

**Traffic Safety Issues and Mitigation Strategies**  
**in**  
**Mature Neighbourhood Overlays**

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## Abstract

As towns and cities throughout North America begin to show signs of aging, the number of emerging mature neighbourhoods and communities within municipalities has burgeoned. The rapid growth of these areas has created transportation safety problems of a magnitude and nature that are hitherto unknown to governing bodies.

Mature neighbourhoods are defined as those communities developed in the historic past that often consist of older and smaller dwellings built on properties with a sizable lot in quiet streets. As the supply of large properties in towns continues to decrease and the costs of developable land continues to increase, the demand and pressure to rebuild infills in mature neighbourhoods is expected to rise. Developers, or existing owners, are now looking into purchasing or converting existing properties and turning them into larger or multi-purpose residences that may be incompatible with the existing built-form, and which would create different safety issues on transportation.

Many municipalities such as the County of Strathcona and the City of Edmonton in Alberta are currently conducting studies to formulate Mature Neighbourhood Overlay (MNO) policies with a view to lessen the threat of loss of character in these redevelopment areas, to protect green spaces, and to balance needs with zoning regulations. While these initiatives to address the land use impacts are necessary and commendable, the same corresponding attention have not been paid to the impact on transportation that are often as challenging, given tight existing conditions and constraints. To be successful, care must be taken to ensure that these infill developments will not create a negative impact, a perceived or real hazard, or an unacceptable increase in traffic on local roads.

This paper sets out to explore some of the more critical issues on transportation in mature neighbourhoods. It examines the unique features within these communities such as the blending of future houses with existing buildings; demographics of residents; traffic calming measures and their implementation; curbside management; geometric conditions and constraints; driveway accesses, setbacks, and parking; roadway dieting; conditions created by senior living; high and low end condominiums, etc.; as they relate to transportation and traffic safety. Strategies, policies and guideline solutions are suggested. The importance of public engagement is highlighted. Case studies using Strathcona County as an example are cited. It is recommended that more encompassing studies in the future should be carried out by research bodies to formulate a best practice guideline document.

## 1.0 Introduction and Background

Due to a steady and in some cases rapid growth of population as a result of immigration, and the successfulness in containing the much dreaded phenomenon of suburban sprawl, there is a general reversal in trend of residential settlement, with the flow of population back into the inner city and town centres, creating a general shortage of developable land in these areas in many North American municipalities. Today a lot of municipalities are experiencing large-scale residential re-developments in their older mature neighbourhoods, often referred to as the building of “monster homes”, which has raised public concern about the character and integrity of how these developments are to be shaped and what are their impacts, especially with how the new travel patterns created, will affect the daily livelihood of citizens living in these areas, and with the problems associated with vehicular and pedestrian traffic safety.

The result of the above is that the review of mature neighbourhood overlays (MNO) has started in earnest in many North American cities, including the City of Edmonton (Edmonton) and the County of Strathcona (SC) in Alberta, Canada; and is identified by their governing councils as an imminently needed and actionable infill roadmap item. The Edmonton Infill Roadmap policy (2016), for example, has instructed administration to : “Revise the Mature Neighbourhood Overlay of the Zoning Bylaw in order to make it a more effective tool to support infill in our mature neighbourhoods, reduce the need for variances and Class B development permits, and improve the approval process” **[Reference 1]**. This will help support more infills across the wide diversity of established neighbourhoods by continuing to encourage infill that responds to the context of a property, increasing predictability in the approval process, and providing more design flexibility for new housing. Prior to the adoption of the MNO, the mature areas of Edmonton were seeing suburban style homes (front attached garages, built to the maximum allowable height and lot coverage) being developed that, in the opinion of many community members and City Administration, did not fit within the context of the existing development. Likewise, SC has recently (2015) enacted comprehensive land use bylaws to govern how mature neighbourhoods should be infilled. The goal of SC’s mature neighbourhood overlay policy is to provide for residential development within mature neighbourhoods that respects and maintains the overall character of these areas and to allow a smooth and safe transition and transformation into a higher density, more populous and vibrant community.

These planning efforts are commendable and indeed necessary, which recognize the criticalness of the situation, and has instilled a sense of urgency in the subject matter. A corresponding and comparable effort to study the many transportation issues associated with the community metamorphosis, however, have not been carried out, which would address the issues of traffic flow and pattern, and more importantly ensure the safety of residents.

