A POLICY GUIDE:

MAKING PARKING LOTS AND COMMERCIAL DRIVEWAYS SAFER FOR PEDESTRIANS

Saira Shah
Masters of Planning (Candidate)

Dalhouise University

Technical Advisor: Dr. Ren Thomas
Course Instructor: Dr. Jill Grant

December 9, 2016

Table of Contents:

How to Use the Guide

I compared nineteen policy documents created in practice to improve pedestrian safety policies. Each document was assessed based on a set of criteria to determine if it is well written and includes valuable pedestrian safety infrastructure. The findings from this research were used to create the guide. This guide is intended to aid municipal planners in the policy writing process to develop a pedestrian safety policy for parking lots and commercial driveways.

Organization of the Guide:

Background Research:
The guide starts with an introduction to the topic, a literature review, and the method I used for conducting this research. I included a list of the nineteen documents used in the assessment with their final ranking and online links to access the documents.

Elements of a Well-Written Policy:
•Planning Aid England definition for the criteria
•Explanations- What the criteria means and why it should be considered when creating a policy?
•Document Examples- From the highest-ranking documents
•Discussion- Why does the example meet the criteria and what can a policy maker learn from the example?

Pedestrian Safety Features:
•The List of Safety Features
•Document Examples- Provided to highlight how different municipalities included the features in a policy

Lessons Learned and Conclusions:
At the end of the guide, I included aspects to avoid when creating a pedestrian safety policy and tips for implementations to ensure the policies will be effective and make parking lots and commercial driveways safer for pedestrians.
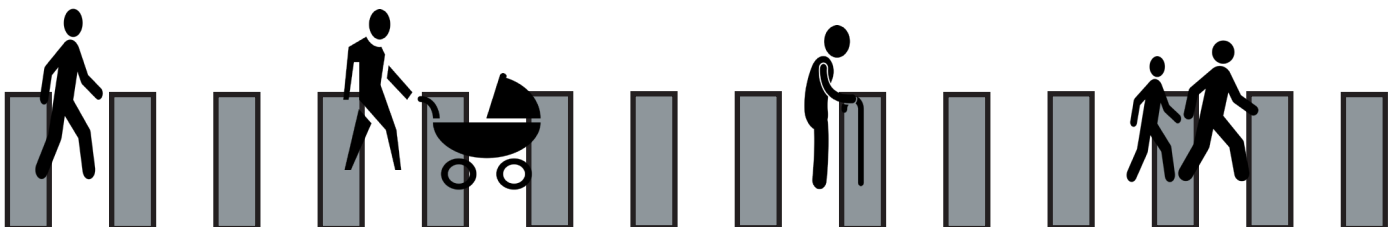
Introduction

Commercial developers do not typically prioratize pedestrians in the design of parking lots and commercial driveways. Pedestrians are forced to walk in direct traffic and share the space with cars operated by distracted drivers looking for parking spots (Stark, 2012). The interaction between drivers and pedestrians causes conflict that leads to unsafe conditions for pedestrians. Everyone who visits a commercial development is a pedestrian. A person may walk from their home, the bus stop, or their car to the store. If everyone is walking at some point during their visit, why are pedestrians not included in the design process? Certain municipalities are taking the lead by incorporating pedestrian safety initiatives into their policies and guidelines. In my research, I analyzed nineteen plans and design guidelines in North America and ranked each document based on a set of writing and pedestrian safety criteria. I used criteria from a Planning Aid England document to determine the quality of the policy maker's writing. The second set of criteria I used was determined by a literature review of pedestrian studies to identify pedestrian safety infrastructure that can be included in a pedestrian safety policy. A well written and researched policy document that is fully implemented can create safer conditions for pedestrians.

Literature Review

Once I identified that pedestrian infrastructure in parking lots and commercial driveways could be improved, I began to research how these spaces can be made safer for pedestrians. I focused on two key elements of a pedestrian safety policy: the quality of the policy maker's writing and the pedestrian safety features that could be included in the policy. The quality of the writing ensures that the policy will be interpreted and implemented as the policy maker intended. The pedestrian safety features would create a safer environment for pedestrians to navigate parking lots and commercial driveways. For the literature review, I looked at guides created by national planning associations and scholarly pedestrian safety studies to build the criteria for the policy assessment.

The Planning Aid England document was chosen as a base for assessing the quality of a policy maker's writing for multiple reasons. Planning Aid England is a reputable research and communication organization that is part of the Royal Town Planning Institute, which is the professional planning organization for the United Kingdom. The Canadian Institute of Planners and the American Planning Association created resources to aid municipalities in the policy writing process focused on the research content of the policies. However, the Planning Aid England document specifically focuses on the quality of the policy maker's writing, which is an aspect of policy creation I wanted to emphasis in the guide.
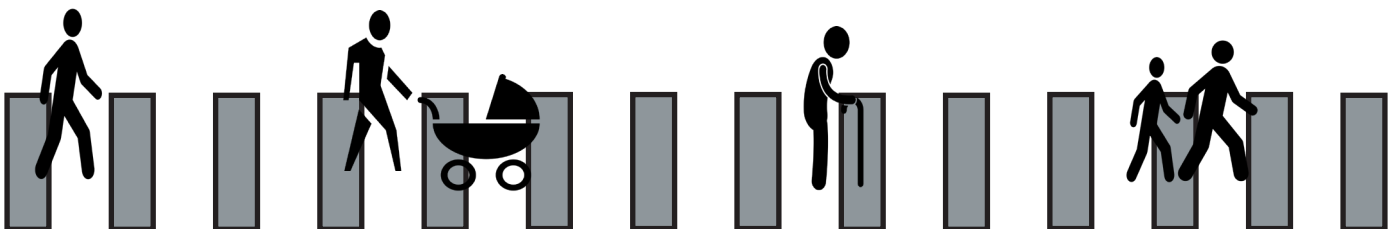
Several studies focusing on the way pedestrians use space have been completed. These studies typically focus on physical design features that encourage walking and create safer spaces. Although most of these examples are not based on parking lots, many of the factors can affect pedestrians in the same way. A study in Europe found that the presence of a sidewalk can make pedestrians feel welcomed (Granie et al., 2015). The size of the sidewalk can determine the balance of power between cars and pedestrian, with wider sidewalks making pedestrians the priority (Granie et al., 2015). Another study found that sidewalks need to be continuous and convenient to use to create a connected and protected pedestrian network (Stevens et al., 2014). Drivers will think they do not have to watch for pedestrians if pedestrian infrastructure, such as sidewalks and crosswalks, is not present or visible (Granie et al., 2015). Stark performed an extensive study comparing different methods to improve pedestrian safety in parking lots (Stark, 2012). A raised pedestrian median between parking aisles could provide a safe environment for pedestrians to walk and prevent vehicles from driving across parking aisles (Stark, 2012). A separate pedestrian pathway on driveways has been associated with a lower risk of injury and can create a safer environment for pedestrians (Shepherd et al., 2010). Charness found that older pedestrians have a slower reaction time to hazards and their speed of movement affects their ability to avoid accidents (Charness, 2012). Infrastructure to slow vehicular traffic provides a longer reaction time for drivers and pedestrians. I used these studies to create a list of design features that could improve safety for pedestrians.

There are several studies on physical features that can improve safety for pedestrians. However, few studies attempt to compare how research is adapted in practice. A study in North Carolina focused on the way pedestrian master plans in North Carolina deal with pedestrian safety by using content analysis (Jones, 2010). This study specifically focused on the use of the word "safety" in pedestrian plans. My research focused on pedestrian infrastructure such as crosswalks and pedestrian medians that can create safer spaces for pedestrians. Jones' study also does not differentiate the way pedestrians are dealt with on public land versus private land (Jones, 2010). My research is specifically on planning policies and guidelines related to private and public parking lots and driveways. Policies related to public streets often include pravisions such as sidewalks and crosswalks, but those provisions are not as prevalent in policies related to private land uses.

