

Memo



To: Jennifer Juste, City of Guelph
From: Adam Prokopanko, Dillon Consulting Limited
cc: Shawn Doyle, Dillon Consulting Limited
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Date: December 10, 2021
Subject: Financial Considerations
Our File: 18-8919

1.0 Overview

This memo summarizes the four individual memos prepared to examine different aspects of the financial considerations required to evaluate transportation alternatives and inform the recommendations of the Guelph Transportation Master Plan (TMP).

- The Cost of Building True Multi-modal Transportation Networks
- Stepping Away from a Car-centric Approach
- Potential Development Charges Recovery
- Funding Sources

Taken together, these components form the financial strategy of the Guelph TMP and provide direction to ensure that the TMP can be implemented in a sustainable and cost-effective manner.

The Cost of Building True Multi-modal Transportation Networks

This memo estimates the impact on future Capital Budgets of transitioning to design practices that represent the Complete Streets philosophy proposed by the Transportation Master Plan from existing road design practices. Details are provided in **Section 2.0**.

Stepping Away from a Car-centric Approach

This memo provides a brief explanation as to why the City of Guelph chose a sustainability approach for the Transportation Master Plan, instead of continuing the auto-centric, business-as-usual approach. Details are provided in **Section 3.0**.

Potential Development Charges Recovery

This memo was prepared by Watson & Associates Economists Limited to assess the capital projects contained within the Transportation Master Plan and identify their potential development charges eligibility. The listing of capital projects is based on the Recommended Network, as approved by Council. Details are provided in **Section 4.0**.

Funding Sources

This memo identifies existing funding options and possible non-property tax revenue tools, which informs an evaluation of preferred revenue tools the City of Guelph may use in future toward funding of the infrastructure projects recommended as part of the Transportation Master Plan. Details are provided in **Section 5.0**.

The Cost of Building True Multi-modal Transportation Networks

There is a cost associated with building a transportation network that is greener, safer, and more accessible than what currently exists within much of the City of Guelph. This section determines the additional cost (delta) of building infrastructure to the standards set out in the TMP recommendations.

Comparison of Right-of-Way Design Components

The City's Development Engineering Standards

The Development Engineering Standards include road design standards that reflect the industry state of practice from 2010/2011 when the latest update was completed. The standards contain a mix of rural and urban cross-sections, with only the urbanized sections being considered as part of the memo. The City's Standard Drawings include the following within the road right-of-way:

- 1.5 m sidewalks provided on one or both sides of all urbanized section;
- No provisions for cycling facilities;
- No defined space for transit amenities though boulevards are generally wide enough to include them;
- No inclusion of street trees; and
- Vehicular lanes that vary in width from 3.5 to 4.5 m for urbanized cross-sections.

A Move in the Right Direction (2021 Design Approach)

In recent years, City staff have endeavored to create more modern, multi-modal transportation corridors despite the absence of a formal policy document or design standard to guide decisions. When (re)constructed by the City, modern arterial and collector right-of-way designs have aimed to include both pedestrian and cycling amenities per the recommendations of OTM Books 15 and 18. This more modern standard has typically included the following within the available road right-of-way:

- 1.5 m sidewalks on both sides of every collector and arterial roadway;
- 1.5 m on-road cycle lanes or 3.0 m multi-use pathways on both sides of every arterial or collector roadway;
- Space for transit pads within the boulevard for arterial or collector cross-section;
- No standard requiring the inclusion of street trees; and
- Vehicular lanes that vary between 3.5 and 3.75 m.

A City for the Future (TMP Design Recommendations)

The Guelph of the future is a City in which people can safely choose walking, cycling, or transit for local trips – leaving road capacity for goods movement and longer distance travel. The types of right-of-way amenities envisioned through the TMP Update include the following:

- All Ages and Abilities (AAA) cycling facilities on all arterial and collector roadways. Facility types include a mix of: wider, physically separated on-road cycling lanes, off-road cycle tracks, and multi-use pathways where space is limited;
- Wider, AODA-compliant sidewalks on both sides of all arterial and collector roadways. Sidewalks will have a minimum width of 1.8 m and may be wider where anticipated pedestrian volumes are higher or where the need is supported by adjacent land uses;
- Transit shelters provided at every transit stop on arterial and collector roadways; and
- Street trees within grassed and/or landscaped boulevards on both sides of all arterial and collector roadways wherever space permits.
- Underground relocation of above-ground hydro wires and other utilities is likely required to maximize efficient use of the Right-of-Way and reduce the property impacts. Placing utilities underground can add up to \$2M per kilometer to a project assuming full underground relocation on two sides of a street. These costs are project-specific and have not been included in the cost comparison below.

