Road Safety

City of Guelph Transportation Master Plan

Background Paper Series

Transportation Master Plan

CITY OF Guelph

Making a Difference

Guelph Transportation Master Plan

Moving Guelph Forward

Guelph is growing and how we move around our city is changing. As a result, we are exploring transportation options to make our city move better in every way. Through the Transportation Master Plan (TMP) update, we will review all of the ways we move: walking, cycling, riding transit, driving, trucking, and using trains. Our goal is to ensure that we offer diverse travel options, have appropriate transportation capacity, and maintain a high quality of life for both existing and future residents and workers.

The updated TMP will look at transportation planning in Guelph beyond 2031. The main objectives of this update are:

- To ensure that the new plan builds upon current policies, including the Official Plan and other master plans that have been approved since 2005;
- To recommend new policies and guidelines that reflect the vision for our community and balance mobility, environment, and efficiency, while prioritizing safety and access for all travellers; and
- To explore how new, evolving technologies and travel services will shape the future of transportation in Guelph.

This paper is part of a series of background papers intended to communicate information, key trends, and concepts. These will form the foundation of and set the strategic direction for our updated TMP. The papers are intended to support conversations in the community and within City Hall about how we plan for the future of mobility.

The series includes the following papers, which are all available at **guelph.ca/tmp**:

- **Transportation Technology and New Mobility Options**
- **The Changing Transportation System User**
- **Transportation and Building 21st Century Cities**
- **Road Safety**
- **Network Planning**
- **Transportation System Resilience**

Each of the background papers opens with an introductory primer on the topic before it examines key global trends, considers how these topics and trends are currently addressed in Guelph, and concludes with an analysis of the implications of that topic on planning Guelph's future transportation system.

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Road Safety: A Primer

Protecting the safety of road users has always been a core consideration for transportation planners, road designers, and managers of transportation systems. Today, road-related incidents of injury and death continue to be a persistent challenge in many jurisdictions. Therefore, communities across Canada and around the world are increasingly emphasizing road safety in long-range planning and day-to-day operational decisions.

Road-related injuries and fatalities are gradually being recognized as a major public health concern. In response, an increasing volume of research is helping cities better understand the causes of road safety incidents and the effective measures that could considerably improve the safety of our streets for all users. This paper discusses some of the key issues and trends related to road safety, existing approaches to road safety in Guelph, and recommendations for how our updated TMP should consider addressing road safety going forward.

Why Focus on Road Safety?

Around the world, approximately 1.35 million people die in road incidents each year and an additional 20–50 million suffer from non-fatal injuries, which often result in long-term disabilities.[1] Over the last decade in Ontario, nearly 600 people have lost their lives due to traffic-related incidents every year.[2] Although the number of injuries from traffic-related collisions has been declining over the last 10 years, there are still hundreds of people killed and tens of thousands injured each year as a result of transportation-related incidents in the province.

1 World Health Organization, 2018. Global status report on road safety 2018.
2 Ministry of Transportation, Ontario. Ontario Road Safety Annual Reports (ORSAR) 2010-2018.

The Safe Systems Approach

The safe systems approach is a helpful framework for road safety management that is considered an international best practice by the World Health Organization (WHO)[3] and the Organization of Economic Cooperation and Development (OECD).[4] The safe systems approach is based on the principles that life and health should not be compromised by the need to travel and that no level of death or serious injury is acceptable in our transportation network. The fundamental philosophy of the approach is that it should be possible to create a transportation system that is designed to make transportation-related death and serious injury nearly impossible outcomes. According to this approach, safe transportation systems consist of four main elements[5]:

1. **Safer road use**, which means encouraging all road users to be safe and in compliance with applicable transportation rules based on a philosophy of shared and proportionate responsibility.
2. **Safer speeds,** which means slowing down vehicular traffic to context-appropriate speeds and ensuring compliance through a combination of design, education, and enforcement.
3. **Safer roads**, which means designing roads that minimize the likelihood and/or the severity of a collision by "guiding" driver behaviour and segregating users or traffic streams, as required.
4. **Safer vehicles**, which means designing, building, and regulating vehicles that better protect vehicle occupants and actively improve driver safety using technologies like collision-avoidance systems.

The four elements of a safe system all strive to reduce **the likelihood of a collision** and **the severity of one,** should it occur. Ultimately, speed plays a key role in both the likelihood and the severity of collisions, as described in the following sections.

Reducing Likelihood

According to the WHO, every 1 kilometre per hour (km/h) increase in the average speed of traffic results in a 3 per cent increase in the likelihood of a collision and a 4–5 per cent increase in the likelihood of a fatal incident. This relationship also works in the reverse, with every 1 km/h decrease in average speed resulting in a 3 per cent decrease in likelihood of a collision and a 4–5 per cent reduction in the likelihood of a fatal collision.[6] Both the perception of hazards and stopping distance are important factors related to speed that can reduce the likelihood of serious road safety incidents.