Increased pedestrian safety is an achievable goal. Municipalities can do this with plans, by-laws, and policies that can regulate the design of parking lots and commercial driveways to include pedestrians. These spaces should be considered shared spaces for both drivers and pedestrians to feel safe and welcomed (Stark, 2012). The literature on pedestrians highlights which design features can create a safe space for pedestrians. Knowledge gained from my comparison of nineteen documents will be useful for practicing planners to create a pedestrian safety policy for their municipalities.
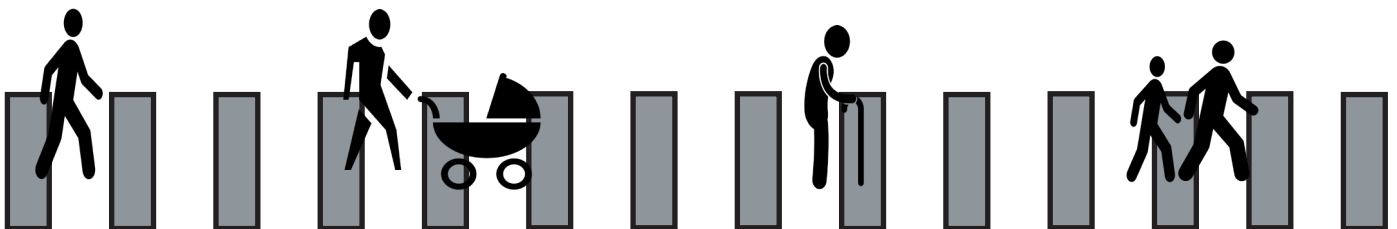
6

Method

To perform the content analysis, the main set of data is from publicly accessible policy documents. The list of documents used in the analysis are a sample of policies and guidelines created by municipal planning departments in North America. The documents were obtained through an online search. Due to time constraints, the first nineteen documents that I discovered that contained phrases such as "pedestrians" and "parking lots" or "driveways" were used for this analysis. The ranking method was created based on definitions included in the Planning Aid England document and a literature review to determine safety features that could be included in a pedestrian safety policy. The Planning Aid England document was chosen for several reasons. The Canadian Institute of Planners and the American Planning Association created resources to aid municipalities in the policy writing process. However, these documents focus on what should be included in the policies rather than how the policies should be written. The Planning Aid England document specifically focuses on the quality of the policy maker's writing which is an aspect of policy creation I wanted to emphasize in the guide.

A good policy would include each of these criteria:

• Have a specific intention (purpose): "be clear about what you are seeking to achieve and what the outcome of applying the policies is intended to be" (Planning Aid England, 2015, P. 6).
• Be clear and unambiguous: "policies should be drafted with sufficient clarity that a decision maker can apply them consistently and with confidence when determining planning applications. Care needs to be taken in order to ensure that your intention is clear and that your policies do not include words that are open to different interpretations" (P. 6).
• Be flexible: Provides options for implementation. "Care needs to be taken in using terms such as 'must' and 'preserve.' This is because it discourages positive change which could improve and enhance the neighbourhood plan area" (P. 7).
• Use positive language: "planning policies should use positive language, looking at ways to enhance and improve your area. The words 'encouraged,' 'supported' and 'will be permitted all convey positive approaches to development" (P. 7).
• Include evidence: "evidences should be provided to support your policies and the choices you have made" (P. 8).
• Have a clear plan for implementation and enforcement: "the policies must set out the time period for which it will apply and a clear plan for implementation" (P. 8).
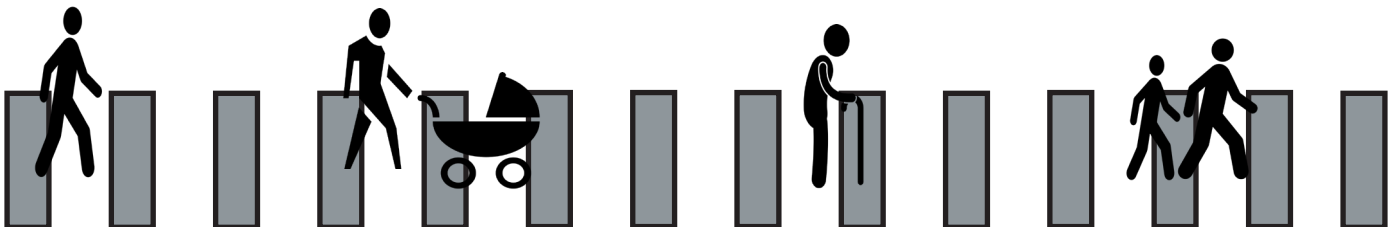
I ranked each item based on my intrepretation of the definitions included in the Planning Aid England document. Examples have been included in the guide to illustrate how I intrepreted the definitions:
0 (Does not meet the requirement)
1 (Meets the requirement)

I identified the safety features based on a literature review of pedestrian safety studies. The studies were used to determine what pedestrian infrastructure could create a safer environment for pedestrians.

• The creation of defined pedestrian paths (using colours or textures to differentiate pedestrian and vehicular space)
• The inclusion of sidewalks (a pedestrian path separated from vehicular traffic)
• The inclusion of painted crosswalks (a pedestrian path allowing pedestrians to cross a lane of vehicular traffic safely)
• The utilization of infrastructure to slow vehicular traffic (stop signs, speed bumps, etc.)
• The implementation of a pedestrian median (a pedestrian path located between parking aisles to allow pedestrians to cross from one end of the parking lot to the other safely)
• The creation of a pedestrian network (creating a path to connected pedestrians to all aspects of the space safely through a combination of sidewalks, crosswalks, and pedestrian medians)

I ranked each item:
0 (Does not include this safety initiative)
1 (Does include this safety initiative)

I imported the rankings into an Excel spreadsheet. The rankings were used to determine which policies were well written and if key safety features had been included in the policies. The results of the ranking are included in the "Content Analysis Results" section. Once the ranking was complete, I then reviewed the documents that received a high ranking to find examples of each criteria for the guide. I also reviewed the documents that received a low ranking to provide examples of what to avoid or improve upon when writing a pedestrian safety policy on parking lots and commercial driveways. The organization of the guide is based on the criteria. Each writing criterion is explained based on the Planning Aid England document. It is then illustrated with an example from the nineteen planning documents I reviewed. A discussion section is included for each criteria to highlight the lessons that can be learned from that document example. The safety criteria are explained in the literature review to highlight why certain infrastructure creates safer spaces for pedestrians. Examples from the high-ranking documents that meet the safety criteria are included in the guide to illustrate how the infrastructure can be included in a policy. The overall lessons and insights I discovered while reviewing the nineteen documents were used to create the "What to Avoid" and "Implementation" sections of the guide.
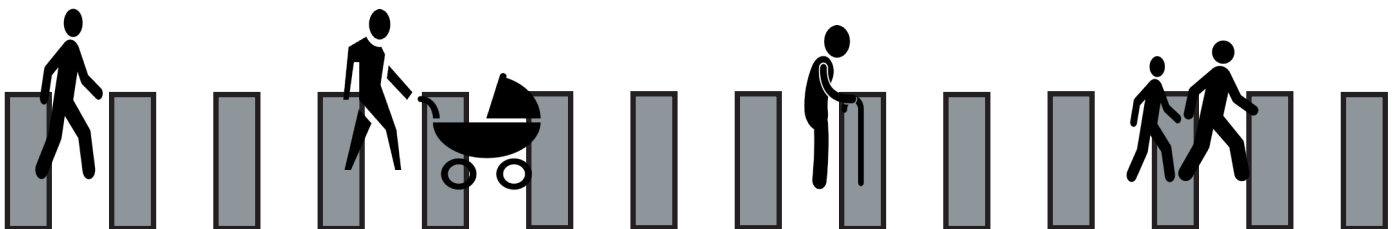
8

Limitations

1. I was not able to review every policy or guideline created by a municipality that includes pedestrian safety initiatives in parking lots and commercial driveways.

Unfortunately, it would be difficult to ensure that every policy is included. There is no set name for this type of policy. To ensure there is a variety of documents various terms and key phrases related to this topic were searched. I used the "find" function to identify if the topic of "pedestrians" and "parking lots" or "driveways" is located anywhere in the document to determine if the document can be used for this project. If those phrases were not used in the document, it was not considered a candidate for this project. This method for choosing documents allowed me to identify a document related to my topic quickly. Considering the time constraints on the project, I attempted to be as extensive in a search for documents as possible.

2. Researcher bias is a factor to consider when viewing the results.

Qualitative analysis is based on the researcher's interpretation which means one researcher may consider a policy clear and flexible while another researcher may not. I tried to account for researcher bias by adhering to the definitions provided in the Planning Aid England document. I also provided explanations in the guide to illustrate why a policy received a certain ranking.