Summary

Table 1 provides an overview of the differences between the design standards discussed in the previous three sections.

Table 1: Overview of Proposed Changes to Design of Guelph's Arterial and Collector Right-of-Ways

Design Standard	Guelph's Development Engineering Standards	2021 Approach to Design	TMP Recommendations
Vehicular Facilities	3.5 to 4.5 m lanes, minimum 8.1 m curb face to curb face	3.5 to 3.75 m lanes, minimum 8.0 m curb face to curb face	3.3 to 3.5 m lanes, minimum 8.0 curb face to curb face
Pedestrian Facilities	1.5 m sidewalks, both sides	1.5 m sidewalks, both sides	Minimum 1.8 m sidewalks, both sides
Cycling Facilities	None	1.5 m cycle lanes or 3.0 m multi-use pathways	AAA Cycling Facilities (including physically separated on-road lanes, 2.0 cycle tracks, or 3.0 m multi-use pathways)
Streetscaping	Grassed Boulevards	Grassed boulevards with some street trees	Grassed boulevards with street trees on both sides
Transit Amenities	Undefined	Shelters at some stops	Shelters at all stops
Location of Electrical Lines	Overhead	Mix of overhead and underground ¹	Fully underground on both sides ²

¹ For comparison purposes, electrical lines have been assumed to be overhead in the 2019 approach.

² Generally required to facilitate the placement of street trees within the right-of-way on both sides of the roadway.

The Cost of Driving Change

While the TMP endeavors to mitigate the need to widen roadways by shifting mode choices, implementing enhanced sidewalks, AAA cycling facilities, higher quality transit amenities and improved streetscapes is not without cost. Without the need for costly widening projects, more space and capital resources will be made available to improve road right-of-ways beyond the curb. This will include the resources to improve the equity of the overall transportation network, maintain or improve the character of existing historic corridors, and enhance the public realm with street trees and other amenities to encourage a sense of community.

Table 2 and 3 provides a comparison of capital costs associated with planned transportation facility improvement categories. The comparison of costs indicates that implementation of the enhanced multi-modal corridors put forward through the TMP can be expected to increase overall capital costs by an average of 3%³.

Note that these costs include new street trees but do not include underground utility relocations, transit shelters, or contingencies to account for complexity of the installations. Transit shelters are not included because the pad designs are consistent across the design standards. The only change for the TMP Recommendations is that shelters be provided at all stops instead of at limited stops. An average of four shelters per kilometre is anticipated, at a cost of \$8,000 per shelter. These costs are not significant enough to affect the delta % value. All calculations are in 2021 dollars.

Table 2: Comparison of Facility Costs by Design Standard

Design Standard	Guelph's Development Engineering Standards	2021 Approach to Design	TMP Recommendations⁴
Pedestrian Facilities	1.5 m sidewalk	1.5 m sidewalk	1.8 m sidewalk
Pedestrian Facilities	\$280	\$280	\$335
Cycling Facilities⁵	None	New 1.5 m on-road	New 2.0 m cycle track
Cycling Facilities	\$0	\$1,185	\$410

³ Not including corridor retrofit solely to implement AAA cycling facilities.

⁴ Costs for TMP Recommendations include street trees but do not include potential need to relocate overhead utilities.

⁵ Presented costs represent retrofits to widen the roadway for cycle lanes or install cycle track in the boulevard. Note cost to relocate transit amenities or modify intersections are not included in these unit costs.

Design Standard	Guelph's Development Engineering Standards	2021 Approach to Design	TMP Recommendations⁴
Cycling Facilities			New 2.8 m buffered lane
Cycling Facilities			\$1,489
Two Lane Arterial	4.1 m lanes, sidewalks	4.0 m lanes, cycle lane and sidewalk	4.0 m lanes, cycle track and sidewalk
Two Lane Arterial	\$2,953	\$3,491	\$3,727
Three Lane Arterial	3.5 m lanes, TWLTL ^c , sidewalks	3.5 m lanes, sidewalks, cycle lanes, and TWLTL ⁶ or parking	3.5 m lanes, sidewalks, AAA cycling ⁷ , and TWLTL ^c or parking
Three Lane Arterial	\$3,264	\$3,740	\$3,715
Four Lane Arterial	3.5 and 3.75 m lanes, sidewalks	3.3 and 3.5 m lanes, cycle lanes and sidewalk	3.3 and 3.5 m lanes, cycle track and sidewalk
Four Lane Arterial	\$3,670	\$3,845	\$3,945
Five Lane Arterial	No standard	3.5 and 3.75 m lanes, TWLTL ^c cycle track, sidewalk	3.3 and 3.5 m lanes, TWLTL ^c cycle track, sidewalk
Five Lane Arterial	n/a	\$4,395	\$4,450
Two Lane Collector	3.95 m lanes, sidewalks	3.3 – 3.5 m lanes, sidewalks and cycle lanes	3.3 – 3.5 m lanes, sidewalks and buffered cycle lanes
Two Lane Collector	\$3,100	\$3,350	\$3,565

⁶ Two way left turn lane, 4.0 m wide.

