

Request for Decision

Kingsway at Third Avenue - Traffic Signals

Presented To: Operations Committee

Presented: Monday, Jul 09, 2012

Report Date Wednesday, May 30, 2012

Type: Managers' Reports

Recommendation

That the median islands on the Kingsway at Third Avenue be removed and repainted as a two-way centre left turn lane, and;

That the cost to undertake the work be included in the 2012 capital roads budget, and;

That Staff continue to monitor traffic operations and safety at that intersection.

Background

At the Operations Committee meeting heard on April 16, 2012, Staff was directed to prepare a report regarding the need for traffic signals or other measures to improve safety at the intersection of the Kingsway and Third Avenue.

The intersection of Kingsway and Third Avenue is located near the east end of the former City of Sudbury (see exhibit "A"). In this area, the Kingsway is constructed with two (2) through lanes in each direction with east and westbound left turn lanes and an eastbound right turn lane. This section of the Kingsway carries an Annual Average Daily Traffic volume (AADT) of 19,000 and has a posted speed limit of 80 km/hr.

As part of the project to widen the Kingsway to four lanes in 2007, median islands, pole bases and other underground plant was constructed to facilitate the future installation of traffic signals when they were required.

Third Avenue is designated as a collector road that carries an AADT of 1,300 south of the Kingsway. Third Avenue intersects with the Kingsway at approximately 90 degrees forming a four legged intersection with an entrance to an industrial property on the north side.

Safety

A review of the City's collision information from 2009 to 2011 inclusive revealed that there were a total of 13 collisions at the subject intersection during the three year period. Two (2) of these collisions resulted in injuries. A more detailed analysis of the collision experience is contained below in the section dealing with

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traffic signals. Due to concerns expressed about safety at the intersection, staff has undertaken an analysis of the collision history at that intersection, and reviewed a number of measures to improve safety. These measures include the installation of traffic signals; removal of the median islands; and prohibition of left turns.

1) Traffic Signals

While traffic signals are not considered to be safety devices, they can reduce certain types of collisions, such as right angle and turning movement collisions. However, they can increase other types of collisions such as rear end collisions.

Staff conducted a seven hour turning movement count at the Kingsway at Third Avenue intersection on May 11, 2011 and applied the traffic count data to the traffic signal warrants set out in Book 12 of the Ontario Traffic Manual. The results show that the intersection meets 57% of the Minimum Vehicle Volume justification. The Minimum Vehicle Volume justification compares the total intersection volume with the total volume from Third Avenue and the private driveway on the north side of the intersection. The justification requires a combined minimum of 120 vehicles per hour exiting Third Avenue and the private driveway for the eight busiest hours of the day. During the May 11, 2011 turning movement count, we recorded an average of 68 vehicles per hour. It has been suggested that should traffic signals be installed additional vehicles would use this intersection to turn left from Third Avenue onto the Kingsway. A review of the turning movement count shows that an average of 15 more vehicles per hour turn right from the Kingsway onto Third Avenue than turn left from Third Avenue onto the Kingsway. If you were to add these additional vehicles to traffic signal warrant, the intersection would meet 69% of the Minimum Vehicle Volume justification.

Also, as part of the traffic signal warrant, Staff reviewed the collision history at this intersection from 2009 to 2011 to determine the number of collisions per year that may be susceptible to correction through the installation of traffic signals. These would predominantly include vehicles turning left from the Kingsway onto Third Avenue and vehicles from Third Avenue turning left onto or crossing the Kingsway. The non-reducible collisions include rear ends, sideswipes and vehicles striking wild animals. A summary of the collision history is indicated below:

	2009	2010	2011
Total Number of Collisions	4	3	6
Reducible Number of Collisions	1	2	4

The Collision Experience justification requires an average of five or more reducible collisions per year over a three year period to warrant traffic signals. As indicated above, there were a total of seven collisions at the Kingsway and Third Avenue which meets only 47% of Collision Experience justification. A review of the available 2012 collision reports also reveals an additional two collisions have occurred at this intersection this year. Both collisions are considered to be reducible and one involved personal injuries.

