

Corridor Safety Review - Avenue Road

Date: September 27, 2017
To: Toronto and East York Community Council
From: Acting Director, Transportation Services, Toronto and East York District
Wards: Ward 20, Trinity-Spadina
Ward 22, St. Paul's
Ward 27, Toronto Centre-Rosedale

SUMMARY

As the Toronto Transit Commission (TTC) operates a transit service on Avenue Road, City Council approval of this report is required.

At the request of Toronto and East York Community Council, Transportation Services was directed to conduct a traffic and pedestrian safety review of Avenue Road, between St. Clair Avenue West and Davenport Road.

This report will discuss potential strategies for improving pedestrian and motorist safety through the use of road improvement measures such as, pavement marking treatments, amended traffic regulations and geometric design modifications within the subject section of roadway.

The following is a brief summary of our review:

- Extend the existing School Speed Zone to become approximately 100 metres longer than the existing zone;
- Request the Toronto Police Service to provide additional enforcement;
- Refresh and enhance some of the pavement markings;
- Further investigate and consult on the feasibility of turn movement prohibitions at the locations where collision patterns have emerged;
- Implement the one-year geometric road design pilot project to re-align the southbound lanes of Avenue Road, between Lynwood Avenue and Balmoral Avenue, in order to provide a separation between the flow of traffic and pedestrians on the west side of the road;
- Examine converting some of the current 'No Parking Anytime' sections to allow on-street parking;
- Continue to evaluate and the monitor existing signal timing plans, sight line concerns, pavement markings conditions, traffic control signal warrants, parking inventory and collision data in this area; and
- Continue to review this corridor for enhancements as part of the City of Toronto, Vision Zero (2017 to 2021).

RECOMMENDATIONS

The Acting Director, Transportation Services, Toronto and East York District recommends that:

1. City Council amend the existing School Speed Zone in effect 8:00 a.m. to 5:00 p.m., Monday to Friday on Avenue Road, between a point 30 metres south of Balmoral Avenue and a point 30 metres north Lynwood Avenue, to be in effect between a point 30 metres south of Clarendon Avenue and a point 30 metres north Lynwood Avenue.

FINANCIAL IMPACT

All costs associated with the necessary signage installation are included within the Transportation Services 2017 Operating Budget.

DECISION HISTORY

At its meeting on April 4, 2017, Toronto and East York Community Council adopted item TE23.107, directing Transportation Services staff to conduct a comprehensive review of traffic and pedestrian safety on Avenue Road, between St. Clair Avenue West and Pears Avenue, and report back to the September 6, 2017 meeting of the Toronto and East York Community Council with recommendations for safety improvements. The Council decision can be found at:

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2017.TE23.107>

At its meeting on June 13, 2017, Toronto and East York Community Council adopted item TE25.139, re-opening Item TE23.107 with respect to Recommendation 1, requesting Transportation Services, Toronto and East York District to extend the south study area limit of the road safety review to include Avenue Road, between Pears Avenue and Davenport Road. The Council decision can be found at:

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2017.TE25.139>

COMMENTS

Existing Conditions

Avenue Road, between St. Clair Avenue West and Davenport Road, is classified as a north/south major arterial road and is approximately 1.3 km in length. It consists of a six-lane cross-section, with three lanes per direction and a daily two-way traffic volume of about 30,000 vehicles. The average pavement width is about 20 metres and sidewalks are adjacent to the curb on both sides of Avenue Road. There is a seven percent vertical curve on Avenue Road, between Edmund Avenue and Poplar Plains Crescent.

The study area as shown on Drawing No. 421G-2628, dated August 2017 consists of seventeen intersections. Four intersections are signalized, ten intersections have a stop control sign on the side street, one of which operates one-way eastbound from Avenue,

and three are designated one-way beginning from Avenue Road (two are westbound and one is eastbound). TTC service in this section of Avenue Road is provided by the regular route '5 - Avenue Road' bus and the downtown express route '142 - Avenue Road Express' bus.