⁷ Either cycle track or buffered on-road cycle lanes.

Design Standard	Guelph's Development Engineering Standards	2021 Approach to Design	TMP Recommendations⁴
Three Lane Collector	3.5 m lanes, TWLTL ^c , sidewalks	3.5 m lanes, TWLTL ^c , and multi-use pathways	3.5 m lanes, TWLTL ^c , and multi-use pathways
Three Lane Collector	\$3,265	\$3,465	\$3,465

Table 3: Comparison of Facility Costs by Design Standard

Facility Type	Estimated cost per km (000) and Delta		
	2021 Cost	TMP Cost	Delta (TMP-2021)
Two Lane Arterial	\$3,491	\$3,727	7%
Three Lane Arterial	\$3,740	\$3,715	0%
Four Lane Arterial	\$3,845	\$3,945	3%
Five Lane Arterial	\$4,395	\$4,450	3%
Two Lane Collector	\$3,350	\$3,565	6%
Three Lane Collector	\$3,465	\$3,465	n/a

Guelph is growing to a population of 203,000 people and an employment base of 116,000 jobs by 2051; an increase of about 50% from today's levels. An equivalent increase in the demand for travel is expected, and Guelph faces a choice about how to meet the demand of the future. Guelph has not chosen to continue the current auto-centric approach to transportation, for several reasons.

Why not continue with the current auto-centered approach?

Guelph cannot continue to follow its current auto-centred approach to transportation service. Today's approach is:

- **Unaffordable**, for both the City and for travelers
- **Unsustainable**, with significant negative impacts on the climate and natural and human environments
- **Less equitable**, in that it fails to provide a variety of travel options and it does not meet the needs of all travelers
- **Less safe**, as more cars and wider streets leaves pedestrians and cyclists more vulnerable to serious injury

Unaffordable

The current auto-centred approach to transportation service (as represented by *Alternative Solution 4: Car Efficiency Focus*) would require almost 15km of road widening more than *Alternative Solution 2: Sustainability Focus*. At costs ranging from \$4.5M to \$7.0M per km for road widening, this translates to between \$65M and \$100M in additional capital costs. The larger network would also have higher asset management and operating/maintenance costs.

An auto-centred approach would also increase the average cost of travel for individuals. Consider the following data on traveler costs per mode:

- Annual cost of owning and operating a car are typically between \$8,000 and \$12,000 per year⁸
- Annual costs of a transit pass are currently \$960/year
- One-time costs for purchasing a bicycle range from \$200-\$500, depending on the bike
- Walking is free to the traveler

Note that an auto-centric solution forces these higher individual costs onto a greater portion of the traveling public, as the current auto mode share of 80% is maintained (instead of being reduced to 55% under the sustainable approach).

⁸ Average of the costs of owning a vehicle from the CAA Driving Cost Calculator

Unsustainable

Transportation is the largest single source of greenhouse gas (GHG) emissions in Guelph, a condition that Guelph has committed to changing through a number of strategic planning documents (such as the Official Plan, Strategic Plan, Climate Emergency, Community Energy Efficiency).

The Guelph Community Energy Initiative's Business-as-Usual Report provided a snapshot of current and projected 2050 emissions (tonnes of CO₂) from the transportation sector based on forecasted population and employment growth and assuming no additional policies, actions or strategies to address energy and emissions will be implemented between 2017-2050, other than those planned or currently underway.

Table 4: Community emissions tabulated results, 2016 & 2050 Business-as-Usual (BAU)

Emissions by sector (tCO₂e)	2016	Share 2016	2050 (BAU)	Share 2050	% +/- (2016-2050)
Commercial	275,300	23.8%	256,800	23.2%	-6.7%
Fugitive	69,500	6.0%	63,200	5.7%	-9.1%
Industrial	148,900	12.9%	150,700	13.6%	1.2%
Residential	208,400	18.0%	205,300	18.6%	-1.5%
Transportation	374,200	32.4%	336,900	30.5%	-10.0%
Waste	80,400	7.0%	92,100	8.3%	14.6%
Total	1,156,700		1,105,000		-4.5%

Source: City of Guelph Energy and Greenhouse Gas Emissions, 2018

As Error! Reference source not found. presents, transportation remains the largest contributor to atmospheric impacts under a Business-as-Usual (BAU) approach.