3 World Health Organization. Global Plan for the Decade of Action for Road Safety 2011-2020.
4 Organization of Economic Cooperation and Development, 2008. Towards Zero: Ambitious Road Safety Targets and the Safe System Approach
5 Brake, 2015. The safe systems approach to road safety.
6 World Health Organization, 2004. *World Report on Road Traffic Injury Prevention*.

Perception of Hazards

Research shows that travel at higher speeds reduces a driver's field of vision. At higher operating speeds, the driver is able to perceive and process a smaller portion of their view, as shown in the visualization in **Figure 1.** This diminished perception makes it more dangerous for a driver to operate at higher speeds.

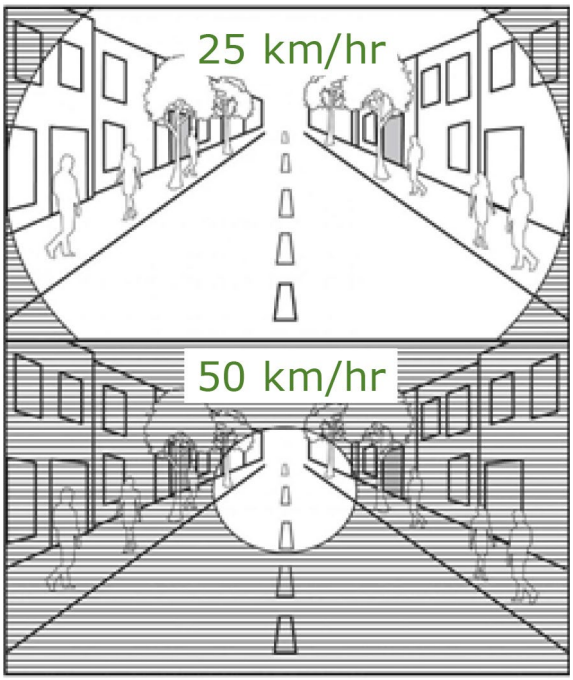

Figure 1: Visualization of the effect of speed on a driver's field of vision[7]

Stopping Distance

The stopping distance of a vehicle is proportional to the speed at which the vehicle is travelling. This means that at faster speeds, it takes longer to stop after initially perceiving an upcoming hazard. This relationship is illustrated in **Figure 2**, which demonstrates how the typical distance that a vehicle requires to fully stop increases with travel speed. When travelling at higher speeds, a driver is less likely to be able to stop in time to avoid a vulnerable road user ahead, even if that driver sees the other road user several metres in advance. Note that drivers will require even more distance in order to stop safely when roads are wet or icy.

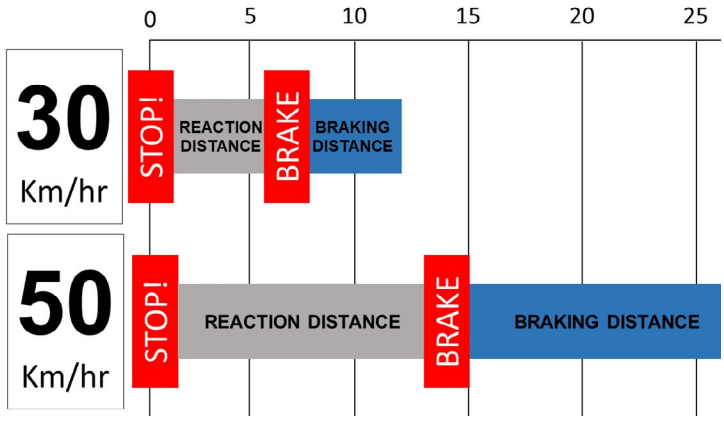

Figure 2: Relationship between speed and braking distance[8]

7 Reprinted from *Walkable City Rules: 101 Steps to Making Better Places*, Speck, J., 2018. Washington, DC: Island Press.

8 Adapted from *Playground Zones: Why 30?* City of Edmonton.

Reducing Consequences

Severity of Injury

Higher operating speeds also increase the severity of the injuries and risk of death that results from traffic collisions. **Figure 3** illustrates the dramatic relationship between vehicle speeds and the risk of pedestrian death.

Traffic collisions are most severe when they involve a vulnerable road user (e.g., a person walking or cycling). A pedestrian safety study conducted by the City of Vancouver showed that, between 2005 and 2011, pedestrians and cyclists were each involved in only 1 per cent of transportation-related collisions. However, in that same timeframe, pedestrians represented 45 per cent of all transportation-related fatalities in Vancouver, while cyclists represented 5 per cent.[9]