As part of the most recent update to Book 12 of the Ontario Traffic Manual, a new collision experience justification was proposed to help traffic engineers estimate the expected safety of installing traffic signals. The new collision experience justification takes into consideration the potential increase in some types of collisions and decrease in others when traffic signals are installed.

The proposed approach uses collision experience, intersection configuration and traffic volume data from the MTO to generate safety indices for similar types of intersections. The collision experience and AADT of the intersection being studied are then applied to an advanced statistical method to predict the number of expected collisions at the intersection should it become signalized or remain unsignalized. By applying the safety indices to the expected collision numbers and comparing the signalized vs unsignalized values, a net safety change can be derived. The net safety change is expressed in collisions per year, with a positive value indicating that the number of collisions will increase after signalization and a negative value indicating that the number of collisions will decrease after signalization.

In terms of the Kingsway and Third Avenue intersection, the method was applied and the results are summarized below.

	Weighted Reducible Collision (collisions/year)	Weighted Non-Reducible Collisions (collisions/year)	Total Weighted Collision (collisions/year)
Expected Collision with Signalization	0.637	0.631	1.268
Expected Collisions without Signalization	0.450	0.262	0.712
Net Safety Change*			0.556

*Net Safety Change = Total Weighted Collisions with Signalization – Total Weighted Collisions without Signalization

Based on the new collision experience justification, it is expected that there will be an increase of 0.556 collisions per year if the intersection is signalized.

As previously indicated, the underground plant needed for the installation of traffic signals was previously installed as a part of the Kingsway widening project. A review of the existing infrastructure revealed that many of the existing pole bases have been damaged by snow plows or other vehicles, and require repair or replacement. The estimated cost to install traffic signals at this intersection is \$150,000.

Some of the advantages of installing traffic signals include:

- A potential reduction in angle and turning type collisions which can be more severe.
- Turning left or crossing the Kingsway will also be made easier with signals.

The disadvantages of traffic signals include:

- Potential for an increase in the total number of collisions at the intersection.
- An increase delay to the major movements of traffic.
- Cost to install and maintain signals.

2) Removal of Median Islands

Removal of the existing median islands on the Kingsway has been reviewed as a way to improve safety at the intersection. As previously discussed, median islands were installed on the Kingsway to facilitate the future installation of traffic signals. However, at an unsignalized intersection the median islands can inhibit left turn movements from Third Avenue and represent a potential hazard to traffic. Removal of the median islands will allow left turning vehicles from Third Avenue and the private entrance to access the centre lane rather than having to wait for a break in traffic in both directions to enter the appropriate through lane directly.

The estimated cost to remove the median island and pole bases is \$20,000. If and when traffic signals are warranted, the islands and pole bases will have to be reinstated.

The advantages of removing the median islands include:

- Increased safety and reduced delay for left turn movements from Third Avenue and the private entrance.

- Lower cost than traffic signals.

Some of the disadvantages include:

- Increased cost of future signals.
- Concern over the legality of using the centre left turn lane when turning onto an arterial road.
- Will not reduce turning movement collisions from the Kingsway onto Third Avenue or the private entrance.

3) Left Turn Prohibition

The implementation of a left turn prohibition from Third Avenue onto the Kingsway was also reviewed. Under this scenario left turns would be prohibited by by-law and signs would be installed. This option would be the least costly to implement at approximately \$500. The advantages of this alternative are:

- Low cost and easy to implement.
- Improved safety.