This paper examines the many traffic problems surrounding the re-development of MNOs, and recommends that policies, strategies and guidelines are to be set up by the authorities to address the transportation concerns associated with this important land use development phenomenon. An orderly and structured traffic study should always be carried out before any land use changes are to be made. Comprehensive studies in the future should be conducted by research bodies and municipalities to formulate a best practice guideline document. Factors such as physical constraints; curbside management; geometric conditions; driveway accesses, setbacks, and parking; accessibility; roadway dieting; conditions created by senior living; high and low end condominiums, etc.; as they relate to transportation and traffic safety, should be all considered. The importance of public engagement is highlighted. Case studies using examples from SC are given in some detail.

## 2.0 Mature Neighbourhoods and their related Transportation Issues

Mature neighbourhoods are defined as those communities developed in the historic past that often consist of older and smaller dwellings built on properties with a sizable lot in quiet streets. The demand and pressure for large-scale residential rebuild infills in mature neighbourhoods is expected to rise as the supply of large properties in towns continues to dwindle and the costs of developable land continues to rise. Often these properties are purchased by developments, or are being sold by existing owners, with the intent of redeveloping existing dwellings with larger ones that may be incompatible with and which would create different safety issues on transportation.

Strathcona County has further defined mature neighbourhood re-developments as follows:

- A mature neighbourhood is understood to be a residential neighbourhood that has predominantly been built out prior to 1980.
- Redevelopment in these areas is understood to include modifications to an existing dwelling and/or the demolition and reconstruction of an existing dwelling.
- Infill in these areas relates to the development of undeveloped sites, the addition of secondary suites to an existing lot and/or rezoning land to allow higher densities.

In mature neighbourhoods, existing properties that have not been built to their maximum development potentials as permitted by zoning by-laws are populated by “infills” which may result in the creation of existing built form or neighbourhood character that is not reflective of zoning, unless developments are planned and controlled by regulation. With surplus development potentials on these properties, development applications are often able to conform to all applicable zoning regulations without requiring any planning review. The lack of regulatory framework will thus not only result in a threat of loss of character within older communities but may also create a potential unsafe situation on transportation.

Recognizing the problem, the City of Halton Hills **[Reference 2]** and the City of Ottawa in Ontario, as well as many other communities in the Greater Toronto Area such as Oakville, Burlington, Vaughan **[Reference 3]**, and Brampton, have initiated studies in recent years to address this growing trend of development of “monster homes” in mature neighbourhoods. In Alberta, Edmonton and SC have led others in similar efforts to address the same problem. Documents in the public such as the “Mature Neighbourhood Overlay Project Charter” published by Edmonton in July 2016, and the “Mature Neighbourhood Strategy Preliminary Consultation Program” published by SC in June 2013, are available for information and guidance domain **[Reference 4]**.

## 3.0 The Planning Approach

To address transportation needs, a systematic planning and study approach of mature neighbourhoods will be necessary. At the very minimum the following procedures should be considered:

- Form a technical steering group to direct and guide the study. The group should include representatives from local jurisdictions, as well as that it should consist of a team of multi-disciplinary professionals that encompass traffic and safety engineers, traffic police, environmentalists, land use planners, and other community leaders. The group

should meet periodically over the duration of the project to provide guidance and directives to the project staff.

- Conduct an initial search, validation and verification of existing baseline data.
- Establish a preliminary public consultation program involving residents of the older neighbourhoods, as well as other key stakeholder groups including the development industry, service providers, government administration, and community organizations.
- Investigate and identify transportation issues.
- Devise viable solutions; and analyze proposed mitigation measures.
- Design a public engagement process to involve community stakeholders and interest groups to obtain their input and to get their buy-ins to the proposed solution(s).
- Organize project implementation.
- Conduct a post implementation study to measures of effectiveness.

On the technical side, the goal and purpose of the approach is to prepare the neighbourhood with a traffic plan that should include the important feature of traffic calming, and which is tailored to the needs of and acceptable by the residents. The plan should be based on the use of traffic calming measures, enforcement or regulatory initiatives to satisfy as fully as practicable the following objectives:

- Improve safety and convenience for pedestrians and cyclists;
- Reduce the number and severity of collisions;
- Reduce the speed and volume of motorized vehicles;
- Reduce the volume of extraneous or non-local traffic;
- Minimize traffic impacts on adjacent local residential streets;
- Reduce motor vehicle emissions; and
- Maintain access for local traffic and emergency vehicles.