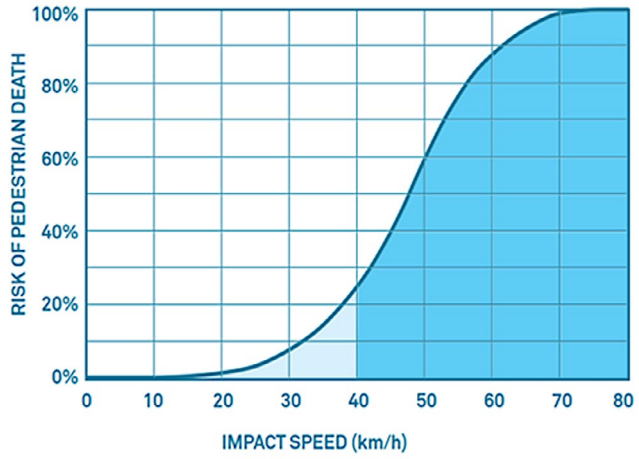

Figure 3: Relationship between impact speed and risk of pedestrian death[10]

9 City of Vancouver, 2012. *Pedestrian Safety Study, Final Report*.
10 Reprinted from *Safe Streets Save Lives*" Global Designing Cities Initiative.

Road Safety Trends

This section explores four important areas of focus in current discussions about road safety: Vision Zero, designing cycling facilities for all ages and abilities, street function and design, and intersection design.

Vision Zero

The Vision Zero philosophy was first introduced in Sweden in 1997. At that time, the Swedish government committed itself to a safe systems approach and pledged to eliminate death and serious injuries from its roads. The program proved to be extremely successful and attracted widespread attention when Sweden managed to cut its traffic-related death rate in half in just two decades. Today, the Vision Zero philosophy has been widely adopted around the globe, including in several municipalities in Canada.

Committing to Vision Zero means committing to not accepting any loss of life from transportation-related incidents and treating safe mobility as a human right. It also means that safety is paramount above all other transportation system-related decisions.

Road safety is affected by complex and diverse factors. Vision Zero is more of a philosophy, rather than a checklist. The philosophy acknowledges that there are no simple fixes that can address all road safety issues but it sets a goal for continuous improvement. Since active transportation users are disproportionately injured or killed in road incidents, many Vision Zero approaches focus on making the network safer for these users. The safe systems approach, discussed at the beginning of this paper, is the foundation for many Vision Zero initiatives.

Vision Zero aims to update the traditional perspective on transportation safety in a number of important ways, as outlined in **Table 1**.

Table 1: The Vision Zero mindset[11]

✗ OLD STYLE THINKING	✓ NEW THINKING
Responsibility to prevent crashes, injuries, and deaths rests with individuals	Responsibility to prevent crashes, injuries, and deaths rests with system designers
Focuses on what causes accidents	Focuses on what causes safety
Allows individual errors to kill and harm	It is unethical to allow individual failures to lead to death or serious injury
90 per cent of the problem are errors made by people on foot and in personal vehicles	90 per cent of the solutions involve speed reductions, alternative approaches to road design, and advances in vehicle design
Studies the effects of single road safety interventions, one at a time	Understands that road safety interventions work best together or in bundles

11 Reprinted from *The Safe Systems Approach for Road Safety*, Arason, N.

✗ OLD STYLE THINKING	✓ NEW THINKING
Can only justify making improvements based on a cost-benefit analysis	Understands that the default is to make the motor vehicle and the road system safe
Only works on problems with large numbers or high crash locations	Makes the system safe everywhere
Believes in the need for further "study" — waits for crashes and coroner reports to identify problems	Recognizes that the evidence to act already exists. Proactively takes actions using data, crash testing, simulations, physics, etc.
Ignores exposure to the motor vehicle as an injury risk factor	Embraces multi-modal transportation for better safety

Many jurisdictions around the world have adopted Vision Zero but very few jurisdictions have been able to achieve anything close to zero traffic-related serious injuries and fatalities. This leads to the obvious question – why bother aiming for something that is impossible?

There are several good reasons to aim for Vision Zero:

1. **Vision Zero is a target -**Though achieving this target may not happen this year or even within the next decade, it serves as something to strive for. Any progress towards Vision Zero, no matter how small, will reduce the number of fatalities and serious injuries on a transportation network for a municipality.
2. **It is the right thing to do -** From the perspective of transportation ethics and equity, striving for Vision Zero is the right thing to do. For a community, no death or serious injury should be an acceptable cost of daily transportation. Unjustly, traffic-related incidents often disproportionately affect members of more marginalized communities. For instance, a study conducted between 2008 and 2015 found that, in Ontario, children living in lowest-income areas had a 48 per cent higher rate of ending up in the emergency room due to being hit by a vehicle, when compared to those living in highest-income areas.[12] Any potential for safety improvements that are within the control of a municipality should be acted upon.
3. **Small steps, meaningful change -** The philosophy can be applied to make small but powerful targeted improvements at a time. While achieving zero deaths may be a target for the far future, the adoption of the Vision Zero philosophy can be in the form of building upon more achievable objectives such as 'Zero for one week' or 'Zero for one area'. These more digestible goals will result in smaller safety improvements while always moving the needle towards the ultimate target.