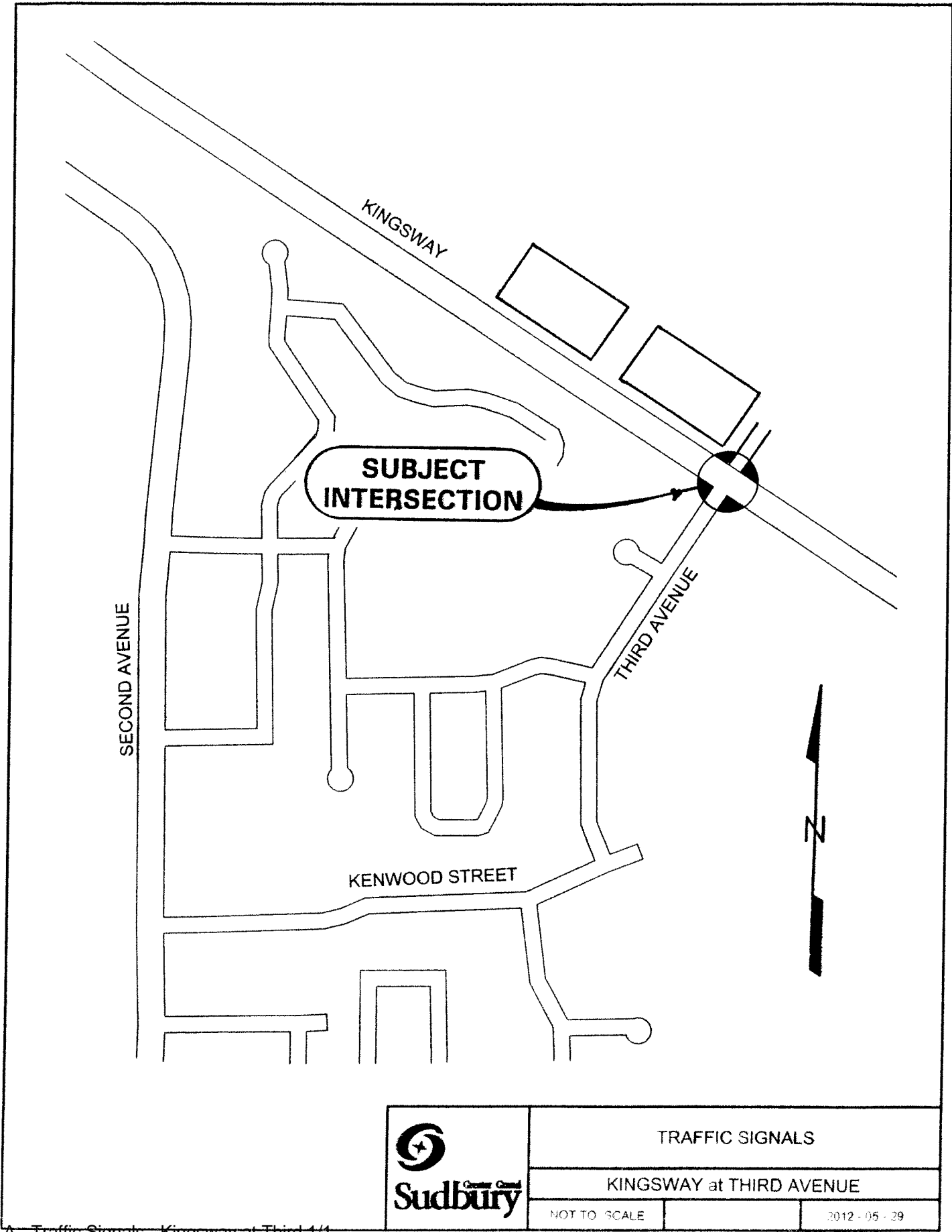
Some of the disadvantages include:


- Frequent disobedience of the signs.
- Increased travel time and distance.
- Driver confusion.
- Left turns still permitted from private driveway on the north side.

Based on the above information, Staff recommends that the median islands on the Kingsway be removed. The provision of a two-way centre left turn lane has improved safety at other locations in the City. The estimated cost of \$20,000 to remove the islands can be covered under the 2012 capital roads budget.

Staff will continue to monitor traffic operations and safety at the intersection to ensure that the changes are effective.

EXHIBIT: A



	TRAFFIC SIGNALS		
	KINGSWAY at THIRD AVENUE		
	NOT TO SCALE		2012 - 05 - 29