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### **HIGHWAY 7 - PINE VALLEY DRIVE TO WESTON ROAD TRAFFIC OPERATIONS REVIEW CITY OF VAUGHAN**

**The Transportation and Works Committee recommends the following report, dated September 3, 2008, from the Commissioner of Transportation Services, be deferred to the November 5, 2008 Transportation and Works Committee meeting to be considered in conjunction with the upcoming report concerning the establishment of speed limits on Regional roads.**

#### **1. RECOMMENDATIONS**

It is recommended that:

1. The speed limit on Highway 7 (Y.R. 7) from Pine Valley Drive (Y.R. 57) to Jane Street (Y.R. 55), be reduced from 70 kilometres per hour to 60 kilometres per hour, in the City of Vaughan.
2. The Regional Solicitor prepare the necessary by-law for the speed limit change.
3. The Regional Clerk forward this report to the Clerk of the City of Vaughan and to the Chief of York Regional Police for enforcement, as their resources permit.

#### **2. PURPOSE**

This report addresses concerns raised by the Council of the City of Vaughan regarding traffic operations on Highway 7 between Weston Road and Pine Valley Drive, in the City of Vaughan (*see Attachment 1*).

#### **3. BACKGROUND**

Regional staff received a resolution (*see Attachment 2*) from the City of Vaughan Council dated October 22, 2007, outlining concerns about traffic operations on Highway 7, between Pine Valley Drive and Weston Road. Subsequently, staff received correspondence outlining similar concerns regarding the intersection of Highway 7 and Weston Road.

### **Concerns raised by residents of the City of Vaughan**

The resolution received from the City of Vaughan states various complaints have been received from residents of the City of Vaughan and users of Highway 7. This resolution requested a general review of traffic operations on this road section.

In recognition of these issues and to satisfy the concerns outlined by the City of Vaughan Council, Regional staff conducted a review of traffic operations on Highway 7 between Pine Valley Drive and Weston Road.

## **4. ANALYSIS AND OPTIONS**

### **Annual average daily traffic volumes have remained constant on Highway 7**

On average, traffic volumes on Regional roads increase by approximately 3% per year. The historical annual average daily traffic (AADT) on Highway 7 west of Weston Road is shown below. Although these values fluctuate year-to-year, the traffic volumes have remained fairly constant throughout the nine-year period.

**Table 1**  
Historical Traffic Volumes on Highway 7 (AADT)

| <b>1999</b> | <b>2000</b> | <b>2001</b> | <b>2002</b> | <b>2003</b> | <b>2004</b> | <b>2005</b> | <b>2006</b> | <b>2007</b> |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 41,300      | 55,700      | 47,100      | 51,700      | 48,000      | 52,200      | N/A         | 48,500      | 51,700      |

As Highway 7 is a major east-west arterial road that carries traffic from the Regions of Peel and Durham, the traffic volumes measured on Highway 7 are considerably higher when compared to other Regional roadways. For example, the section of Highway 7 from Weston Road to Jane Street, just east of the study area, carries an average of 72,000 vehicles per day making this the second busiest road section in York Region. The highest recorded traffic volume of 80,000 vehicles per day is found on the section of Highway 7 between Leslie Street and Highway 404. Highway 7 has been and continues to be a major arterial roadway that accommodates a high volume of traffic.

Highway 7 from Weston Road to Pine Valley Drive is approximately two kilometres in length and has five sets of traffic control signals spaced throughout the road section. On most Regional roads, traffic control signals operate on a typical cycle length ranging from 90 to 120 seconds. Due to the large volumes of traffic on this section of Highway 7, and at some of the major intersections, the cycle length has been increased to 130 seconds. This longer cycle length provides for more opportunity to accommodate all traffic movements, including left turns and through movements from intersecting streets, while maintaining the flow of traffic on Highway 7.

