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OPERATIONAL AND SAFETY REVIEW 16TH AVENUE WEST OF KENNEDY ROAD

The Transportation and Works Committee recommends:

- 1. The following deputations be received:**
 - (a) Larry Martinello, representing residents of Aitken Circle, Birchview Lane and Roverdale Crescent, Markham;**
 - (b) Patrick O'Hanlon, representing Kylemore Homes; and**
- 2. The following report, January 12, 2005, from the Commissioner of Transportation and Works be received;**
- 3. The following be the selected option for the intersection improvements in the 16th Avenue and Kennedy Road area:**
 - (a) Locate Street 'A' 260 metres west of Kennedy Road and signalize the intersection with 16th Avenue;**
 - (b) Construct left turn lane on Kennedy Road at Birchview Lane and install signals, depending on the outcome of discussions between the Region of York and Town of Markham relating to financing; and**
- 4. Staff be requested to report back to the Transportation and Works Committee in regard to the discussions with the Town of Markham.**

1. RECOMMENDATION

It is recommended that:

1. This report be received for consideration and to seek direction on intersection improvements and the location of a proposed traffic control signal in the vicinity of 16th Avenue and Kennedy Road, based on the suite of options outlined in this report.

2. PURPOSE

The purpose of this report is to present to Committee the findings of a traffic operation analysis and safety assessment of various options to provide easier access and egress from the subdivision in the southwest quadrant of 16th Avenue and Kennedy Road. The report will provide Committee with sufficient information to select a solution based on the suite of options in this report.

3. BACKGROUND

On January 5, 2005, a report was submitted to the Transportation and Works Committee seeking direction on four access/intersection matters. One matter, Aitken Circle/16th Avenue was referred back to staff for a further report providing additional details and analysis.

Residents from the residential area on the southwest corner of the intersection of 16th Avenue and Kennedy Road have requested the installation of traffic signals at the intersection of Aitken Circle and 16th Avenue and/or Birchview Lane and Kennedy Road. These are the only two intersections that provide access to this residential area and local residents find it difficult to perform left turn manoeuvres at these intersections. A plan showing the area is included as *Attachment 1*.

A property developer, Kylemore Homes (a division of Angus Glen Development Ltd.) has submitted an application to the Town of Markham to develop the land north of 16th Avenue and west of Kennedy Road. The proposed development will contain 47 condominium townhouses, 17 freehold townhouses, 6 single detached dwellings and a commercial block. The proposed development will link to 16th Avenue via Street 'A'.

The position of Street 'A' has not been finalized. Regional staff support a location 260 metres west of the Kennedy Road intersection, while the Town of Markham prefers that Street 'A' line up with Aitken Circle. Aligning Street 'A' with Aitken Circle will benefit the Town of Markham in that signalization of this intersection will resolve the concerns of residents on the southwest corner.

Regional staff does not support the alignment of Street 'A' with Aitken Circle as a traffic signal at this location will be situated too close to the intersection at Kennedy Road, which poses some safety concerns. The spacing of 160 metres is less than the Region's absolute minimum spacing standard of 215 metres.

If Street 'A' is located 260 metres west of Kennedy Road, not opposite Aitken Circle, and signalized immediately or when warrants are met, gaps will be created in the traffic flow that will assist vehicles turning onto 16th Avenue from Aitken Circle.

Consideration was also given to signalizing Birchview Lane at Kennedy Road. However, traffic signals are not warranted at this intersection. If it is decided to install signals at this intersection, costly road works would be required to construct a left-turn lane on Kennedy Road. The left-turn lane is warranted, however, the benefit would only be to the relatively small number of residents in this subdivision.

The Transportation and Works Committee at its meeting on January 5, 2005 referred the matter to staff for a further report and an analysis to provide more detailed information on the impact the signalization of Aitken Circle and/or Street 'A' will have on traffic operations and safety.

4. ANALYSIS AND OPTIONS

In general, whenever a new traffic control signal is installed, the delay to the main street traffic will be increased. As a result, staff has taken the approach that a signal should only be installed if and when it meets the Regional Council adopted warrant criteria.

The installation of a traffic control signal will provide a safer move for vehicles from the sidestreet to the main street. In some cases, however, the delay to the sidestreet traffic may actually be increased as traffic must wait for the green signal as opposed to proceeding when there is a gap in traffic.

To assess the impact of signaling Street 'A' at 16th Avenue compared to Street 'A'/Aitken Circle at 16th Avenue, a number of traffic models were developed using the Synchro® and Simtraffic® modelling software applications.

Several options were evaluated to determine the affect of installing signals at Street 'A', located 260 metres west of 16th Avenue and at Aitken Circle with Street "A" located directly opposite Aitken Circle. Each of these options has been evaluated with and without signals at Birchview Lane and Kennedy Road. These options are listed in Table 2 on page 6 of this report.