3. I will not be able to evaluate the success of the implementation of the documents reviewed.

The purpose of this study is to learn from the writing of the policies and what is and is not included. Most of the policies that I reviewed were created within the last 5 to 10 years. It is difficult to fully assess the success of implementation because the results have not been realized. However, I would encourage further research on this topic that may build on my study. In the future, another researcher could potentially use the list of documents that I compiled to assess the success of implementation.
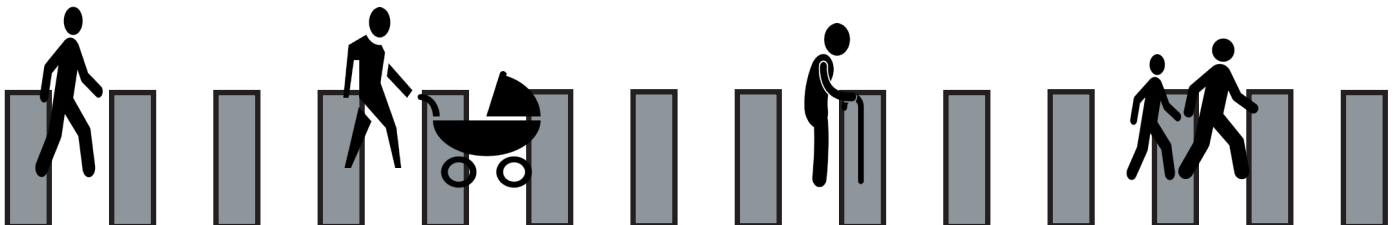
Content analysis Results

Although the focus of this guide is on learning how to write great pedestrian safety policies and providing examples to inform municipal planners, I included tables to illustrate some of the results of the content analysis that may be useful for further research.
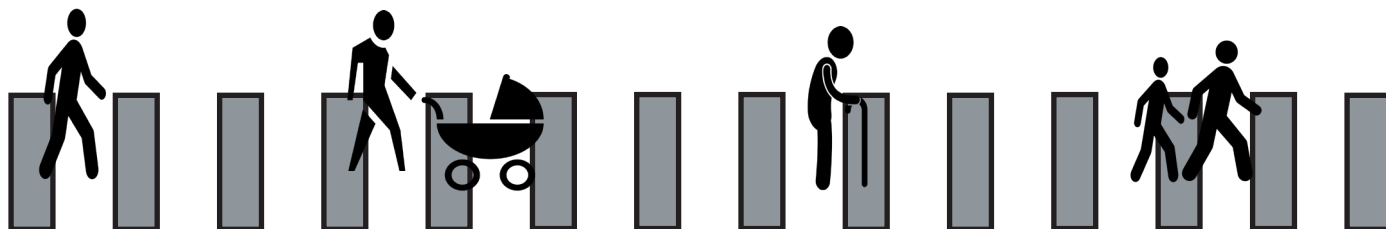
List of Documents with Criteria Ranking for Each Document:

| Document	Ranking for the Document (out of 12)	Reference
Boston Region's Pedestrian Transportation Plan (Boston, MA)	7	MAPC Project Team. (2010). Accessed on September 3, 2016. http://www.mapc.org/sites/default/files/PedPlan_Intro.pdf
Commercial Development Design Guidelines (Lafayette, CO)	10	City of Lafayette. (2007). Accessed on September 3, 2016. http://www.cityoflafayette.com/DocumentCenter/Home/View/130
Commercial Urban Design Guidelines (London, ON)	8	City of London Planning Division. (1999). Accessed on September 3, 2016. https://www.london.ca/business/Resources/Guideline-Documents/Documents/Commerical-Urban-Design-Guidelines%20-%20November%201999.pdf
Community Design Guidelines (Town of The Blue Mountains, ON)	5	GSP Group Inc. (2012). Accessed on September 3, 2016. http://www.thebluemountains.ca/public_docs/documents/CDG-June2012.pdf
Design Guidelines for Greening Public Parking Lots (Toronto, ON)	11	Toronto City Planning. (2013). Accessed on March 9, 2016. http://www1.toronto.ca/city_of_toronto/city_planning/urban_design/files/pdf/greening_p-lot_guidelines_jan2013.pdf
Design Standards for Commercial and Community Facility Parking Lots (New York, NY)	3	NYC Department of City Planning. (2007). Accessed on March 9, 2016. http://www1.nyc.gov/assets/planning/download/pdf/plans/parking-lots/parking_lot_present.pdf
Design Standards for Pedestrian Circulation in Commercial and Industrial Areas (Lincoln, NE).	10	City of Lincoln. (2006). Accessed on September 3, 2016. https://www.lincoln.ne.gov/city/attorn/designs/ds3105.pdf
Parking & loading Design Guidelines (Ventura, CA)	7	Ventura County Planning Division. (2009). Accessed on March 9, 2016. http://vcrma.org/planning/pdf/ordinances/guidelines/Parking_Design_Guidelines_12-28.pdf
Site Plan Guidelines (Hamilton, ON)	7	City of Hamilton. (2003). Accessed on March 9, 2016 https://www.hamilton.ca/sites/default/files/media/browser/2014-12-18/site-plan-guidelines-section1.pdf

Document	Ranking for the Document (out of 12)	Reference
Parking Design Guidelines (Vaughan, ON)	11	City of Vaughan Policy Planning Department. (2016). Accessed on March 9, 2016. https://www.vaughan.ca/projects/policy_planning_projects/ city_wide_parking_standards_review/General%20Documents/ Draft%20Web%20Version%20Parking%20Design%20Guide- lines%20Oct%2021.pdf
Parking Design Manual (San Diego, CA)	8	County of San Diego. (2013). Accessed on September 3, 2016. http://www.sandiegocounty.gov/pds/docs/Parking_Design_Manu- al.pdf
Parking Lot Landscaping Or- dinance & Design Guidelines (Glenview, IL)	3	The Village of Glenview. (2009). Accessed on March 9, 2016 http://www.glenview.il.us/government/Documents/Parking_Lot_ Landscaping.pdf
Parking Structure Design Guide- lines (Sunnyvale, CA)	7	City of Sunnyvale Community Development/Planning Division. (2015). Accessed on March 9, 2016. http://sunnyvale.ca.gov/Portals/0/Sunnyvale/CDD/Planning/Plan- ning%20Library/ParkingStructureDesignGuidelinesWeb.pdf
Pedestrian Master Plan (North Vancouver, BC)	7	Opus International Consultants (BC) Ltd. (2009). Accessed on March 9, 2016. https://www.dnv.org/sites/default/files/edocs/pedestrian-mas- ter-plan.pdf
Urban Design Manual (Kitchen- er, ON	4	City of Kitchener. (2014). Accessed on September 3, 2016 https://www.kitchener.ca/en/businessinkitchener/resources/Par- tA-UrbanDesignGuidelines_JULY2014.pdf
Pedestrian Master Plan (Victo- ria, BC)	6	Opus Hamilton Consultants Ltd. (2008). Accessed on March 9, 2016. http://www.victoria.ca/assets/Departments/Engineering~Pub- lic~Works/Documents/transportation-pedestrian-master-plan.pdf
Pedestrian Plan (Cambridge, MA)	10	City of Cambridge. (2000). Accessed on March 9, 2016. http://www.cambridgema.gov/~/media/Files/CDD/Transportation/ Pedestrian/ped_plan_2000.pdf
Parking Structure Design Guide- lines (Lincoln, NE)	6	Carl Walker, Inc. (2012). Accessed on September 3, 2016. http://parkandgo.org/media/parking_studies/appendI.pdf
Retail Commercial Design Guidelines (Westminster, CO)	10	City of Westminster. (2011). Access on March 9, 2016 http://www.ci.westminster.co.us/Portals/0/Repository/Documents/ CityGovernment/commstd.pdf
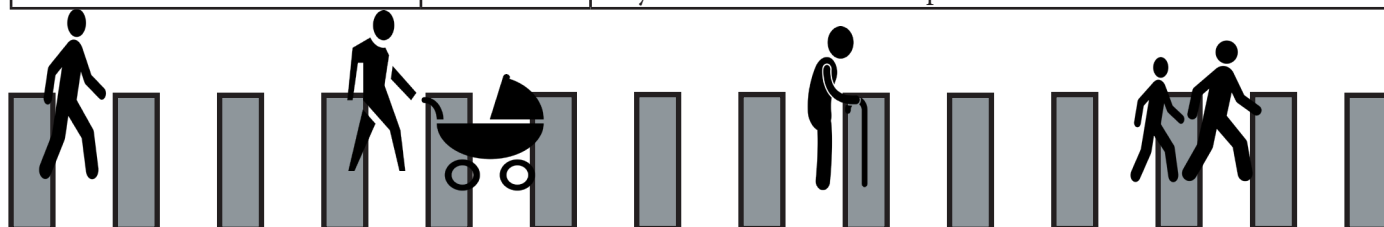
The Document Rankings for Each Criteria:

| Criteria	Number of Documents That Meet the Criteria
Have a specific intention (purpose)	19
Be clear and unambiguous	11
Be flexible	15
Include evidence	4
Use positive language	11
Have a clear plan for implemention and enforcement	10
Include defined pedestrian paths	12
Include sidewalks	16
Include printed crosswalks	11
Utilize infrastructure to slow vehicular traffic	8
Include pedestrian medians	9
Create a pedestrian network	14
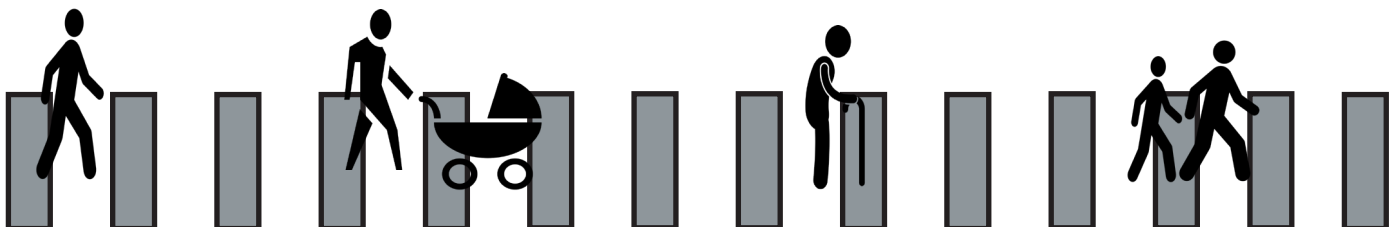
Discussion:

  The ranking system was used to determine which documents met the criteria and which documents could be improved. The documents with the highest-ranking were used to provide policy examples for the guide to illustrate each criteria. The documents with the lowest-ranking were used to provide examples in the guide of what to avoid or improve upon. Among all nineteen documents, there was an even distribution in rankings, which suggests a wide range in the quality of policy documents.

  The document rankings for each criteria table illustrates what current policies and guidelines are doing well and what could be improved. Every document had a specific purpose statement and most included policies that were flexible and included sidewalks. However, there is a lack of evidence being used and a clear plan for implementation. Only four of the nineteen documents included evidence. Evidence provides support for the policy and reinforces the policy objective. Implementation plans were found in ten of the nineteen documents. Implementation highlights how these policies will be used and effectively create safer environments for pedestrians. Both aspects are crucial for a strong policy document. In terms of the safety features, eleven of the nineteen documents did not include measures to slow vehicular traffic or pedestrian medians. The speed in which cars travel is particularly concerning when considering elderly shoppers have a slower reaction time. Pedestrian medians another safety feature that allows shoppers to access the entire parking lot safely, were suggested in nine of the documents.

How to Write the Pedestrian Safety Policy

This section of the guide will illustrate how to write a pedestrian safety policy based on key elements of a well-written policy and the pedestrian safety features that can be included to create a safer environment for pedestrians.
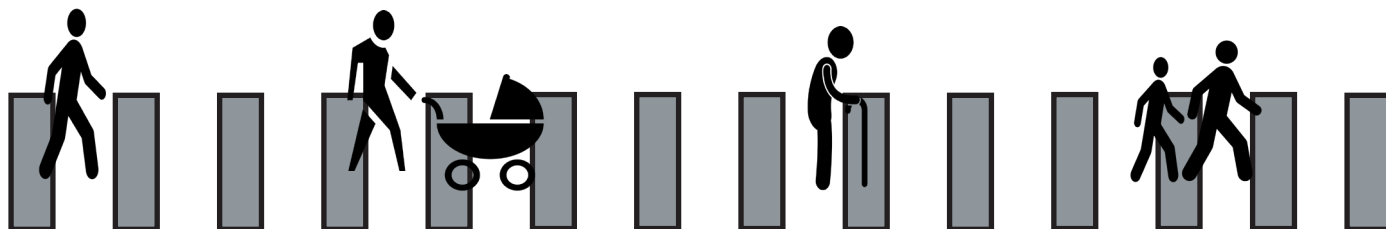
Elements of a Well-Written Policy

Each of the elements identified in this section are based on the Planning Aid England document. The quality of the writing should be a consideration because it can affect the interpretation and implementation of the policy. Although the criteria are useful to consider when creating a pedestrian safety policy, these criteria would also assist in the writing of various other types of planning policies.

Have a Specfic Intention (Purpose):

"Be clear about what you are seeking to achieve and what the outcome of applying the policies is intended to be" (Planning Aid England, 2015, P. 6).

The purpose statement sets the tone for the policy document by introducing the reader to the policy objective. The purpose statement should address why the policies were created and what the municipality hopes to achieve. The objective should be clear and specific to articulate an achievable goal.

Document Example-Toronto, ON: "The Design Guidelines for 'Greening' Surface Parking Lots [respond to] both the [urban design and environmental challenges] associated with a surface parking lot. The Guidelines are intended to create surface parking lots that are not only [efficient, but also safe, attractive and environmentally responsible.]" (Toronto City Planning, 2013, P. 1)

This is a clear purpose statement because it provides a specific reason for creating the policies and identifies the policy objective. The purpose for this policy document is to address urban design and environmental challenges. The objective is to create surface parking lots that are efficient, safe, attractive, and environmentally responsible. This purpose statement is short and specific giving the reader key background information that can be used to interpret the policies.
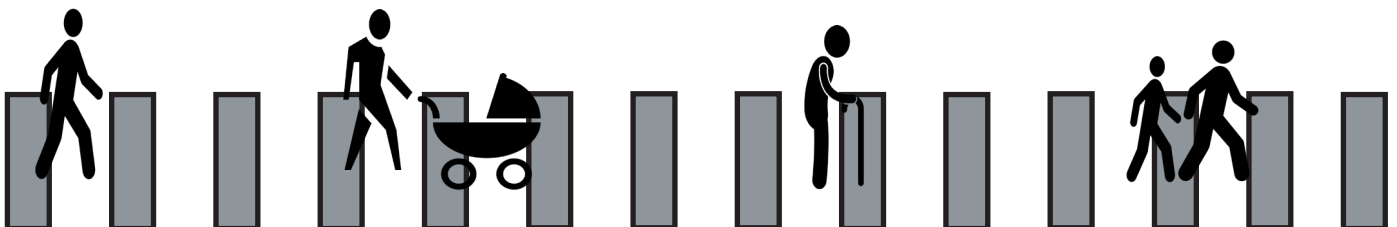
Be Clear and Unambiguous:

"Policies should be drafted with sufficient clarity that a decision maker can apply them consistently and with confidence when determining planning applications. Care needs to be taken in order to ensure that your intention is clear and that your policies do not include words that are open to different interpretations" (Planning Aid England, 2015, P. 6).

Clarity can be difficult to determine. The policy maker may interpret a word or phrase one way while a reader may have a different interpretation. This can create uncertainty for decision maker's. A planner should be specific in the choice of words and include definition and pictures to highlight the intention behind certain terms.

Document Example- Vaughan, ON: "Pathways should be [distinctly paved and barrier-free, well-lit] with pedestrian-scaled lighting and include benches, bike rings, and trash receptacles at nodal points, as determined at site plan design stage. Provide a safe, [interconnected pedestrian network within and adjacent] to parking lots [to connect] building entrances, parking spaces, public side-walks, transit stops and other pedestrian destinations" (City of Vaughan Policy Planning Department, 2016, P. 6).

This policy is clear because it uses specific terms. The description of an ideal pedestrian path includes specific phrases such as barrier-free and pedestrian scaled lighting. These terms can be used by a planner to decided if a new development is following the policy. Another example is the use of the word connect. This word explicitly means that pedestrians should have access to the pedestrian destinations leaving no gaps in the pedestrian network. The clarification that the network should include pedestrian paths within and adjacent to the parking lots gives specific details as to how the pedestrian path will include parking lots into the design. By explicitly stating the pedestrian path should go through the parking lot, the policy reinforces a safe environment for pedestrians to reach their vehicles.
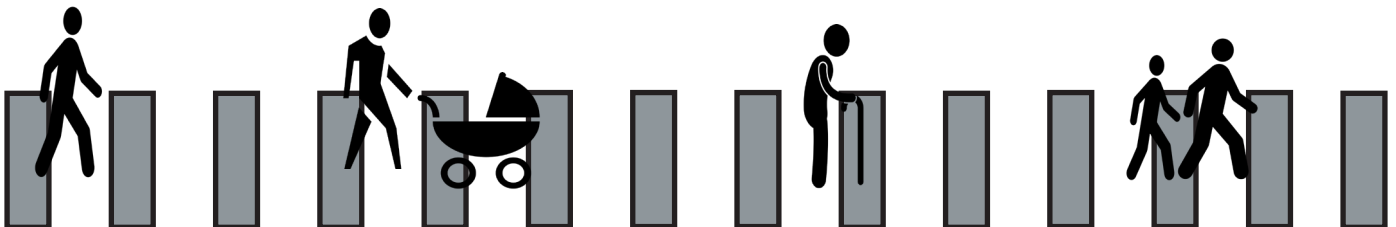
Be Flexible:

Provides options for implementation. "Care needs to be taken in using terms such as 'must' and 'preserve.' This is because it discourages positive change which could improve and enhance the plan area" (Planning Aid England, 2015, P. 7).