#### **4.0 Understanding the issues**

Mature neighbourhoods facing today's land use transformation will need physical changes of its existing transportation infrastructure to effectively address the many traffic safety problems. The strategy is to develop a comprehensive review of the older areas which would address:

- Public realm improvements
- Infrastructure and servicing upgrades
- Criteria to clarify the appropriate location, scope, scale, and aesthetics of redevelopment and infill initiatives

To arrive at a suitable solution, it will be necessary first to identify and to understanding the surrounding issues.

Existing physical site conditions within the neighbourhood areas are obviously critical, and will serve as a baseline for performance measures of any before and after improvement condition. The assessment of existing conditions will include a study of the additional traffic generations of the proposed infills, travel patterns, physical roadway characteristics, traffic operations, safety and accident blackspots, safe routes to school programs, and parking etc.

Traffic data collection should include:

- Traffic volume – roadway AADT (average annual daily traffic) and/or intersection turning movement counts
- Prevailing vehicle speeds
- Collision history
- Pedestrian studies
- Traffic infiltration studies
- Location characteristics

Various traffic calming devices and other safety measures to be considered should include, but not limited to the following:

- Speed humps (conduct a warrant analysis)
- Raised crosswalk (conduct a warrant analysis)
- Raised intersection (where possible)
- Roundabout/traffic circle (priority consideration)
- Median (conduct a warrant analysis)
- Curb extension/road narrowing (conduct a warrant analysis)
- Contrasting material – e.g. textured concrete crosswalks and parking lay-bys (engineering consideration)
- Pavement markings – e.g. painted road narrowing (engineering consideration)
- Warning signs – e.g. curve warning, children playing, park area, etc. (engineering consideration)

In addition to the above the wide range of tools available by referencing to the literature should be utilized to achieve the goal, including formulating policy development, infill and redevelopment guidelines, area redevelopment plans and zoning overlays. The Canadian Guide to Traffic Calming, Second Edition, published by the Technical Association of Canada in February 2018, is a comprehensive and useful document in the subject matter **[Reference 5]**

## 5.0 Case Studies

The recommended procedural guidelines, planning philosophy, and design principles of transportation improvement in mature neighbourhoods outlined in the previous sections are illustrated in two case studies given below. Both sites cited as a reference are located in the hamlet of Sherwood Park, in Strathcona County, Alberta, Canada (**Figure 1**). Despite its status as a hamlet, Sherwood Park is the largest urban centre in SC and has a population of over 64,000. Started in the mid-1950s as a satellite community to house employees of the Oil Refinery Row industrial area, “The Park,” as it is sometimes known, has become a “community of choice” for people wanting to live in a smaller community. Today, residents appreciate the community for its safe neighbourhoods, popular recreation facilities and green space, excellent schools, and high-quality police and ambulance services. Although still a relatively “new” community, many of the areas in the older neighbourhoods are however starting to express redevelopment pressures.

### 5.1 Case Study 1 – Glen Allan Neighbourhood, Sherwood Park, Alberta

Glen Allan is a mature neighbourhood within Sherwood Park **[Reference 6]**. As part of the SC’s MNO policy, and as a result of recent growth, Glen Allan is identified as an area for potential

traffic study and traffic calming considerations, based on resident input and confirmation of issues from vehicle speed counts. A consortium of consulting firms was retained by the County in 2016 to undertake a comprehensive traffic study that has assessed the nature of the traffic calming issues (speeding and short-cutting), incorporated significant stakeholder and public input, and proposed solutions and recommendations based on technical, community, and stakeholder considerations.