12 SickKids, 2019. *Ontario children getting hit by cars less frequently, yet children in low-income areas are still at higher risk, study finds*.

Core Elements of Vision Zero[13]

Ethics: No death or serious injury is acceptable. Significant risks to life and health should not be the cost of using a transportation system.

Responsibility: The responsibility for road safety falls on everyone. Transportation departments of the various levels of government and law enforcement agencies have a responsibility to plan, design, and operate a transportation system that minimizes the risk of death or injury. Meanwhile, road users are responsible for following the basic rules of the road (e.g. obeying speed limits, driving unimpaired, making responsible driver decisions, etc.).

Safety Philosophy: Vision Zero is founded on two fundamental facts:

- Human beings make errors
- There is a critical limit beyond which survival and recovery from an injury are not possible

To account for these unchangeable truths, transportation systems should be designed to account for human error and to minimize impacts of such errors so that deaths and serious injuries can be avoided. Crashes and minor injuries can still be acceptable as long as the factors that lead to death and serious injuries are minimized or eliminated.

Creating Mechanisms for Change: From a perspective of human rights, Vision Zero supports each citizen's right to safe mobility - in essence, the right to survive each day while travelling in a complex modern transportation system. Each road user has an obligation to comply with the basic rules of road safety. However, governments - which include the designers, maintainers, and enforcers of transportation systems - are responsible for keeping their citizens safe. Therefore, government stakeholders must work together to enable safer transportation systems. This means implementing the appropriate network designs, street designs, policies, incentives, educational campaigns, enforcement, programs, and performance measures to support progress towards Vision Zero goals. These government mechanisms are necessary to drive change.

In practice, adopting a Vision Zero philosophy means that:

1. **Interventions occur as early and as often as possible;**
2. **Safety input is given at earlier stages of the planning and design process;**
3. **Operating speeds and the tolerance for speeding are lower;**
4. **More disciplines and partners are being involved in transportation safety decisions; .**
5. **Earlier education is provided about transportation safety;**
6. **There is greater public and institutional awareness and support for transportation safety**
7. **There is more funding, available for longer periods of time, for transportation safety improvements; and**
8. **Proven safety measures are implemented everywhere.**

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13 Adapted from World Health Organization, 2004. *World Report on Road Traffic Injury Prevention.*

Protecting Vulnerable Users

Streets have historically been designed primarily for vehicles, with minimal accommodation provided to all other travelers. As a result, the spaces that serve people who walk or cycle often do not meet the needs of the less physically able travellers or the less confident cyclists. Fortunately, design approaches and parameters are changing. Both the actual and perceived safety for active transportation users is being used to establish design parameters for both new and existing streets. Legislation such as the *Accessibility for Ontarians with Disabilities Act* (AODA) and professional organizations like the National Association of City Transportation Officials (NACTO) offer guidance to design streets that meet the needs of people with disabilities and vulnerable users.

Protecting those who Walk

The design of pedestrian infrastructure needs to follow a number of key design principles that relate to safety. Pedestrian infrastructure must:

- **Be accessible for people of all ages and abilities -** Sidewalks must be direct and unobstructed. They must also meet or exceed the width, grade, and cross-slow requirements that have been set out in the AODA Guidelines.
- **Be continuous** - A continuous network of sidewalks should exist throughout the city, allowing for a safe and consistent walking experience from any origin to any destination.
- **Have safe crossings for all** - Frequent, well-defined crossing locations; lower vehicular operating speeds; narrower street widths; adequate signal timing; and high-visibility lighting all contribute to the safety of the pedestrian network. Appropriate curb ramps and tactile walking surface indicators should be provided at all crossing locations.

Protecting those who Cycle

The term *cyclist* has historically referred to a traveller using any "human-powered" mode (excluding walking), such as bicycle, kick-scooter, and/or in-line skates. Users of these modes generally travel at speeds between 15 and 30 km/h and require a horizontal travel width of 1.2–1.5 metres (m), typically with an additional 0.6 m for passing space. These quantitative parameters are often used to design cycling facilities in North America. But the use of these parameters as average benchmarks misses the fact that some cyclists travel slower than others and are less able or less likely to hold a straight line of travel.

An popular industry typology[14] divides cyclists into one of four groups:

- **Strong & Fearless -** people who are comfortable cycling on-street in any conditions.
- **Enthused & Confident -** people who are comfortable cycling in mixed traffic conditions but who would prefer dedicated facilities.
- **Interested but Concerned -** people who enjoy cycling and are curious about on-street cycling but who are nervous to do it in mixed traffic conditions.
- **No Way, No How** - people who are not interested in cycling at all.

14 Roger Geller, "Four Types of Cyclists" Portland Bureau of Transportation, 2009. https://www.portlandoregon.gov/transportation/article/264746

Typical design parameters of the past have led to streets that are comfortable for cyclists falling into the *Strong and Fearless* and the *Confident and Enthused* categories. But studies of different urban centres in North America have shown that only a small fraction of the population typically fall into those two types. Most people in North American cities tend to be potential cyclists who can be described as *Interested but Concerned*. To reach and support this group, cities have turned to adopting street design approaches intended to meet the needs of cyclists of all ages and abilities - in other words, All Ages and Abilities (AAA) infrastructure.