4.1 Results

The results of the modelling show that the overall delay per vehicle will almost double as a result of installing signals on 16th Avenue at either location, although the delay for vehicles accessing 16th Avenue from either Street 'A' or Aitken Circle will be about the same as currently experienced by the residents. The results show that traffic at the intersection of 16th Avenue and Normandale Road, located about one kilometre west of Kennedy Road, will experience an increased delay due to the installation of signals at either location.

4.2 Traffic Safety

The primary safety concern of locating Street 'A' opposite Aitken Circle relates to east/west traffic approaching the Street 'A'/Aitken Circle intersection. It has been the experience of Regional staff that the "upstream" intersection of two closely spaced intersections experience a higher than average number of rear-end and red light running collisions. These collisions occur when drivers are distracted and respond to the traffic signals of the "far" intersection. For example, if the "far" intersection has a red signal and the "near" intersection has a green signal, then the sudden slowing down and stopping manoeuvre of a distracted driver increases the risk of a rear-end collision. Conversely, if the "far" intersection has a green signal and the "near" intersection a red signal, the likelihood of a distracted driver running a red light increases.

Recent analysis towards developing a priority list of sites for the installation of red light cameras found that at least two intersections in the top five list of potential red light

camera sites are similar in spacing and configuration as the Street 'A'/Aitken Circle and Kennedy Road combination, based on "disobey traffic signal" collisions.

Research has shown that as long as the through-traffic on Street 'A' remains low, having Street 'A' and Aitken Circle as offset intersections, instead of a four-leg intersection, will not have a detrimental affect on traffic safety and operations and that, in fact, an offset configuration could result in an improved safety performance. For example, a large left-turn movement (as is the case with Street 'A') is best accommodated at a T-intersection where there is no opposing left-turn traffic to obstruct left turn sight lines.

For drivers turning left from Aitken Circle onto 16th Avenue, if unsignalized, the risk of a collision is higher than if signals were installed. However, as a result of the low traffic volumes (maximum of 20 per hour) on Aitken Circle, the exposure to this risk is low. It is unlikely that the lower risk for Aitken Circle traffic compensates for the increased risk of rear-end and red light running collisions as noted above.

4.3 Additional Considerations

The Town of Markham indicated some specific comments with respect to aligning Street 'A' with Aitken Circle. Table 1 provides comments and responses with respect to aligning Street 'A' with Aitken Circle.

Table 1
Aligning Street 'A' with Aitken Circle

Comment	Response
1. The aligned option reduces the number of intersections on 16 th Avenue. This results in fewer turning movements to and from 16 th Avenue and generally improved traffic flow efficiency.	The amount of traffic turning into and out of Aitken Circle is so low that its impact on traffic operations on 16 th Avenue is almost negligible. Analysis has shown that the aligned option will not improve traffic flow efficiency.
2. The aligned option allows the traffic signal to serve the new development and the Aitken Circle neighbourhood.	Agreed.
3. An aligned north/south collector network maximizes connectivity between neighbourhoods.	Aitken Circle is primarily a residential street and does not and will not form part of a local connector network. Any improvement in north-south connectivity involving Aitken Circle could encourage traffic infiltrating into the local neighbourhood, and is unlikely to be supported by local residents.

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| 4. Certain neighbourhood traffic mitigation measures, such as direct prohibition of north/south through-movements if required, are more effectively implemented with a four-way intersection geometry. | Agreed. However, a prohibition on through-movements is not the only, nor the preferred, traffic mitigation measure available to discourage through-traffic from using Aitken Circle. This is difficult to enforce and only works if police are present. |
| 5. It is more difficult to meet the signal warrants at a T-intersection compared to a four-way intersection. | The Region's traffic signal warrant policy makes an allowance for this by specifying that T-intersections should be analyzed using the same threshold values as a four-leg intersection. |
| 6. Should Street 'A' be signalized, it would preclude consideration of signals at Aitken Circle. | Agreed. However, due to the size of the local community and the limited potential for future development, it is unlikely that traffic signals at Aitken Circle will ever be warranted. The signalization of Birchview Lane provides a more feasible alternative to the signalization of Aitken Circle, although signals are not warranted at Birchview Lane and Kennedy Road either. |
| 7. The offset configuration generally results in decreased traffic flow efficiency (increased congestion along 16 th Avenue), additional circuitous movements and resulting driver frustration for certain motorists. | This may be true if there were large through-movement traffic demand between the areas north and south of 16th Avenue. However, traffic volumes at Aitken Circle are very low and the expected through-movement traffic demand is also low. Furthermore, traffic analysis has shown that the aligned option does not result in greater traffic flow efficiency than the non-aligned option. |
| 8. Reduced north/south network continuity and concurrent inefficiency of transit routing options. | Network continuity is desirable on the collector and arterial road network and not at the level of residential streets (such as Aitken Circle). |
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4.4 Birchview Lane

The Town of Markham requested that the intersection of Birchview Lane and Kennedy Road be considered for signalization (in addition to the signalization of Street 'A'/Aitken Circle), even though this intersection does not meet the Region's warrant for traffic signals.