On transportation issues, SC, in its policy documents, has already outlined a process and a series of steps by which neighbourhoods are identified for potential traffic calming. Key preliminary steps to follow include 1) identification of issues and support for a study by residents, and 2) establishing if there is an issue of a magnitude sufficient to trigger traffic calming measures. Specifically, any road identified for preliminary traffic calming is found to have an 85th percentile speed of greater than 5 km/h over the speed limit is considered to be a candidate for traffic calming. Additional considerations for traffic calming include an excessive volume of short-cutting traffic. Glenbrook Boulevard within Glenn Allan, for example, was found to have a speeding problem based on speed measurements taken by the County, with the 85th percentile speed being found to be more than 5 km/h the speed limit (57-60 km/h, on a 50 km/h road). This indicates that there is in fact a speeding concern along this roadway and that, based on SC's Traffic Calming Policy, it is appropriate for subsequent review and consideration for action. Traffic calming is not, however, a single roadway consideration, but a neighbourhood consideration. Efforts to calm one area can, depending on the type and frequency of treatments, merely shift the issue to other roads and not solve the overall problem. A comprehensive perspective and more holistic approach must therefore be undertaken, including the examination of adjacent and nearby routes.

SC has identified the following roads within the Glenn Allan neighbourhood as key corridors for consideration in the study (**Figure 2**):

1. Glenbrook Boulevard
2. Georgian Way (between Glenbrook Boulevard and Grenada Boulevard)
3. Gatewood Boulevard
4. Galloway Drive
5. Graham Road
6. Galaxy Way

Various traffic calming options to ensure safety were considered for each of the locations above including roadway/cross-section geometry, intersection spacing, driveway locations, pedestrian corridors, and design vehicle requirements. General traffic calming elements, with their advantages and features that were considered as solutions, were listed below; and were considered with the goal of reducing 85th percentile speeds to an acceptable figure, given posted speed limits:

- Curb extensions at intersections: narrows the roadway (constrained environment), requires slower turning speeds, shortens crossing distances for pedestrians, and improves sight lines for vehicles turning onto the calmed roadway.
- Raised intersections: slows traffic via vertical deflection for three or four approaches, which benefits pedestrians crossing at intersections (legal crossing locations) by requiring slower driver speeds.
- Raised medians: horizontal deflection that reduces lane widths (constrained environment to slow vehicles) which can facilitate two-stage pedestrian crossings.

- Raised crosswalk: slows traffic via vertical deflection for two approaches, and benefits pedestrians by highlighting the crosswalk and requiring slow driver speeds.
- Speed table: slows traffic via vertical deflection for two approaches (but no directly associated pedestrian accommodation benefit).
- Roundabout: slows traffic while providing a high level of traffic capacity; facilitates two stage pedestrian crossings at clearly defined locations.

An iterative process was followed that involved the consulting team, County staff, and stakeholders which led to the ultimate version of the options for presentation to the public for feedback. Consideration was given to ensure lane widths are appropriate for cyclists for the selected traffic calming devices. It was noted that raised features can generally be safely negotiated by cyclists without undue impact to riding control.

## **5.2 Case Study 2 - Davidson Creek/Clarkdale Meadows, Sherwood Park, Alberta**

Davidson Creek/Clarkdale Meadows, as shown in **Figure 3**, is another mature neighbourhood in Sherwood Park.

In Davidson Creek/Clarkdale Meadows several collector roads are nearing time for regularly scheduled rehabilitation. Residents have also expressed concerns with traffic speed and pedestrian safety at both of these subdivisions in recent years as a result of development infill. In some locations, the County has collected speed data that indicates traffic speeds in excess of the 50 km/h speed limit. In addition, a new school is planned at Davidson Creek that will change traffic patterns in the neighbourhood.

As a result, a traffic calming study project was initiated for these roads. Public engagement is deemed to be of paramount importance. SC has committed itself to working with residents and other stakeholders to develop solutions that are long term sustainable, which will be economically viable, technically feasible, environmentally compatible, and publically acceptable. Public engagement for this initiative is being conducted at the “Listen and Learn” level. The following provides a summary of the process/timeline to be used for this traffic calming initiative:

1. Workshops and online survey - December 2016
2. Development of preliminary traffic calming options - January 2017
3. Stakeholder review - February 2017
4. Online feedback of preliminary traffic calming options - Spring 2017
5. Open house - Spring 2017
6. Development of final traffic calming recommendations - May 2017
7. Presentation to County Council for final decision - June 2017
8. Construction (with planned neighbourhood rehabilitation) - starting Summer 2018

The methodology for public engagement includes the recruitments for the workshop (through the Sherwood Park Newsletter), an online survey (Facebook and Twitter), and an open house structure during which residents were provided with information on community and engineering concerns at each location, as well as comparative information on the proposed options.

