



City of
Peterborough

To: **Members of the Committee of the Whole**

From: **W.H. Jackson, Director of Utility Services**

Meeting Date: **June 19, 2017**

Subject: **Report USTR17-014**
Glenforest Boulevard / Denure Drive All-way Stop Control

Purpose

A report to recommend the implementation of all-way stop control at the intersection of Glenforest Boulevard and Denure Drive.

Recommendation

That Council approve the recommendation outlined in Report USTR17-014 dated June 19, 2017, of the Director of Utility Services, as follows:

That All-way Stop Control with oversized stop signs be implemented at the intersection of Glenforest Boulevard and Denure Drive.

Budget and Financial Implications

The implementation of the all-way stop signs and pavement markings will cost approximately \$3,000, funds for which are available in the uncommitted balance in the 2017 Capital Budget for Traffic Improvements (Project Reference 5-13.04).

Background

In response to resident concerns, staff undertook a traffic operational review of the intersection of Glenforest Boulevard and Denure Drive with respect to the need for all-way stop control.

Site Details

Glenforest Boulevard is a two-lane high capacity collector road running east-west from Sherbrooke Street to Brealey Drive. Glenforest Boulevard traverses through a residential area and serves St. Catherine's Catholic Elementary School to the east. The SSFC/Kawartha (#6) transit route operates through the subject area, travelling along Woodglade Boulevard, Glenforest Boulevard and Denure Drive. Glenforest Boulevard has an urban cross-section with a pavement width of approximately 10 meters, with sidewalks on both sides of the street and 5.5 metre grass boulevards.

Denure Drive is a two-lane medium capacity collector road running north-south from Ireland Drive to Kawartha Heights Boulevard through a predominately residential area except at Sherbrooke Street where there is a commercial plaza. The road cross-section is approximately 10 meters wide with sidewalks on both sides of the street and 3.0 metre grass boulevards.

The speed limit on Glenforest Boulevard and Denure Drive is 50km/h, except in the areas of St. Catherine's Catholic Elementary School, where the speed limit is reduced to 40km/h during school admittance and dismissal times. Crossing guards are located at the school to assist children crossing the roads during these periods.

A sketch of the subject area is shown in Appendix A.

Traffic Operational Review

The traffic operational review included the following data collection and analysis:

- Vehicle volume,
- Vehicle speed,
- Collision history,
- Sight line measurements and;
- Site observations.

Vehicle Volume

Glenforest Boulevard is approximately 2,300 vehicles per day while Denure Drive carries 1,800 vehicles per day. The Transportation Association of Canada (TAC) guidelines suggest that less than 8,000 vehicles per day is typical for the average daily

volume on a residential collector road. While the City does not undertake annual traffic counts on every collector road, there have been a number of counts done as part of other studies that suggest many other collector roads in residential areas of Peterborough have traffic volumes within this range. A few examples include Cameron Street (2,830 / day), Dumble Avenue (6,740 / day), Kawartha Heights Boulevard (2,845 / day), Royal Drive (2,200 / day) and Marsdale Drive (4,570 / day). The average daily volume on Glenforest Boulevard and Denure Drive is within the TAC guidelines for a collector road, and is typical of other collector roads in the City.

Vehicle Speed Study

The speed limit on Glenforest Boulevard is 50 km/h. Vehicle speed studies were conducted on both the east and west approaches of the Glenforest Boulevard / Denure Drive intersection and it was found that 85% of the drivers on Glenforest Boulevard are travelling at or below 59 km/h, and the average speed recorded was 53 km/h. These results are typical for a high capacity collector road within the City of Peterborough.

Collision History

Since 2010 there have been ten reported right-angle collisions within the intersection of Glenforest Boulevard and Denure Drive. Of the ten collisions, six involved vehicles on Denure Drive failing to stop at the stop sign and four involved vehicles on Denure Drive that stopped at the stop sign and then proceeded into the intersection believing the way was clear. A more detailed review of the collision reports revealed eight of the collisions occurred in winter between the months of January and April and five of the reports referenced snow conditions.

Sight Line Review

Stopping sight distances were measured for vehicles travelling eastbound and westbound on Glenforest Boulevard approaching the intersection. Sight line distances were measured for vehicles stopped on Denure Drive waiting to cross or turning onto Glenforest Boulevard.

The stopping sight distance is the minimum distance required for a driver to perceive the need to stop plus the reaction and deceleration time to bring the vehicle to a complete stop for the prevailing operating speed. The measured stopping sight distance for vehicles travelling eastbound and westbound on Glenforest Boulevard meets the minimum requirements set out by the TAC design guidelines.

The sight line distance is the minimum distance required for a driver stopped on the side road to perceive a gap in traffic plus the reaction and acceleration time necessary to cross the intersection or turn onto the intersecting roadway and then accelerate to the normal operating speed without interfering with through traffic. The review of sight line distances for vehicles turning from the north leg of Denure Drive onto Glenforest Boulevard revealed that the sight line to the east is partially restricted by a low approach grade on Denure Drive and very restricted when vehicles are parked on the asphalt

driveways between the sidewalk and the curb. When this occurs, the measured sight line distance from the stop bar on the north leg of Denure Drive is reduced to approximately 30 metres which is insufficient for a through or right turning vehicle to exit Denure Drive. To achieve an adequate sight distance, drivers need to pull forward through the crosswalk to the curb line on Glenforest Boulevard.