### **This section of Highway 7 currently has several traffic control signals**

Traffic control signals are located at the following intersections along Highway 7 between Weston Road and Pine Valley Drive (*see Attachment 1*):

- Weston Road
- Nova Star
- Ansley Grove Road/Whitmore Road
- Aberdeen Avenue/Marycroft Avenue
- Pine Valley Drive

All local and Regional road intersections on Highway 7 from Weston Road to Pine Valley Drive are signalized. At this time, no further traffic control signals are proposed on this section of Highway 7.

### **Left-turn phases at traffic control signals along Highway 7**

The Region evaluates left-turn phasing, also known as advanced greens, by determining whether or not a specific set of criteria has been met. As part of this evaluation, staff reviewed the volume and delay to left-turning traffic, any relevant collisions and the occurrence of vehicles spilling back from the left-turn lane into the adjacent through-lane. In order to minimize overall intersection delay, specifically during peak traffic periods, left-turn phasing is not normally implemented.

To serve left-turns at a traffic control signal requires the reduction in green time for other traffic movements. For example, to provide a left-turn phase would require taking green time from a through-phase. A reduction in the amount of green time reduces the amount of time for through-traffic; hence, fewer vehicles get through the signal during the shortened green time phase. Over several cycle lengths, traffic queues will increase.

Irrespective of this, left-turn phases are in operation at all of the intersections in this area except at Aberdeen Avenue/Marycroft Avenue. As a result of a recent investigation and the existence of left turn phases at adjacent intersections, staff implemented left-turn phases at the intersection of Highway 7 and Aberdeen Avenue/Marycroft Avenue. Table 2 identifies the direction and time of day that left turn phasing is in operation at all intersections in the study area.

**Table 2**  
Left Turn Advance Phasing on Highway 7  
Between Weston Road and Pine Valley Drive

| Cross Street                     | Direction                | Time of Day |
|----------------------------------|--------------------------|-------------|
| Weston Road                      | All directions           | All Day     |
| Nova Star                        | Eastbound Left           | All Day     |
| Ansley Grove Road/Whitmore Rd    | Eastbound/Westbound Left | All Day     |
| Aberdeen Avenue/Marycroft Avenue | Eastbound/Westbound Left | All Day     |

**The collision history in this study area is typical of a high volume roadway with signalized intersections**

A collision analysis was conducted for the signalized intersections located within the study area. This analysis shows that rear-end collisions are the most frequent type of collision at all the intersections, and turning movement, or right angle collisions, occurring least frequently. Similarly, a collision analysis for other signalized intersections, on Highway 7 to the east of Highway 400, revealed a similar collision history.

Rear-end collisions can be attributed to driver inattention or driving too fast for conditions. This type of collision is common at signalized intersections and at each of these locations it occurs considerably more frequently than any other type of collision. No other patterns of collision were identified.

**Directly comparing collisions at intersections may not provide a true reflection of intersection safety**

Collisions are random events and cannot be predicted. A direct comparison of collisions at one intersection to another intersection is not an accurate reflection of intersection safety. Many factors, such as intersection geometrics and traffic volumes must be considered when performing a comparison. Even intersections within close proximity of one another have different characteristics. The collision history at each intersection in this study area has a relatively similar number of collisions.

**Highway 7 at Weston Road is one of the largest and busiest intersections in York Region**

On an average day approximately 100,000 vehicles navigate the intersection of Highway 7 and Weston Road. There are dual left turn lanes for southbound and westbound traffic and single left turn lanes for northbound and eastbound traffic (*see Attachment 3*). Prior to August 19, 2008, these left turns operated on a “fully protected” basis. This allowed left turns to occur only during the left turn phase (i.e. a green arrow) and through and right turns to occur only during a green signal indication (i.e. a solid green) with left turns not allowed.

Fully protected left turns are used at various intersections and are a common method to accommodate high volumes of left turning traffic. An advantage of a fully protected left turn is that opposing through traffic is stopped allowing left turns to be completed with minimal risk and delay. A disadvantage of a fully protected left turn is that vehicles cannot turn left during the green through phase. This causes driver frustration as they may wait several cycles before being able to complete their turn, particularly at an intersection where there is a high volume of left turning vehicles.