Each development has its unique challenges. There are various safety options available for a developer to achieve the objective of increasing pedestrian safety. Municipal planners can create policies that outline their objectives and provide options for developer.

Document Example- Westminster, CO: "To enhance pedestrian safety and attractiveness of the walkway, internal pedestrian walkways within a parking lot or drive area must be distinguished from the driving surface by [use of pavers, bricks, integrally colored, scored concrete, or other acceptable methods] as determined by the City" (City of Westminster, 2011, P. 10).

The objective of this policy is to create a safe environment for pedestrians by making the pedestrian walkway look different than the driving lanes. The policy outlines several methods that could be used to achieve the objective. It provides flexibility for the developer to determine the most cost effective way to achieve the objective while maintaining the design vision for the development.

Include Evidence:

"Evidence should be provided to support your policies and the choices you have made" (Planning Aid England, 2015, P. 8).

Research is used to highlight the safety risk to pedestrians in parking lots and persuade developers to include pedestrian infrastructure. Evidence is also used to explain why certain pedestrian infrastructure would improve safety for pedestrians. Evidence should be included throughout the policies and a detailed reference list provided. Unfortunately, only 4 documents out of nineteen assessed included evidence. Pedestrian and transportation plans included evidence such as statistics and survey results for the municipality. These plans also included academic research to reinforce why pedestrian safety policies exist. Examples have not been provided within the guide because the research is lengthy and often specific to the municipality. The design guidelines typically did not include evidence to support the policies.
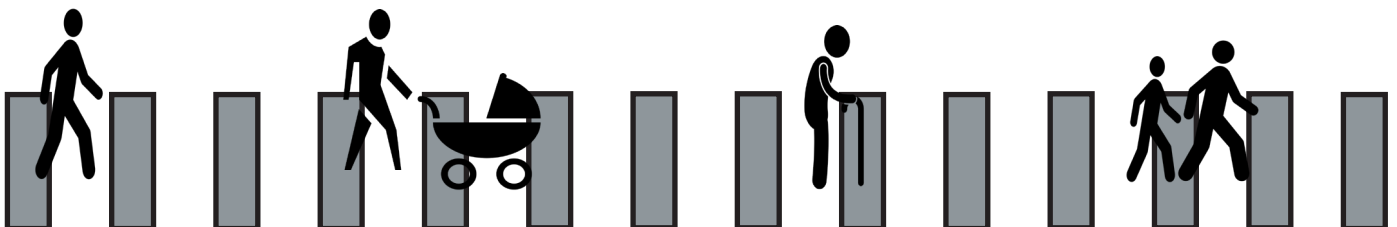
Use Positive Language:

> "Planning policies should use positive language, looking at ways to enhance and improve your area. The words 'encouraged,' 'supported' and 'will be permitted' all convey positive approaches to development" (Planning Aid England, 2015, P. 7).

The addition of pedestrian infrastructure can increase the cost of development. However, there is added value because pedestrian infrastructure enhances the experience for all customers. Every customer is a pedestrian at some point when they visit a store which means pedestrian safety should be a high priority for developers. Encouraging pedestrian infrastructure by using positive language could persuade a developer to recognize the value in improving pedestrian safety.

> Document Example- Vaughan, ON: "To provide for a [safer and more generous] pedestrian realm, more landscaping and reduce the length of pedestrian crossings, minimize dimensions of drive aisles, access mouths, stacking lanes or turning radii" (City of Vaughan Policy Planning Department, 2016, P. 3).

A municipal planner can choose to highlight the benefits for developers. Rather than feel restricted by policy, developers can be presented an opportunity to improve the quality of their design. In the Vaughan policy, developers are encouraged to add more landscaping and reduce the length of pedestrian crossings to create a safer and more generous pedestrian realm. Because all customers are pedestrians as some point during their visit, a generous pedestrian realm could be an appealing concept for a developer.
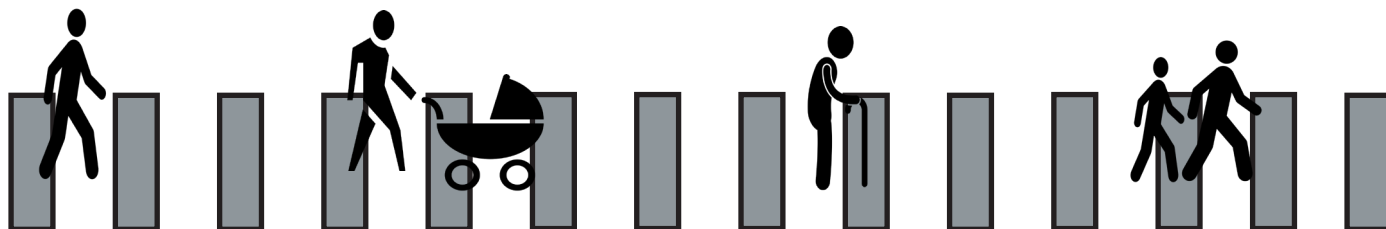
Have a Clear Plan for Implementation and Enforcement:

"The policies must set out the time period for which it will apply and a clear plan for imple-mentation" (Planning Aid England, 2015, P. 8).

The policy objective is to make parking lots and commercial driveways safer for pedestrians. This can be achieved if the policies are considered and evaluated for every development application that includes parking lots and commercial driveways. An implementation strategy should include who these policies will apply to and what the process will entail. If a developer knows the pedestrian safety policies will apply to their development they can anticipate it before the application process. Transparency is key for municipal planners to achieve policy objectives.

Document example- Toronto, ON: "The Design Guidelines for 'Greening' Surface Parking Lots [apply to] the design, review and approval [of all devel-opments containing surface parking.] The Guidelines have [city-wide appli-cability] and [will normally apply to] the evaluation of [design alternatives in rezoning, official plan amendment and site plan applications.] Owners of existing parking lots are not required, but are encouraged, to make alterations and improvements consistent with the Guidelines at the time of resurfacing or other appropriate phase in the development lifecycle" (Toronto City Planning, 2013, P. 4).