The following roadways/intersections with their unique characteristics/problems and proposed solution are listed. Opinions of local residents on what they think are the best solutions are also given. For detailed analysis please refer to **[Reference 7]**.



1. Davidson Drive Trail Crossing
  - Concern: High traffic volume location used by many children (age 7-11), going to playground, and also commuting to school. Speeds are too high.
  - Suggested solution: Median island with pedestrian beacons.
  - Citizens' comment: Beacons would make pedestrian feel safer since people normally park and walk in that area. There should be brighter crosswalks and speed should be lowered to 30 km/hr. Install warning signs. Do not plant bushes in the median.
2. Davenport Drive at the Playground
  - Concern: Speeding.
  - Suggested solution: Do nothing but remove existing median or ban parking within 10m; or install speed humps.
  - Citizens' comments: Speed humps will cause congestion and noise, and will affect snow removal. Most drivers ignore or do not understand the difference between school area & playground zone.
3. Darlington Drive
  - Concern: Speeding.
  - Suggested solution: Permanent speed display boards or speed humps.
  - Citizens' comment: Speed humps are no good as they are perceived as a permanent solution to a temporary issue. Speed humps are also hard on vehicle suspension and wear and tear.
4. Davenport Drive east of the playground zone to Clarkdale Drive
  - Concern: Speeding.
  - Suggested solution: Permanent speed display boards or speed humps.
  - Citizens' comments: Some think that speed bumps would be more effective and be less of a cost than other options. Drivers will eventually ignore and get used to the speed signs.
5. Intersection of Davenport Drive and Clarkdale Drive
  - Concern: Pedestrian safety due to sightline issues caused by vegetation; presence of young children.
  - Suggested solution: Trim vegetation obstructing sight distance.
  - Citizens' comments: Consider a 3-way stop before a traffic signal.
6. Clarkdale Drive at Orchid Crescent
  - Concern: Pedestrian safety and speeding.
  - Suggested solution: Curb extensions with or without raised crosswalks.
  - Citizens' comment: Curb extensions are very effective but expensive. Raised crosswalks may be cheaper and just as effective.
7. Meadowview Drive at Lilac Terrace
  - Concern: Pedestrian safety due to a lack of pedestrian facilities to access the park. There is a large number of frequent walkers out there.
  - Suggested solution: Curb extension/raised curbs.
  - Citizens' comments: Flashing pedestrian signals may be useful.
8. Meadowview Drive Trail Crossing
  - Concern: Pedestrian safety due to visibility caused by roadway curve and on street parking; speeding.
  - Suggested solution: Curb extension with pedestrian beacons; or curb extensions with raised crosswalk.
  - Citizens' comments: Residents prefer options that are more aesthetically pleasing, but safety is not to be compromised. There should be no parking

five (5) vehicles away from crosswalks. Street furniture (e.g. mail boxes) are in the way and need to be relocated.

## **6.0 Conclusions and Recommendations**

The large scale redevelopment of mature neighbourhoods in North America today has created opportunities to real estate developers and has helped ease some of the housing shortage problems within older popular residential communities. At the same time, MNO has also become a cause of concern to governing bodies and local residents as a result of the changes in built form and character, as well as introducing new and different transportation issues in the neighbouring streets. Faced with these challenges, and recognizing that there is currently a gap in the systematic treatise on the subject, municipalities are starting to formulate policies and strategies by enacting bylaws to address the issue. This paper sets out to explore some of the more critical issues on transportation in mature neighbourhoods. It examines the unique features within these communities such as the blending of future houses with existing buildings; the significant increase in population, changing demographics of residents; traffic calming measures and their implementation; curbside management; geometric conditions and constraints; driveway accesses, setbacks, and parking; roadway dieting; conditions created by senior living; high and low end condominiums, etc.; as they relate to transportation and traffic safety. The importance of ensuring traffic calming and lowering of vehicle speeds cannot be over emphasized to endure safety. In the derivation of solutions, the need for public engagement is highlighted. The two case studies cited in this paper at SC served as good examples of how the problems of transportation should be approached and addressed. It outlined the planning and design process and considered the various options available to the transportation engineer and the public bodies having jurisdiction. It is recommended that comprehensive studies in the future should be carried out by research bodies and professional associations such as universities and the Technical Association of Canada to formulate a best practice guideline document.

