meaningful ways that are economically viable. This could mean eroding hierarchical divisions between road users, celebrating active transportation culture, and acknowledging the economic contributions of cyclists.

Urban sustainability integrates the economic, societal, and environmental issues of a city within a multi-dimensional framework. These recommendations speak to a larger conversation about contemporary city planning. According to Metrolinx, traffic congestion in the Greater Toronto and Hamilton Area (GTHA) is a growing concern, with mounting social, economic, and ecological costs (Greater Toronto Transportation Authority, 2008). By 2031, Metrolinx predicts that congestion will cost residents of the GTHA $7.8 billion per year (Greater Toronto Transportation Authority, 2008). Cycling can alleviate many urban-related concerns, with congestion surely being at the forefront. Thus, a shift in travel behaviour should be supported by interventions in space that support active transportation users. Bike lanes restore power into the hands of cyclists seeking a safe, clean, accessible, and efficient transportation network; empowering cyclists through the installation of bike lanes is important to achieving a diverse transportation network.

In the planning of the 21st Century Street, there are competing users of space with competing opinions on the best use of that space. Planners are to consider the greatest public good in the design and execution of their plans for the city. What public is served through the Bloor Street Bike Lane Pilot Project–is it the cyclists who use them, is it the businesses that front onto them, or is it the pedestrians whose experience is enhanced by them? This is where planners need to decide where to place value. The 21st Century Street recognizes all users of space, a model that celebrates this diversity. Bike lanes are an important part of urban mobility and can contribute to the contemporary planning of the city.

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