The Toronto implementation strategy outlines who these policies will apply to. It applies to all develop-ments in the city that have a surface parking lot component. The guidelines will apply during the eval-uation stage for a rezoning, official plan amendment, and site plan application process. It clarifies when these guidelines will come into affect. It also states which actors will be affected. This ensures transpar-ency between the municipality and developers to foster a positive relationship. Developers can anticipate and include features the municipality has stated in their policies to speed up the application process.
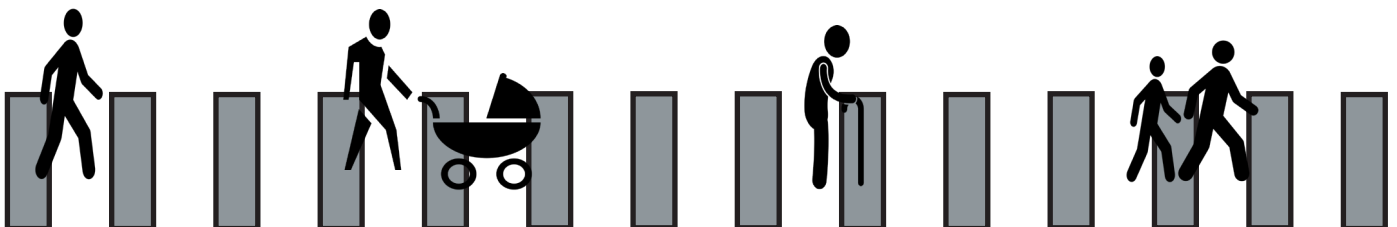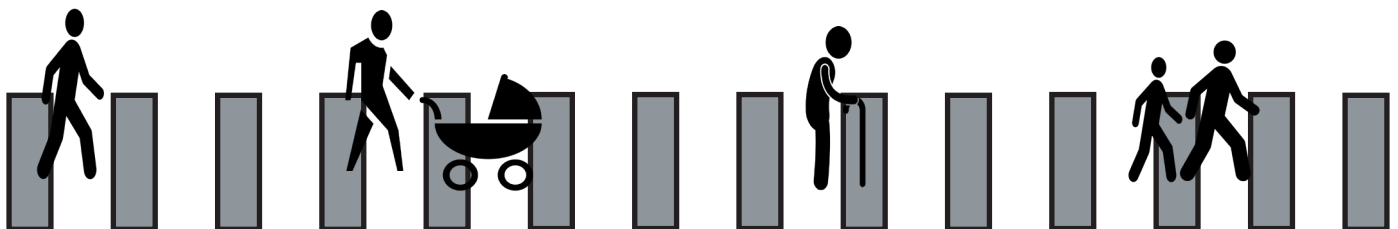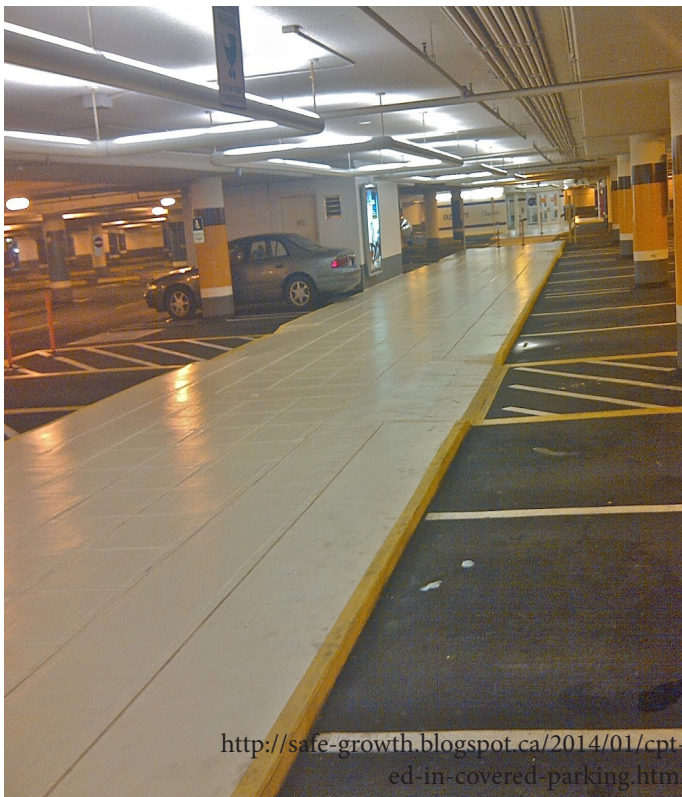
Pedestrian Safety Infrastructure:

I determined the list of pedestrian safety infrastructure based on a literature review of pedestrian safety studies. This is not an inclusive list of all pedestrian safety features that could be included, but it provides ideas for a planner to consider when drafting a pedestrian safety policy. In the guide, I include document examples showcasing the different ways safety features can be included in a policy. Each of the policy examples are specific to parking lots or commercial driveways. Several of the features can be combined in a single policy which is reflected in the examples.

Defined Pedestrian Paths
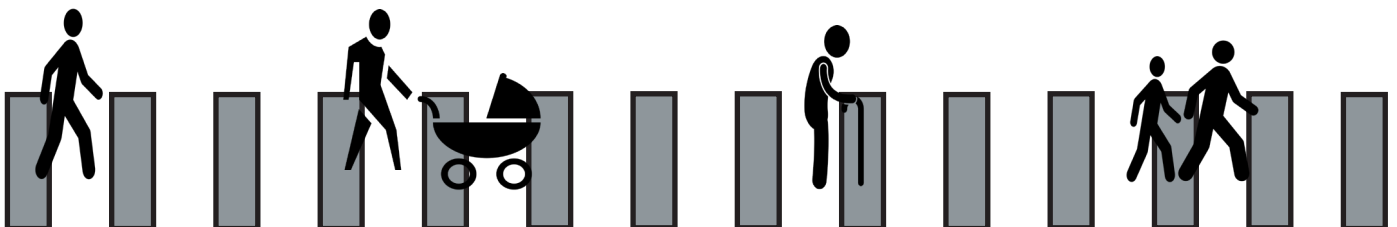(using colours or textures to differentiate pedestrian and vehicular space)

http://www.pedestrians.org/images/epi-sodes161to170/p4p168.jpg

http://safe-growth.blogspot.ca/2014/01/cpt-ed-in-covered-parking.html

Sidewalks
(a pedestrian path separated from vehicular traffic)

http://www.sfbetterstreets.org/find-project-types/greening-and-stormwater-management/greening-overview/sidewalk-landscaping/

Crosswalks
(a pedestrian path allowing pedestrians to cross a lane of vehicular traffic safely)

https://www.stokesinjurylawyers.com/atlanta-car-accident-lawyer/atlanta-crosswalk-accidents-attorney/

Infrastructure to Slow Vehicular Traffic
(stop signs, speed bumps, etc.)

http://www.saspeedbumps.co.za/index.php/products/rubber-speed-bumps/

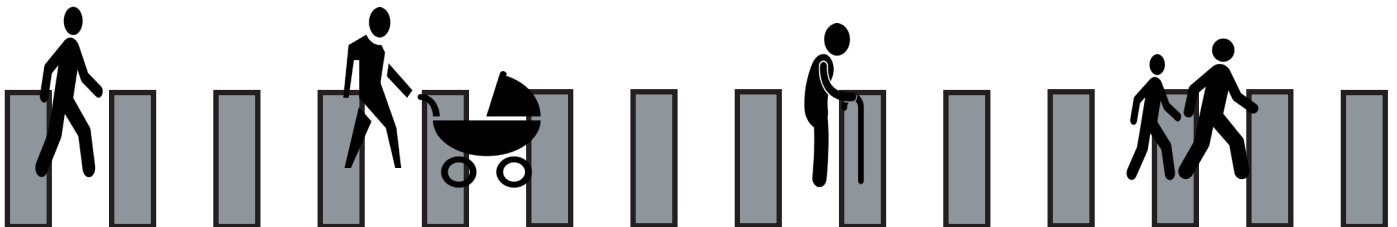http://www.drmarkmuncy.com/blog/who-put-that-stop-sign-there
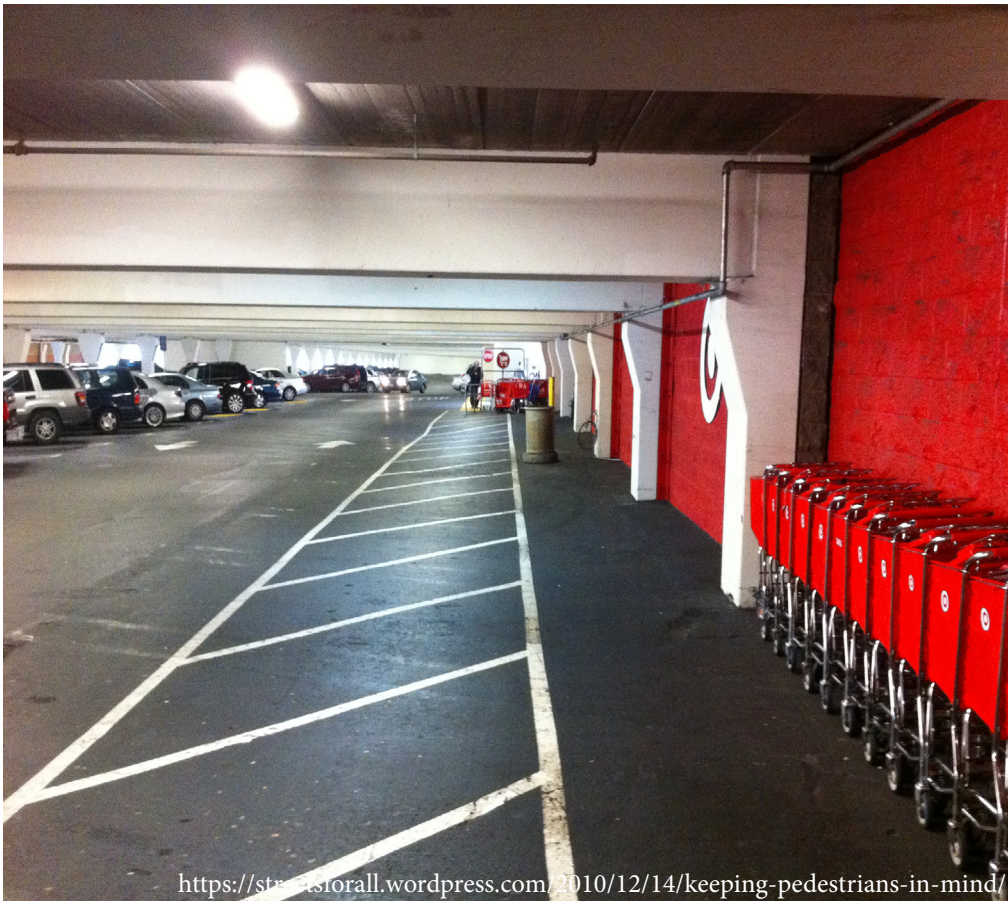
A Pedestrian Median
(a pedestrian path located between parking aisles to allow pedestrians to cross from one end of the parking lot to the other safely)

(Shah, 2015)

(Stark, 2012)

A Pedestrian Network
(creating a path to connected pedestrians to all aspects of the space safely through a combination of sidewalks, crosswalks, and pedestrian medians)

https://streetsforall.wordpress.com/2010/12/14/keeping-pedestrians-in-mind/

Example Policies from Documents:

Policies Combining Pedestrian Network and Defined Space for Pedestrians:

Westminster, CO: "To enhance pedestrian safety and attractiveness of the walkway, [internal pedestrian walkways] within a parking lot or drive area [must be distinguished] from the driving surface by use of pavers, bricks, integrally colored, scored concrete, or other acceptable methods as determined by the City" (City of Westminster, 2011, P. 10).