The single northbound left turn from Weston Road onto Highway 7 has been of particular concern to local drivers. Based on observations conducted by staff, at times, the queue of vehicles waiting to complete a northbound left turn extended approximately 170 metres.

### **Changes were made to the operation of the northbound and eastbound left turn at Highway 7 and Weston Road**

On August 19, 2008, changes were made to the operation of the northbound and eastbound left turn phases at the intersection of Weston Road and Highway 7. The single lane of northbound and eastbound left turning vehicles can now complete their turn during the advanced green phase for the opposing double lane of left turning vehicles and are now also permitted to move on the solid green phase when there are sufficient gaps in the oncoming through moving vehicles.

Staff also verified that the intersection is operating as intended and that the timing of all signal indications, including the pedestrian indications, is sufficient.

Staff conducted preliminary observations at the intersection and a substantial decrease in the northbound queue of traffic has been observed. Staff will periodically monitor this intersection to ensure these operational changes continue to be effective.

### **Speed study results indicate a high compliance with the posted speed limit**

The posted speed limit on Highway 7 from Pine Valley Drive east to Jane Street is 70 kilometres per hour, which continues to Centre Street, approximately three kilometres east. The posted speed limit on Highway 7 west of Pine Valley Drive is currently 60 kilometres per hour.

Studies completed by staff, within the 70 kilometres per hour zone, revealed that there is higher compliance to the posted speed limit along this road section than the Regional average. Based on speed studies conducted on a wide range of Regional roads, on average, 38% of drivers obey the posted speed limit while travelling on Regional roads.

On this section of Highway 7, 62% of drivers obey the posted speed limit. Based on a speed study conducted by staff on Highway 7 west of Aberdeen Avenue/Marycroft

Avenue, the average speed of westbound traffic is 73 kilometres per hour and the average speed of eastbound traffic is 63 kilometres per hour.

Although the compliance to the speed limit on this road section is high, in order to provide a speed limit that is consistent with the portion of Highway 7 further to the west, it is recommended to reduce the speed limit on Highway 7 between Pine Valley Drive and Jane Street from 70 kilometres per hour to 60 kilometres per hour.

At this time, this section is comprised of commercial properties with several access points to Highway 7. In consideration of the City of Vaughan's future plans for the Vaughan Corporate Centre, and other future higher density developments, increased traffic including transit and pedestrian activity will be generated. The proposed speed reduction will result in a consistent speed limit in the area between Highway 27 and Jane Street.

### **A process to consider renaming Highway 7 is already underway**

A process to rename the entire length of Highway 7, from the east boundary to the west boundary of York Region, is currently underway. A separate report outlining this process was presented to the Transportation and Works Committee on February 6, 2008.

Renaming the road to "Avenue 7" will help change drivers' perception of the road and, over time, influence driver behaviour. At this time, staff has completed the following:

- Met with all stakeholders from area municipalities, emergency services and Canada post to discuss the impacts of a name change and the strategies for implementation;
- Compiled a list of all property owners that will be affected along the Highway 7 corridor;
- Conducted an inventory of all existing roadside signage on the entire Highway 7 corridor;
- Requested a sign inventory and cost to replace roadside and overhead signs from the Ministry of Transportation of Ontario (Highway 400 and 404) and the 407 group (Highway 407).

Regional staff is currently in the process of sending letters to all affected residents along the Highway 7 corridor and are arranging public information centres in the fall of 2008.

### **Operational changes have been made at several intersections on Highway 7**

To address the concerns outlined by Vaughan Council, staff conducted a review of traffic operations on Highway 7 between Pine Valley Drive and Weston Road. Table 3 summarizes the issues addressed and any resultant operational changes implemented within the study area.