According to NACTO, an association of major North American cities and transit agencies, an essential strategy for cities that seek to improve traffic safety is to design streets that are safe and inviting for users of all ages and abilities. AAA cycling infrastructure must therefore meet the needs of cyclists ranging from school-age children to seniors, low-income riders, people with disabilities, and able-bodied cyclists of varying confidence levels. Presence of AAA infrastructure in all communities (including communities of traditionally marginalized people) also allows cities to address some safety and health concerns related to traffic congestion, air quality, and public health. Additionally, improvements to cycling infrastructure can bolster local economies by providing better and more equitable access to jobs and opportunities.[15]

Many elements go into designing a cycling route that is safe and comfortable for all ages and abilities. In its *Transportation Design Guidelines for All Ages and Abilities Cycling Routes,* the City of Vancouver provides 10 helpful general rules to consider when designing AAA facilities or designating safe cycling routes:[16]

- Rule #1: Build the types of cycling facilities that feel comfortable for all.
- Rule #2: Target motor vehicle volume to be fewer than 500 vehicles per day.
- Rule #3: Target motor vehicle speed to be below the 30 km/h median (below 40 km/h or the 95th percentile).
- Rule #4: Consider the interplay between parking and roadway width, so cyclists are able to pass an oncoming vehicle without feeling like they are being squeezed or entering into a door zone.
- Rule #5: Design bike lane width for the comfortable passing of fellow cyclists.
- Rule #6: Provide adequate lighting along the entire length of the route.
- Rule #7: Create designated and physically separated spaces for walking and cycling.
- Rule #8: Provide smooth, paved, and hard travel surfaces.
- Rule #9: Keep grades below 3 per cent, as much as possible.
- Rule #10: Design intersections thoughtfully to reduce conflicts, increase visibility, and provide clear direction of movement (fewer than 50 vehicles per peak hour).

15 National Association of City Transportation Officials, 2017. Designing for All Ages & Abilities: Contextual Guidance for High-Comfort Bicycle Facilities.

16 City of Vancouver, 2017. *Transportation Design Guidelines: All Ages and Abilities Cycling Routes*.

Figure 4: Different types of bike facilities and relative level of comfort[17]

The *Ontario Traffic Manual (OTM) Book 18: Cycling Facilities* is a reference guide for the development of cycling facilities in the province. It recommends separating cycling facilities from general traffic at certain speed and volume thresholds to improve the actual and perceived safety experienced by users. The upcoming update to the *OTM Book 18* will lower these speed and volume thresholds to be in-line with current best practices. The updated *OTM Book 18* will also reference the AAA philosophy.

Street Function and Design

Streets support a variety of different functions. The design of a street should be consistent with its desired function and compatible with the surrounding neighbourhood and land uses.

If the design of a street does not match its desired function or is misaligned with the surrounding context, undesirable operating conditions and increased risks to user safety may develop on the street.

The most common undesirable operating condition is when a motor vehicle travels at a speed higher than is appropriate or designated for that street. As it has been proven that the most effective way to reduce fatalities and severe injuries on streets is to reduce vehicle speeds,[18] a critical safety element in the transportation network is to ensure that street function is aligned with and supported by street design.

17 Reprinted from *Transportation Design Guidelines: All Ages and Abilities Cycling Routes*, City of Vancouver, 2017.

18 Salt Lake City, 2012. *Pedestrian Safety Review: Risk Factors and Countermeasures*. Salt Lake City: Department of City and Metropolitan Planning, University of Utah, School of Public Health and Community Development, Maseno University.

A critical component of a safe transportation network is to intentionally design a street to match its intended function and integrate it with its surroundings. Vehicular operating speeds are more strongly influenced by changing street design features, which can be a primary contributor to actual speed reduction.

Today, many municipalities are considering implementing 40 km/h or even 30 km/h zones across wide swathes of their cities. However, studies have demonstrated that changing the posted speed limit without any additional speed reduction measures has a limited effect on lowering actual operating speeds or reducing the frequency or severity of collisions. [19,20]

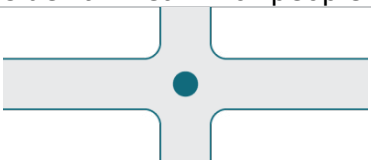
Examples of Traffic Calming Techniques

Median
Medians create a pinchpoint for traffic in the center of the roadway and can reduce crossing distances.

Pinchpoint
Chokers or pinchpoints restrict motorists from operating at high speeds on local streets and significantly expand the sidewalk realm for people.

Chicane
Chicanes slow drivers by alternating parking or curb extensions along the corridor.