## References

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Edmonton

DAVIDSON CREEK  
CLARKDALE MEADOWS

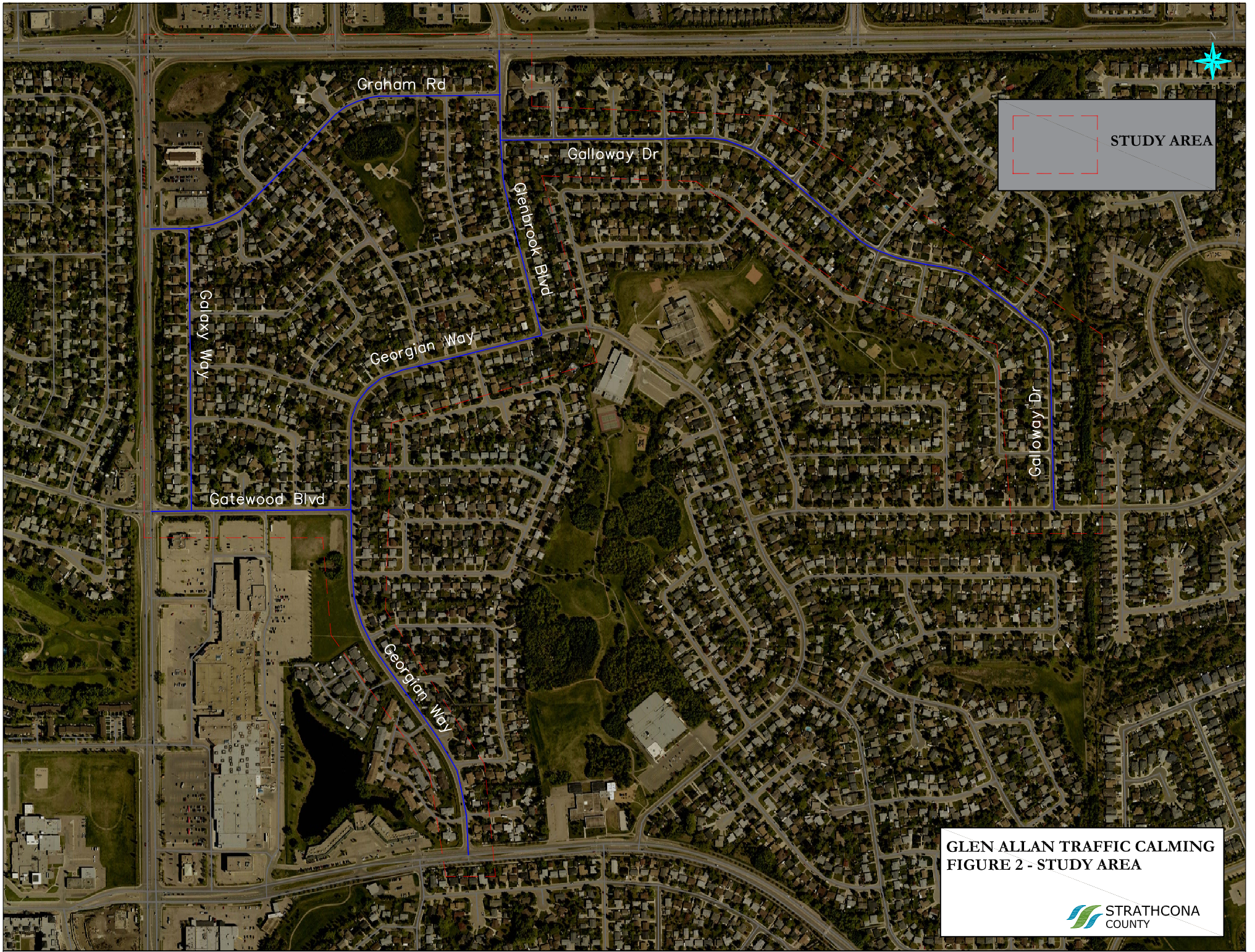
Strathcona  
County

GLEN ALLAN

KEY MAP  
FIGURE 1

0 1 2  
Kilometers





STUDY AREA

GLEN ALLAN TRAFFIC CALMING  
FIGURE 2 - STUDY AREA



STUDY AREA

DAVIDSON CREEK/CLARKDALE  
MEADOWS TRAFFIC CALMING  
FIGURE 3 - STUDY AREA