**Table 3**  
Summary of Operational Changes on Highway 7  
Between Weston Road and Pine Valley Drive

| <b>Location</b>      | <b>Issue</b>                                                        | <b>Solution</b>                                                                                                                                                                                     |
|----------------------|---------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Entire study area    | Increasing traffic volume                                           | Historical review shows moderate constant growth similar to other areas                                                                                                                             |
| Entire study area    | Signal locations and left turn operation                            | Reviewed operation of all signals and implemented left turn phase at Aberdeen/Marycroft                                                                                                             |
| Entire study area    | Collision experience                                                | Historical review and analysis shows no patterns or trends beyond expectations                                                                                                                      |
| Weston and Highway 7 | Signal operation and long queues of northbound left turning traffic | Reviewed operation of signal and implemented protected permissive phasing to reduce overall intersection delay, particularly for northbound traffic, by permitting simultaneous opposing left turns |
| Entire study area    | High operating speed of traffic                                     | Conducted speed studies and, based on future plans for the area, recommended a lower posted speed limit to be consistent with adjacent sections of Highway 7                                        |
| Entire study area    | Renaming of Highway 7                                               | Process endorsed by Council in February of 2008 and is now underway                                                                                                                                 |

## **5. FINANCIAL IMPLICATIONS**

Any funds required to implement improvements on Highway 7 are the responsibility of the Region. The cost related to the installation of the speed limit signs are minor and the relocation of any other signage can be taken from the approved 2008 Roads Budget. The implementation of the advanced green phases at the intersection of Highway 7 and Aberdeen Avenue/Marycroft Avenue and the operational changes regarding left turns at the intersection of Highway 7 and Weston Road are part of the day-to-day operations of staff and are included in the 2008 Roads Budget.

## **6. LOCAL MUNICIPAL IMPACT**

The implementation of improvements on Highway 7 will enhance overall safety for residents of Vaughan and users of the roadway. These improvements will also create a safer roadway for residents and commercial property owners on Highway 7. The recommended revisions to the speed limit, west of Weston Road, reflect adjacent development and local concerns for speeding and safety. The change to the speed limit is intended to provide a consistent speed limit in the area.

Regional staff will discuss the implementation of these improvements with staff of the City of Vaughan. A meeting will be hosted with Regional staff and representatives from the City of Vaughan. Any operational improvements impacting the flow of traffic on this road corridor will be discussed directly with the appropriate municipal staff to ensure they are effective.

## **7. CONCLUSION**

Regional staff received a resolution from the City of Vaughan Council, dated October 22, 2007, outlining concerns about traffic operations on Highway 7, between Pine Valley Drive and Weston Road. The resolution also requested the implementation of a left-turn signal on Highway 7 within this roadway corridor. Subsequently, staff received correspondence outlining similar concerns regarding the intersection of Highway 7 and Weston Road.

In recognition of these issues and to satisfy the concerns outlined by Vaughan Council, Regional staff conducted a review of traffic operations on Highway 7, between Pine Valley Drive and Weston Road and at the intersection of Highway 7 and Weston Road.

Overall, traffic operations on this road section are good, but the corridor will benefit from recent modifications. To adapt to the changing role of Highway 7 in this location, the existing speed limit of 70 kilometres per hour on Highway 7, from Pine Valley Drive to Jane Street, will be reduced to provide a more consistent speed limit in the area. This speed limit change requires Council authorization.

In addition, staff modified the operation of the traffic control signals at the intersection of Highway 7 and Aberdeen Avenue/Marycroft Avenue and Highway 7 and Weston Road to reduce delays to turning traffic.

Report No. 8 of the Transportation and Works Committee  
Regional Council Meeting of October 23, 2008

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For more information on this report, contact Paul Jankowski, General Manager, Roads at extension 5901 in the Transportation Services Department.

The Senior Management Group has reviewed this report.

*(The attachments referred to in this clause were included in the agenda for the October 1, 2008 Committee meeting.)*