All-way Stop Analysis

The key factors used to assess the need for the implementation of all-way stop control includes: collision experience, minimum vehicle volume, and traffic flow. The technical justification for the installation of an all-way stop is broken down into two warrants, Minimum Vehicle Volume Warrant and Collision Warrant. The Minimum Vehicle Volume Warrant requires a minimum of 350 vehicles entering the intersection for the peak hour of the day and the vehicle volume on the major road must be less than 65% of the total traffic volume entering the intersection. The Collision Warrant requires an average of four or more collisions per year over a three year period that involve side street traffic failing to yield to through street traffic. The warrant for the installation of all-way stop control was met under the Minimum Vehicle Volume Warrant with 416 vehicles entering the intersection and with a vehicle volume on the major street of 56%.

Site Observations

Staff visited the area on several occasions to better assess the existing driving and environmental conditions. The geometric layout of the intersection is a conventional four leg intersection with stop control on Denure Drive. The stop signs and painted stop bars are placed behind the sidewalk and are set back approximately 8.0 metres from the curb line on Glenforest Boulevard. The positioning of the stop signs appears to be far from the curb line on Glenforest Boulevard but it was confirmed through field reviews that they are standard location for streets constructed on a 26 metre road allowance.

On Denure Drive, southbound traffic approaches the north leg of the intersection by accelerating up an incline to the stop sign at the top of the hill. On the south leg of the intersection the approach is both straight and level but since Denure Drive drops off to the north, there is vast horizon visible that takes away from the prominence of the stop sign.

The eastbound approach to the intersection on Glenforest Boulevard is straight and level, however; there is a noticeable low point in the road about 80 metres west of the intersection that may momentarily reduce a driver's sight line. The westbound approach is level but the intersection is partially obscured by an extended horizontal curve in the road that terminates at the intersection.

During peak A.M. and P.M. times, staff observed numerous school aged children and parents crossing the intersection. A review of the turning movement count data revealed approximately 62 pedestrians crossed Glenforest Boulevard and 85 pedestrians crossed Denure Drive during the nine hour study period.

Discussion

The traffic operational review revealed a significant number of right-angle collisions at the intersection due to drivers failing to yield the right-of-way to vehicles travelling on Glenforest Boulevard. A detailed review of the collision reports indicated that drivers didn't see / recognize vehicles travelling on Glenforest Boulevard before entering the intersection. A review of the sight lines for vehicles entering the intersection from Denure Drive showed that vehicles parked in driveways between the sidewalk and the curb, vehicles parked on-street in the vicinity of the intersection and high snow banks could potentially restrict sight lines to a level where it is necessary for drivers to pull forward through the crosswalk to the curb line on Glenforest Boulevard before entering the intersection. On the northbound approach to the intersection along Denure Drive, the existing standard sized stop sign is not prominent against the background of the view to the north.

Site observations identified a large number of school aged children and pedestrians crossing Glenforest Boulevard at Denure Drive. This residential area is served by three area schools: St. Catherine's Catholic Elementary School, James Strath Public School and Crestwood Secondary School. Denure Drive is at the mid-point on Glenforest Boulevard between existing controlled crossings at Brealey Drive and Woodglade Boulevard. Based on the pedestrian demand at this location, staff are of the opinion that a controlled crossing would improve pedestrian safety at this intersection.

Analysis has shown that all-way stop control is warranted and should be implemented based on minimum vehicle volume at the intersection. A review of the collision history revealed that the majority of the collisions at this intersection are right-angle collisions and are susceptible to correction through the implementation of all-way stop control.

Timelines

If the recommendations are approved, implementation would commence immediately and it is anticipated that it would be complete before the start of school in September 2017.

Summary

The Glenforest Boulevard / Denure Drive traffic operational review has shown that the vehicle volumes for these streets are within the TAC guidelines for a collector road and vehicle speed is typical for a collector designated road within the City of Peterborough. Despite this, a review of the intersection collision history shows a consistent collision pattern of right-angle collisions. Intermittent sight line restrictions attributed to parked vehicles, snow banks and a low approach grade on the north leg of the intersection complicate driver decision making when crossing or turning onto Glenforest Boulevard.

The review also identified the presence of pedestrian activity specifically during school admission and dismissal times and the need for a controlled crossing opportunity.

Based upon analysis, the minimum technical criteria for the installation of an all-way stop was met and considering the additional factors identified through this review, the implementation of all-way stop control at the intersection of Glenforest Boulevard and Denure Drive will improve driver and pedestrian safety.

Submitted by,

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Attachments:
Appendix A: Glenforest Boulevard at Denure Drive Area Diagram

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