Considering the low traffic volumes, the relatively small size of the subdivision and the negative impact of traffic signals on arterial traffic operations, there is no justification to have both Birchview Lane and Aitken Circle signalized. The signalization of either one of these intersections will meet the local community's demand for improved access to their neighbourhood.

At the Unionville sub-committee meeting at the Town of Markham on December 6, 2004, local residents clearly stated their preference for a traffic signal at Birchview Lane rather than at Aitken Circle. If signals were to be constructed at Birchview Lane and Kennedy Road, there would still be the need, eventually, for signals at Street "A" and 16th Avenue when the warrants would be met.

4.5 Option for Consideration

The options in Table 2 are listed in order of Regional staff preference with number 1 being the option most preferred by Region staff and number 5 being the option least preferred by Regional staff.

Table 2
Improvement Options

Improvement Options	Estimated Cost	Pros/Cons
<u>Option 1</u>		
Locate Street 'A' 260 metres west of Kennedy Road. Place undergrounds ready for signals when warranted. No improvements at Birchview Lane and Kennedy Road.	\$50,000 for undergrounds. \$100,000 for future signal installation.	• No change to current access/egress concerns from residents. • Future signals will provide some gaps for traffic from Aitken Circle. • Future signals will increase average delays to traffic on 16th Avenue. • Preferred from a traffic safety perspective. • Consistent with current signal warrant policy.
<u>Option 2</u>		
Locate Street 'A' 260 metres west of Kennedy Road and signalize. No improvements at Birchview Lane and Kennedy Road.	\$150,000.	• Will provide some gaps for traffic from Aitken Circle as soon as signals are installed. • Signals will increase

average delays to traffic on 16th Avenue.

- Preferred from a traffic safety perspective.
 - Not consistent with policy, signals installed prior to warrants being met.
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Option 3

Locate Street 'A' 260 metres west of Kennedy Road. Place undergrounds ready for signals when warranted (same as Option 1) and construct left turn lane on Kennedy Road at Birchview Lane and install signals. \$700,000.

- Requires construction of left turn lane on Kennedy Road.
 - Provides a signalized intersection for residents in the subdivision on the southwest corner.
 - High cost.
 - Not consistent with policy, signals not warranted.
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Option 4

Locate Street 'A' opposite Aitken Circle and signalize. No improvements at Birchview Lane and Kennedy Road. \$150,000.

- Reduces safety performance on 16th Avenue.
 - Signals will increase average delays to traffic on 16th Avenue.
 - Provides signalized intersection for residents in southwest quadrant.
 - Not consistent with policy, signals not warranted.
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Option 5

Locate Street 'A' opposite Aitken Circle. (same as Option 4) with Birchview Lane and Kennedy Road signalized. \$850,000.

- Reduces safety performance on 16th Avenue.
 - Provides two signalized intersections for residents in southwest quadrant.
 - Signals will increase
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average delays to traffic on 16th Avenue.

- Most costly.
 - Not consistent with policy, signals at Kennedy Road and Birchview Lane not warranted.
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5. FINANCIAL IMPLICATIONS

The cost for installing traffic signals and associated road works at the intersection of Street 'A' and 16th Avenue or at Street 'A'/Aitken Circle and 16th Avenue will be the responsibility of the property developer. Funding of the traffic signals and associated road works at Birchview Lane are not included in the proposed roads capital program.

6. LOCAL MUNICIPAL IMPACT

The residents in the existing subdivision located on the southwest corner of 16th Avenue and Kennedy Road are experiencing difficulty leaving their subdivision by either Aitken Circle and 16th Avenue or Birchview Lane and Kennedy Road. Several requests have been made for the Region to install traffic control signals at either of these intersections. Installing signals would benefit these Town of Markham residents.

7. CONCLUSION

Further analysis was completed on the different options available for providing a safer access/egress for the residents in the subdivision in the southwest quadrant of 16th Avenue and Kennedy Road in the Town of Markham. In all, five options were developed and evaluated. The options are listed in Table 2 with Option 1 as most preferred by staff and Option 5 as the least preferred by staff.

In consideration of these options, staff is seeking direction on the intersection improvements and the location of signals in the vicinity of 16th Avenue and Kennedy Road.

The Senior Management Group has reviewed this report.

(The attachment referred to in this clause is attached to this report.)