Lane Shift
A lane shift horizontally deflects a vehicle and may be designed with striping, curb extensions, or parking.



Roundabout
Roundabouts reduce traffic speeds at intersections by requiring drivers to move with caution through conflict points.

Speed Hump
Speed humps vertically deflect vehicles and may be combined with a mid-block crosswalk.

Diverter
A traffic diverter breaks up the street grid while it maintains permeability for people on foot and on bikes.

Adapted from NACTO, *Speed Reduction Mechanisms*.

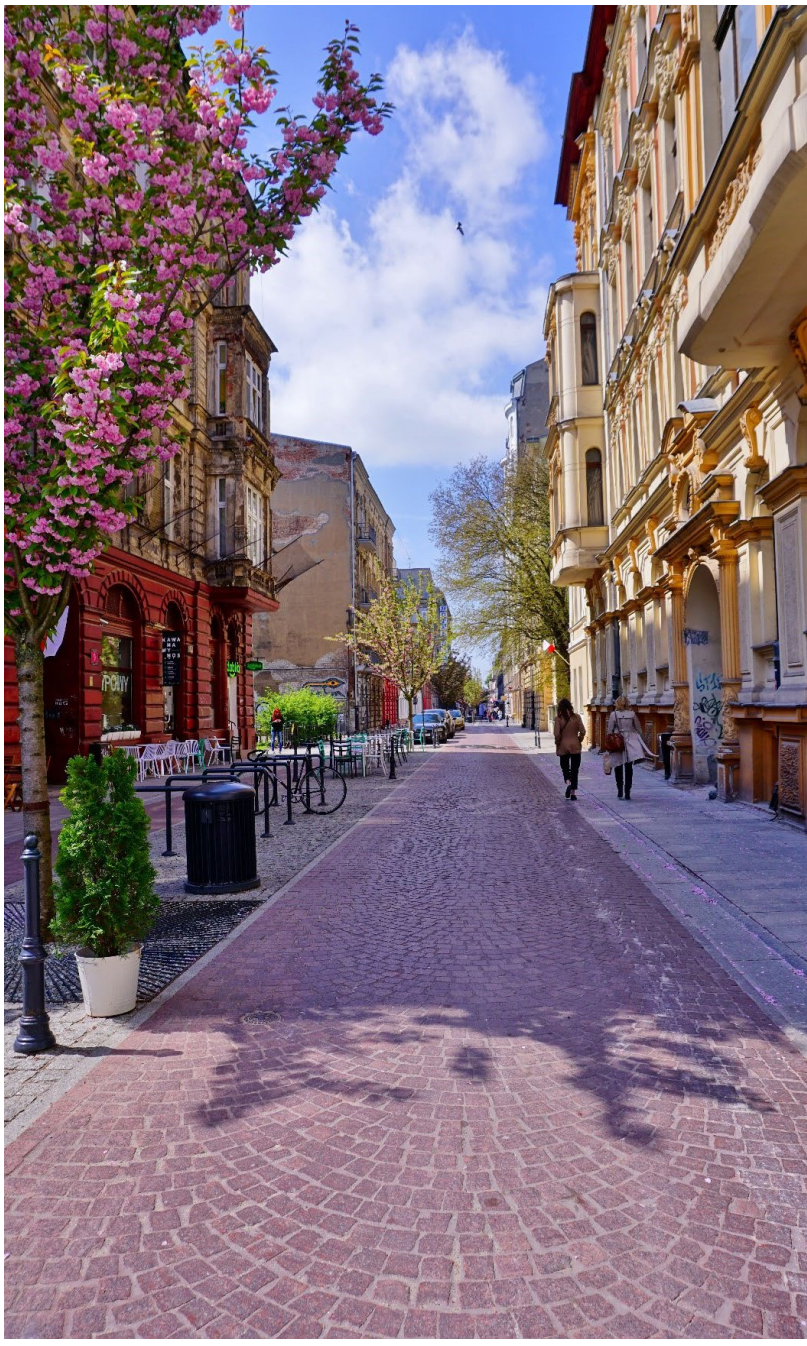
19 Dillon Consulting Limited, 2013. Low Posted Speed Limit Study. Prepared for the Nova Scotia Transportation and Infrastructure Renewal. https://novascotia.ca/tran/publications/NSTIR_Speed_Zone_Study_-_Dillon_-_Final_Report_2013-11-15.pdf

20 US Department of Transportation, Federal Highway Administration, 1997. *Effects of Raising and Lowering Speed Limits on Selected Roadway Sections*. https://safety.fhwa.dot.gov/speedmgt/ref_mats/fhwasa1304/Resources3/33%20-%20Effects%20of%20Raising%20and%20Lowering%20Speed%20Limits%20on%20Selected%20Roadway%20Sections.pdf

Different street designs will result in different road user behaviour through various physical and perceptual cues. The speed at which a driver will operate a vehicle is highly influenced by the physical characteristics of the road, such as the number and width of lanes, intersection design, or the presence of street trees and furnishings.