The Energy and Emissions Report (2012) provided some direction to reducing climate impacts from transportation, notably committing to more sustainable transportation modes, such as cycling and public transit.

Environmental impacts do not stop at climate impacts. A traditional auto-centric transportation solution would require street widenings through mature neighbourhoods such as Old City west of Downtown or the Ward east of Downtown, and significant natural areas such as the Natural heritage areas, river crossings, and Arboretum lands.

Less Equitable

The current auto-centred approach to transportation service prioritizes auto mobility, which puts those who cannot or do not wish to drive at a disadvantage. For instance, someone who owns a car can make a cross-town trip in 10 minutes, but this trip could take up to an hour on transit with current service

levels. Not only does this make transit inconvenient, but it makes key services, employment, and parts of the city or transportation system (such as frequent transit, safe cycling routes or continuous sidewalks) less accessible. This disproportionately affects communities of traditionally marginalized people and vulnerable residents who are more likely to depend on transit and other forms of mobility for their daily travel needs, and is a major barrier to self-efficiency.

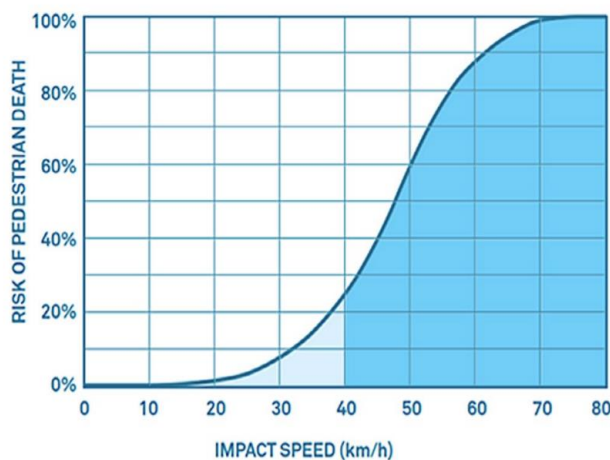
A traditional auto-centric transportation solution would only put these communities at more of a disadvantage, while undermining the goals of the City and other investments directed at transit. A sustainable approach prioritizes investments that help improve access to and increase the efficiency of sustainable travel options, like transit, which will help make these modes more attractive and convenient, and meet the transportation needs of more residents.

Less Safe

In most cities in Canada, active transportation road users (pedestrians, cyclists, etc.) are disproportionately injured or killed in road incidents. Although some improvements for vulnerable users have been made in Guelph, these have not always been significant or suitable for all users. For instance, paved shoulders or painted bike lanes are only comfortable for a small fraction of cyclists. The current auto-centred approach does not prioritize a significant amount of investments into making streets safe for all modes and users of all ages and abilities. This has a societal cost of about \$100 million annually in expenses related to collision-related injuries.

In Guelph:

- 1 person is injured in a collision every 9 hours
- 6 collisions occur every day
- 2 collisions with pedestrians or cyclists occur every 10 days
- 1 road fatality occurs every 4 months



Source: *Safe Streets Save Lives Global Designing Cities Initiative*

Figure 1: Relationship between impact speed and risk of pedestrian death

Traditionally, road safety was the responsibility of the driver to prevent collisions and focus was on what causes the collisions instead of how to prevent them and proactively take actions to increase safety for all road users.

An auto-centric approach may not consider facilities that make other modes of transport safer, like intersection crossings, sidewalks, and bike lanes, forcing these users onto the road. Depending on the operating speeds on the road, the severity of injuries and risk of death for pedestrians and cyclists increases drastically. **Figure 1** illustrates this relationship.

Moving on from traditional transportation approaches to a sustainable approach will enable the City to achieve their TMP and strategic goals of City's goals of shifting mode share, improving road safety, reducing Guelph's carbon footprint, and designing an increasingly sustainable city as Guelph grows.

Potential Development Charges Recovery (Watson)

As per the request of the City, we have examined each of the capital projects identified within the Transportation Master Plan (TMP) and evaluated their potential Development Charges (DC) allocations. To assess the potential DC eligible component of the capital projects, we have utilized the assumptions from the 2018 Development Charges Background Study as a basis for the analysis undertaken herein. As noted above, there are different types of projects included within the listing which may require the attributions to be further refined as part of the City's next formal DC study process.