### Policies that Include Pedestrian Network:

Lincoln, NE (Design Standards): "An [on-site sidewalk system] shall be constructed along streets and drives (both public and private) and shall [connect] to the sidewalk system on abutting streets. Sidewalks shall also be constructed to lead to pedestrian crossings at off-site full access median openings, trail crossings, and pedestrian signal crossings on abutting streets. Sidewalks may be constructed along one side of private drives if the sidewalk system is continuous and the number of driveway crossings is greatly minimized" (City of Lincoln, 2006, Ch. 3 P. 1).

Vaughn, ON: "Provide a safe, [interconnected pedestrian network] within and adjacent to parking lots to connect building entrances, parking spaces, public sidewalks, transit stops and other pedestrian destinations" (City of Vaughan Policy Planning Department, 2016, P. 6).

Toronto, ON: "Establish a direct and [continuous pedestrian network] within and adjacent to parking lots to connect building entrances, parking spaces, public sidewalks, transit stops and other pedestrian destinations" (Toronto City Planning, 2013, P. 10).

Policies that Combine Infrastructure to Slow Vehicular Traffic and Crosswalks:

Vaughn, ON: "Provide [elevated crossings] with [rolled curbs, chicanes and bump outs] at major internal intersections [to calm vehicular traffic] and promote pedestrian safety. Crosswalks should be elevated to the level of the connecting pedestrian walkway" (City of Vaughan Policy Planning Department, 2016, P. 8).
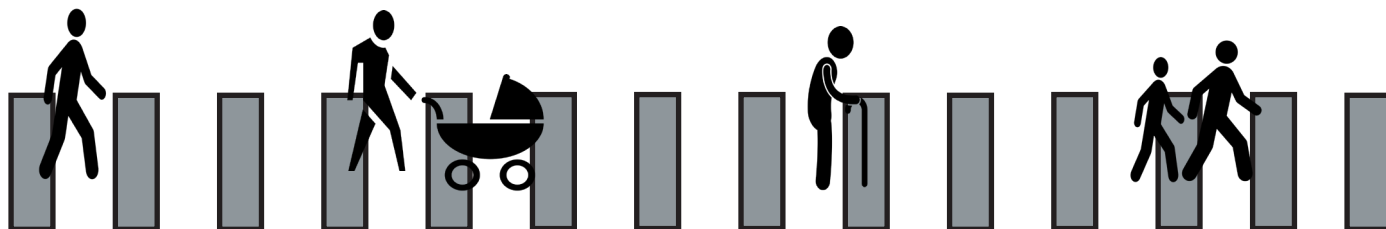
Toronto, ON: "Consider installing "tables" [rolled curbs bordering slightly elevated crossings] at major internal intersections to serve as a traffic calming feature and provide pedestrian priority" (Toronto City Planning, 2013, P. 11).

Policies that Combine Sidewalks and Pedestrian Medians:

Lincoln, NE (Design Standards): "Internal parking lot design that provides for the comfort and safety of the pedestrian through the provision of [sidewalk facilities within the parking area.] This type of pedestrian facility offers the pedestrian a safe, convenient, and comfortable walking environment from the furthest parking stall up to the front of a building" (City of Lincoln, 2006, Ch. 3 P. 2).

# What to Avoid When Creating Pedestrian Safety Policies:

For this section, I provided examples from the documents that did not receive a high ranking to illustrate how they could be improved.

1. Vague phrases

Town of The Blue Mountains, ON: "For [longer blocks] or properties, create [central pedestrian connections] that connect [parking areas to building entrances.]" (GSP Group Inc, 2012, P. 10)

Kitchener, ON: "Provide barrier-free walkways [between] all barrier free entrances, [parking], passenger loading areas, municipal sidewalks and outdoor amenities i.e. telephone seating areas, playgrounds, parks" (City of Kitchener, 2014, P. C19)

These policies lack clarity for the reader by using terms such as "central pedestrian connections" and "between" to describe a pedestrian network. These policies do not explicitly state that all the key pedestrian areas will be connected creating no gaps in the pedestrian network. The word "parking" or "parking areas" is also vague because pedestrians should have safe access to the entire parking lot. When describing pedestrian areas, a policy maker should be specific to ensure pedestrians have full access. A better phase could be: A development should provide pedestrian access within and adjacent to the parking lot to ensure pedestrians have a safe and convenient path to their vehicles.
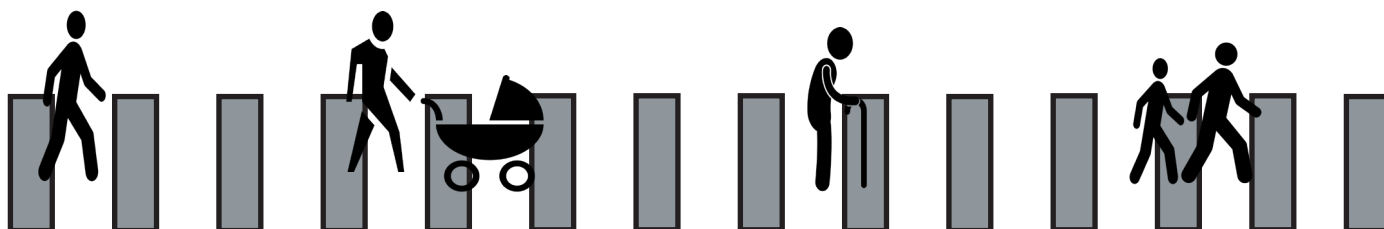
2. Discourage developers from including pedestrian infrastructure

Kitchener, ON: "[Have] at least one building face or the main entrance adjacent to an arterial road. [Have] barrier free pedestrian access from the public sidewalk to the main building entrance. [Have] on-site lighting to maximize pedestrian safety. [Have] barrier free pedestrian links to transit stops provided in either concrete or asphalt. [Have] the local road pattern provide direct pedestrian access to transit stops and transfer points" (City of Kitchener, 2014, P. C30)

The word "Have" implies that a developer must do something which can put a negative connotation on adding pedestrian infrastructure. Safety standards such as widths and heights for pedestrian infrastructure need to be adhered to by developers. But providing pedestrian links to transit stops is something that could be encouraged in a positive way. Highlight some of the advantages to the developer in statements such as: Adding barrier-free access for pedestrian connecting the development to transit stops would enhance the pedestrian experience and connectivity of the development.

3. Not including examples and specific tools to achieve the policy objective

New York, NY: "[Improve] pedestrian & vehicular circulation" (NYC Department of City Planning, 2007, P. 1)).

North Vancouver, BC: "[Provision of pedestrian routes] through parking lots, for example at shopping malls" (Opus International Consultants (BC) Ltd., 2009, P. 61).

Glenview, IL: "Pedestrian needs [should be accommodated] within parking lots. Parking lots should include design elements to address: a. How pedestrians will be protected from high volume vehicular traffic, b. How main entrances are linked to the parking lot; and c. How traffic will be properly managed and controlled. Large planting medians should incorporate pedestrian cross paths. Bicycle racks should be provided" (The Village of Glenview, 2009, P. 4).