Common speed mitigation strategies include horizontal (e.g., chicanes) and vertical (e.g., speed bumps) traffic-calming techniques, as well as more comprehensive road redesign to reduce the role of vehicles on a street (e.g., flexible streets, slow streets, living streets, home zones, woonerfs).

Methley's Home Zone in Leeds, UK. Image source: Vision Zero Canada



Woonerf, Lodz, Poland. Image source: MirSiwy / Shutterstock.com.

Intersection Design

Conventional road intersection design prioritizes efficient vehicular movement by maximizing vehicle capacity and minimizing vehicle delay. This vehicle priority is often at the expense of safety and comfort for users who are not in vehicles. However, new intersection designs from the last 10 to 15 years have given more priority and provided a much greater degree of safety for more vulnerable road users. The following figures illustrate examples of these recent intersection design innovations.

Protected intersections, dedicated intersections, and minor street crossings with consideration for active transportation users are all examples of designs that minimize the potential conflicts between vulnerable road users and vehicles.

A protected intersection, in particular, can reduce the likelihood of high-speed vehicle turns, improve sightlines, and dramatically reduce the distance and time during which cyclists are exposed to conflicts. Traffic signal phasing can also be used as a feature to make intersections safer for active transportation users. These strategies and tools all promote three important outcomes to enhance safety at intersections: reducing turning speeds, making active transportation users more visible, and giving cyclists the right of way.[21]

It should be noted that some protected intersection designs pose challenges for navigation or access by larger vehicles, such as trucks, buses, and emergency service vehicles. The best intersection designs should be context-sensitive and balance the needs of all users.

21 National Association of City Transportation Officials, 2019. *Don't Give Up at the Intersection: Designing All Ages and Abilities Bicycle Crossings*.

Figure 5: Protected intersection, Dynes Road and Prince of Wales Drive, Ottawa. Image source: Google

Protected Intersections: This design includes physically separated crossings where the bikeway is set back from parallel vehicular traffic, providing cyclists with a dedicated path through the intersection. Various design elements create shorter and simpler crossings, offer better visibility, and allow for more predictable movements for active transportation users (i.e., people on foot and on bikes).

Figure 6: Dedicated intersection crossing at Gordon Street and Stone Road, Guelph. Image source: Morgan Boyco

Dedicated Intersections: This intersection provides cyclists with a dedicated path through an intersection, even where there is not enough space for a fully protected bike setback. Although dedicated intersections are an improvement to conventional bike lane intersections, they can be more challenging to use than a protected intersection and do not offer the same level of comfort.[22]

22 National Association of City Transportation Officials, 2019. *Don't Give Up at the Intersection: Designing All Ages and Abilities Bicycle Crossings*.

Figure 7: Minor street crossing, Cawston Avenue and Ethel Street, Kelowna. Image source: Google

Minor Street Crossing: This example of a bikeway that crosses a minor street or driveway includes a design treatment that clearly indicates to all road users that people on foot and on bikes have the priority when crossing.

Road Safety in Guelph Today

Guelph has several programs, plans,and strategies already in place to improve the safety on the roads for its communities. These include established active transportation facilities, a dedicated intersection design treatment, and active management through a Neighbourhood Traffic Management program. The existing measures contribute to a safe systems approach.

Active Transportation Facilities

A large portion of Guelph's active transportation network is off-road and made up of multi-use pathways and trails. The City maintains over 110 km of off-road, active transportation connections that enable pedestrians or cyclists to travel in a completely vehicle-free environment. The off-road network also allows for active transportation connections that are not dependent on the length of a street block.

In 2020, most of Guelph's on-road active transportation network is not physically separated from mixed traffic, with the exception of some Multi-use Path Segments along Woodlawn Road West, Eastview Road, and York Road (for a total of 5.5 km of separated pathway). This on-road bike network consists of painted bike lanes, shared use lanes, and signed routes.

The City is also making progress in filling in the gaps in the pedestrian network that were identified in the 2016 *Guelph Sidewalk Needs Assessment Study*. City staff regularly publish progress reports on the state of the pedestrian network across the city.

Intersection Design

In 2018, Guelph's first dedicated crossing intersection was implemented at the intersection of Gordon Street and Stone Road. This intersection design, illustrated in **Figure 8**, uses corner waiting areas and cross-rides to enable cyclists to complete two-stage left turns in a way that mimics the intended movement of foot traffic across the intersection.