Through the 2018 DC study process, Watson worked with City staff to develop growth percentage allocations for transportation-related projects based on the scope of the capital works. For example, road projects that were expansionary and provided additional lanes were deemed to be 70% growth-related, while projects with a focus on active transportation additions were considered 50% growth-related. **Figure 2** provides the growth percentage criteria on which all of the TMP projects were evaluated.

Criteria	Growth %
Downtown Projects	25%
Upgrade Existing Rural to Urban	50%
Active Transportation - Biking	50%
Expand Road with Additional Lanes	70%
Basic Urban Road to Enhanced Arterial*	70%
Intersection Improvement - New Signalization	90%
New Road	100%
Road Upgrade resulting from direct adjacent development	100%
Additional Lanes Only (No reconstruction)	100%

*New Category in the T.M.P.

Figure 2: Criteria for Growth Percentages

In addition to the 2018 DC growth percentages, we have added a new category for urban roads being upgraded to enhanced arterial roads. These types of projects have been assumed to be 70% growth-related as they provide an expansionary aspect to the existing road and adds boulevards/bus pads throughout the road segments.

Using this framework, we have applied the appropriate criteria noted in Figure 2 to the TMP capital projects. Through City staff's review of the proposed projects, a list was provided to identify 54 projects that could occur by 2031. Of these projects, 37 are already in the 2031 capital budget forecast. The other 17 are considered as potential projects that could be recommended to advance if the pace of implementing the TMP needs to be increased. As it is unknown at this time if all the projects from the additional 17 projects would need to be considered within the 2021 to 2031 timeframe, a sensitivity

analysis has been undertaken to assess the potential DCs from projects of capital budget-only, and capital budget-plus projects.

Figures 3 and 4 summarize the total costs and potential DC recovery for 2021 to 2031 forecast period for capital budget-only projects and “capital budget-plus” projects, respectively.

Project Criteria	2021-2031	
	Gross Project Costs	Potential D.C. Recovery
Downtown Projects	\$ 15,133,277	\$ 3,783,319
Upgrade Existing Rural to Urban	\$ 28,693,797	\$ 14,346,899
Active Transportation - Biking	\$ 77,915,070	\$ 38,957,535
Expand Road with Additional Lanes	\$ 41,966,101	\$ 29,376,270
Basic Urban Road to Enhanced Arterial*	\$ 12,957,842	\$ 9,070,489
Intersection Improvement - New Signalization	\$ -	\$ -
New Road	\$ 9,319,049	\$ 9,319,049
Road Upgrade resulting from direct adjacent development	\$ -	\$ -
Additional Lanes Only (No reconstruction)	\$ -	\$ -
Total	\$ 185,985,136	\$ 104,853,562

Figure 3: Summary of Potential DC Recovery (2031 capital budget only)

Project Criteria	2021-2031	
	Gross Project Costs	Potential D.C. Recovery
Downtown Projects	\$ 15,133,277	\$ 3,783,319
Upgrade Existing Rural to Urban	\$ 66,909,573	\$ 33,454,787
Active Transportation - Biking	\$ 136,271,580	\$ 68,135,790
Expand Road with Additional Lanes	\$ 41,966,101	\$ 29,376,270
Basic Urban Road to Enhanced Arterial*	\$ 29,265,573	\$ 20,485,901
Intersection Improvement - New Signalization	\$ -	\$ -
New Road	\$ 9,319,049	\$ 9,319,049
Road Upgrade resulting from direct adjacent development	\$ -	\$ -
Additional Lanes Only (No reconstruction)	\$ -	\$ -
Total	\$ 298,865,154	\$ 164,555,117

Figure 4: Summary of Potential DC Recovery (2031 capital budget plus 17 additional projects)

Funding Sources

This memo identifies existing funding options and possible non-property tax revenue tools, which may be used to inform a future evaluation of revenue tools the City of Guelph may use to generate the funding for the infrastructure projects recommended as part of the Transportation Master Plan.

Potential sources of new transportation funding options that could be considered to support the TMP capital plan include:

- New Mobility Charge (particularly on ridesharing)
- Sponsorship of the Built Environment
- Tax-Increment Financing
- Curbside User Fees

There are also several more conventional sources that should be considered as future possibilities. These are all used in other jurisdictions in Canada and the United States but require provincial approval in Ontario:

- Municipal Sales Tax
- Municipal Excise Taxes (particularly on fuel)
- Employer Payroll Tax

The full version of this memo with supporting documentation and evaluation will be provided to the City in future.