These documents highlight the objective to create safer spaces for pedestrians, but they do not give specifics on how to achieve this. Several of the documents focus on the idea that pedestrians should be a priority in parking lots. However, they do not give options or examples for developers to consider. The Glenview policy is a great example of putting the emphasis on the developer to come up with solutions. The municipality should present several options and examples in their policies for the developer to consider to ensure the objective of the municipality is achieved.
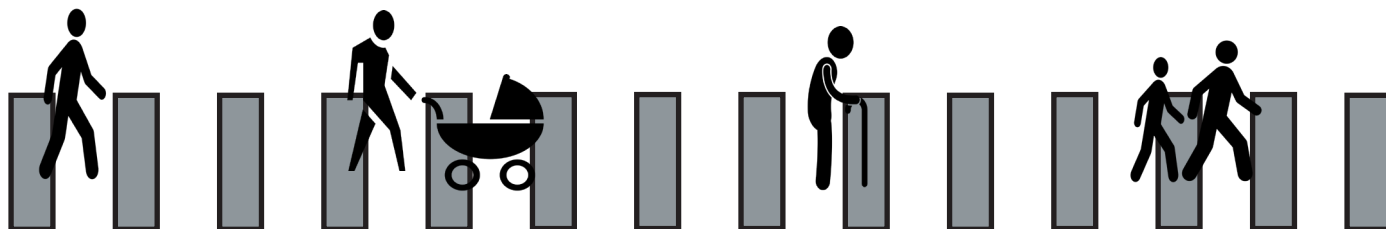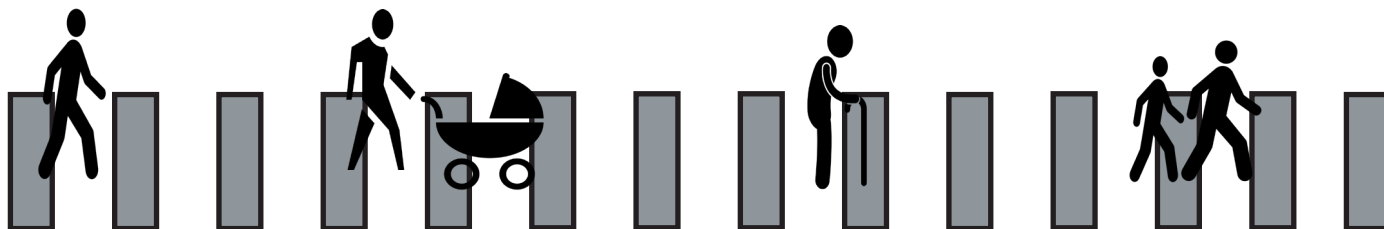
How to Implement a Pedestrian Safety Policy:

While reviewing the documents, I discovered several ideas or programs that could be helpful to implement a pedestrian safety policy.

The first major decisions will be deciding where to place the pedestrian safety policies. The policies can be found in various documents. In my research, I found that pedestrian safety policies are not typically found in a document on their own. They are often combined in a commercial design guideline, a parking lot design guideline, or a pedestrian plan. Determine based on the local context and timeframe which type of document would best be suited for pedestrian safety policies.

The second step is drafting the policies. I found definitions and pictures can help to illustrate what a policy really means for the reader. Several municipalities used pictures of pedestrian safety features located in their municipality to positively reinforce their objective. Consider the safety features the municiplity wants to implement in the pedestrian safety policy and find examples in your municipality to connect the policies with the local context.

Part of the policy drafting process is determining who will be affected by the policies. Many regions throughout North American have already become saturated with big box plazas. Unfortunately, the policies can only apply to new locations not the parking lots and commercial driveways that currently exist. However, a municipality can state that the policies will apply to the redevelopment of parking lots and commercial driveways. As these spaces adapt over time, they will need to incorporate pedestrian safety features for development approval. This tactic can ensure the policies are implemented and pedestrian safety features are incorporated into future developments.

Once you have drafted the policies, they need to be used effectively. Consider including a pedestrian circulation plan as part of the development approval process. The City of Lincoln (Design Standards) refers to a pedestrian circulation plan as "a detailed scaled drawing of the site showcasing the location, orientation, and dimensions of existing and proposed sidewalks and pedestrian facilities" (City of Lincoln, 2006, Ch. 3, P. 3). A pedestrian circulation plan allows a developer to consider pedestrians in the design process and review the pedestrian safety policies created by the municipality. It also encourages the municipality and the developer to discuss pedestrian safety and consider how the pedestrian safety policies could apply to their site.

Developers play a key role in the implementation of the pedestrian safety policies and can be enticed to apply the policies if an incentive is provided. A bonus program allows developers to build a slightly larger store than the zoning permits if they build additional pedestrian safety features on the site. A bonus program encourages pedestrian infrastructure by creating a positive arrangement for the developer and the municipality. A developer can build a larger store and the municipality can achieve the objective of increased pedestrian safety.

A monitoring plan can be included in the policy document to determine the success of the policies. There are several ways a pedestrian safety policy can be evaluated. The number of pedestrian accident in parking lots and commercial driveways can be used as a baseline. The number of pedestrian accidents recorded after the policies have been implemented would reflect the effectiveness of the policies. The number of pedestrian safety features found in current development can also be a baseline for comparison. Once the policies are implemented, the planning department can review if new developments include more pedestrian infrastructure than previous developments. Determine based on local resources and information which type of evaluation is feasible. There are limitations to the conclusions that can be made from both methods of evaluation because various factors outside of the policies can affect the results. However, monitoring the success of policies provides an opportunity to learn lessons that can be applied to future policy documents.

Conclusion

As transportation investment increases, public transportation such as buses, subways, and rapid transit have become priorities on municipal agendas. However, walking is still the most inexpensive form of transportation for the average citizen. Pedestrian safety should be a top priority for municipalities. Parking lots and commercial driveways are prime locations to increase pedestrian safety. They can be difficult spaces for anyone to navigate. It should be recognized as a benefit to include pedestrian safety features in a development. The economic value of creating a development that is inviting, instead of daunting, to pedestrians should be promoted. This guide outlines the research I did on pedestrian safety policy. Based on that research, I provide advice on how to draft a pedestrian safety policy. The advice highlights the qualities that make a policy well-written and the pedestrian safety features that can be included in the policy. My goal is to improve the quality of the policies that are created and encourage municipalities to consider pedestrians as part of the transportation puzzle.
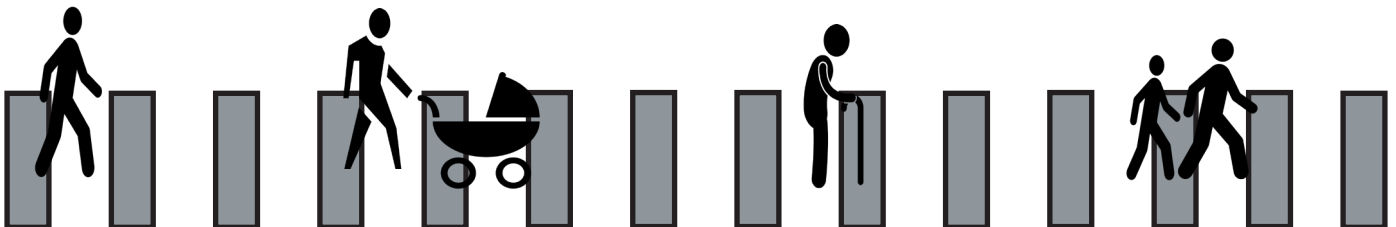
References

Charness, N., Boot, W., Mitchum, A., Stothart, C., & Lupton, H. (2012). Aging Driver and Pedestrian Safety: Parking Lot Hazards Study. Tallahassee: Florida State University.

Granié, M., Brenac, T., Montel, M., Millot, M., & Coquelet, C. (2014). Influence of built environment on pedestrian's crossing decision. Accident Analysis and Prevention, 67, 75-85.

Jones, Evenson, Rodriguez, & Aytur. (2010). Addressing Pedestrian Safety: A Content Analysis of Pedestrian Master Plans in North Carolina. Traffic Injury Prevention, 11(1), 57-65.

Planning Aid England. (2015). How to write planning policies presentation. Retrieved from: http://my community.org.uk/resources/neighbourhood-planning-how-to-write-planning-policies/

Shepherd, M., Austin, P., & Chambers, J. (2010). Driveway runover, the influence of the built enviroment: A case control study. Journal of Pediatrics and Child Health, 46(12), 760-767.

Stark, J.A. (2012). Parking Lots: Where Motorists Become Pedestrians. Albany University. Retrieved from http://www.albany.edu/ihi/files/Parking_Lots_Where_Motorists_Become_Pedestrians.pdf

Stevens, N., & Salmon, P. (2014). Safe places for pedestrians: Using cognitive work analysis to consider the relationships between the engineering and urban design of footpaths. Accident Analysis and Prevention, 72, 257-266.

Pedestrian Figures accessed from The Noun Project: https://thenounproject.com/