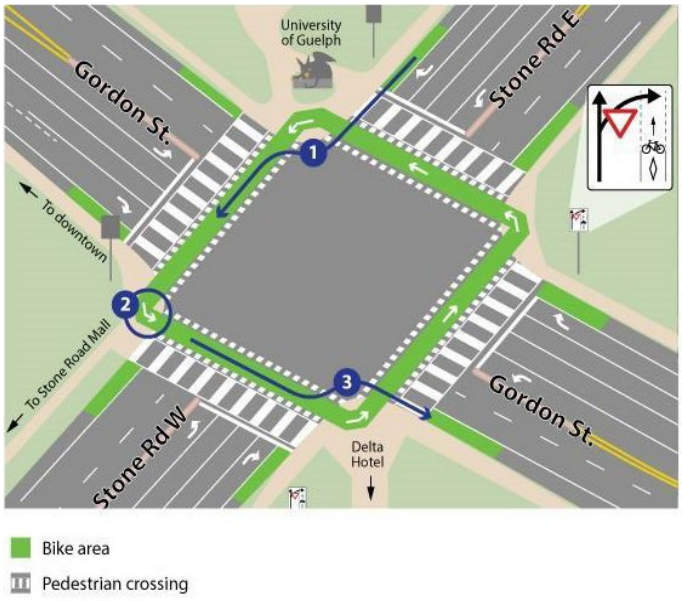


Figure 8: Dedicated intersection at Gordon Street and Stone Road

With the exception of this dedicated intersection, other intersections across the city follow a conventional design that requires cyclists to mix with vehicular traffic in order to cross them.

Active Management

The City actively manages road safety through a number of initiatives and programs. These initiatives and programs are briefly described below.

Community Road Safety Strategy

The City recently developed a *Community Road Safety Strategy* (CRSS), which provides a high-level road safety plan that outlines emphasis areas and appropriate mitigation strategies for safety. In the future, the CRSS will be the core of Guelph's *Active Road Safety Management Strategy*. The CRSS provides strategies to improve road safety for all users and is founded on three main principles:

1. **Evidence-informed decision making:** using data-driven methods to identify and mitigate road safety issues
2. **Equitable approach:** considering vulnerable and underserved populations when prioritizing road safety expenditures and effort
3. **Continuous evaluation:** monitoring the effectiveness of strategies in the community and developing new techniques and initiatives by adding, removing, or revising strategies, as necessary.

Traffic Calming Program

The City's Traffic Calming Program collects safety concerns from the public and uses data to evaluate the need for (and if necessary, implement) mitigation measures. Mitigation measures typically include a combination of pavement markings, physical measures, signage, and education campaigns. The City recently updated its Traffic Calming Policy, which was first adopted in 2005.

Community Speed Awareness Program

Established in 2018, the Community Speed Awareness Program installs temporary radar boards in residential neighbourhoods to raise awareness of speeding issues. Boards are installed in the spring and removed in the fall, as subject to staff resources.

Guelph Road Safety Coalition

The Guelph Road Safety Coalition (GRSC) coordinates and bolsters road safety efforts in the city through educating the public, raising awareness, building capacity, and sharing resources. The GRSC is a coalition of organizations that includes Guelph Engineering and Transportation Services, Guelph Junction Railway, Wellington-Dufferin Public Health, Guelph Police, University of Guelph Campus Police, and the Ministry of Transportation, Ontario.

Active and Safe Routes to School Committee

The Active and Safe Routes to School Committee, established in 2009, supports the development and assessment of safe routes to school. It is complemented by the Guelph Crossing Guard Program.

Moving Guelph Forward: Road Safety

Guelph's transportation planners, engineers, and policymakers can improve road safety through the design of our transportation network, implementation of supportive policies, and education and awareness programs for transportation users. While such interventions alone can't eliminate all risks associated with road safety, they play an important role in ensuring that all people enjoy a right to safe mobility. And as new best practices and studies emerge, there is continuous opportunity to further improve road safety in our community.

Based on the trends, best practices, and existing conditions outlined in this paper, the following is a list of key takeaways about road safety today:

- A safe systems approach is the best practice for road safety. It looks at road safety from all perspectives and requires safe road use, safe speeds, safe roads, and safe vehicles.
- Vision Zero is a commitment to completely eliminate transportation-related deaths and serious injuries from the transportation network. It is rooted in a safe systems approach. Many governments around the world are making Vision Zero commitments, including several municipalities in Canada.
- Speed is a key factor that affects the likelihood of a collision and the severity of the consequences. Victims of transportation-related injuries tend to disproportionately be more vulnerable transportation users: those of us walking or cycling.
- In the last few decades, new street and intersection designs have been developed to create comfortable and safe experiences for diverse users of varying levels of ability. These designs vary, but all seek to prioritize the experience of people walking and cycling.
- The City is building new or improving existing streets and intersections to create a safe and comfortable for all users. The City also has several road safety strategies, programs, and education campaigns to respond to road safety concerns. It is currently developing new tools to further improve road safety in Guelph.

What do you think?

What do you think about road safety? What are your concerns related to the safety of our streets in Guelph? How should our planners and policymakers respond to the latest thinking around road safety, and what are the opportunities to make our streets safer for all members of our community?

Please let us know! Visit **guelph.ca/tmp** to learn more about the transportation topics and trends informing the development of our TMP and to find out how you can have your say on Moving Guelph Forward.

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