The regulatory speed limit on this section of Avenue Road is 50 km/h. During the school year (September to June) Avenue Road, between a point approximately 30 metres south of Balmoral Avenue and a point approximately 30 metres north of Lynwood Avenue, is designated as a 40 km/h school speed zone, between 8:00 a.m. and 5:00 p.m., Monday to Friday. The 40 km/h speed limit is identified by the use of flashing beacons and regulatory signage in both directions of travel. The 40 km/h speed school zone encompasses Brown Junior Public School and the Avenue Road Art School.

The parking regulations on Avenue Road, between St. Clair Avenue West and Davenport Road are described below.

Both Sides

- Pay and Display parking is permitted outside of the peak period stopping prohibitions on various segments between Davenport Road and Dupont Street;
- Maximum three-hour time limit parking permitted at all other times outside the peak period stopping prohibitions, parking prohibitions and hours of operation for Pay and Display parking, on various segments between Davenport Road and St. Clair Avenue West;
- No Stopping Anytime on various segments between Davenport Road and Dupont Street;
- No Stopping, 7:30 a.m. to 9:30 a.m., and 3:30 p.m. to 6:30 p.m., Monday to Friday on segment between Macpherson Avenue and Roxborough Street West; and
- No Parking Anytime on various segments between Davenport Road and St. Clair Avenue West.

East Side

- No Stopping, 3:00 p.m. to 7:00 p.m., Monday to Friday, between St. Clair Avenue West and Macpherson Avenue, and on various segments between Roxborough Street West and Davenport Road.

West Side

- No Stopping, 7:00 a.m. to 9:00 a.m., and 4:00 p.m. to 6:00 p.m., Monday to Friday, on between St. Clair Avenue West and Macpherson Avenue; and
- No Stopping, 7:00 a.m. to 10:00 a.m., and 3:00 p.m. to 7:00 p.m., Monday to Friday on various segments between Roxborough Street West and Davenport Road.

Avenue Road, between St. Clair Avenue West and McMaster Street, is primarily comprised of medium density residential properties. The Avenue Road Arts School and Brown Junior Public School are located on the west side of Avenue Road between Lynwood Avenue and Balmoral Avenue. The west extent of De La Salle College is adjacent to the east side of Avenue Road, between Farnham Avenue and Oaklands Avenue. Amica at the Bradgate Arms and The Balmoral Club retirement homes are located on the east side of Avenue Road between Balmoral Avenue and Farnham

Avenue, and the remaining portion of the study area includes commercial properties and park lands.

Transportation Services investigated and identified opportunities for engineering, and enforcement countermeasures on Avenue Road, between St. Clair Avenue West and Davenport Road. This safety review plan includes the following components: collision review; pavement marking review; speed review; request for Toronto Police Services enforcement; on-street parking and traffic control signal review.

Collision Review

In order to assess the operating characteristics and driver behaviour, a review of Toronto Police Services collision records for a five-year period ending May 31, 2017 was obtained for each intersection and mid-block section on Avenue Road, between St. Clair Avenue West and Davenport Road. The results are summarized in the following table:

Table 1: Collision Analysis on Avenue Road

Locations: Intersection (I) Off-Set Intersection (OI) Mid-Block (MB)	Collision Type and Frequency		
	All	Pedestrian	Cyclist
(MB) - St. Clair Avenue West to Lynwood Avenue	12	-	-
(I) - Lynwood Avenue	4	-	-
(MB) - Lynwood Avenue to Foxbar Road	1	-	-
(I) - Foxbar Road	5	-	-
(MB) - Foxbar Road to Balmoral Avenue	3	-	-
(I) - Balmoral Avenue	59	2	1
(MB) - Balmoral Avenue to Farnham Avenue	2	-	-
(OI) - Farnham Avenue/Clarendon Avenue	50	-	-
(MB) - Clarendon Avenue to Edmund Avenue	2	-	-
(I) - Edmund Avenue	26	2	1
(MB) - Edmund Avenue to Poplar Plains Crescent	3	-	-
(I) - Poplar Plains Crescent	12	-	-
(MB) - Poplar Plains Crescent to Oakland Avenue	-	-	-
(I) - Oakland Avenue	6	1	-
(MB) - Oakland Avenue to Cottingham Street (north intersection)	1	-	-

Locations:	Collision Type and Frequency		
(I) - Cottingham Street (north intersection)	16	1	-
(MB) - Cottingham Street (north intersection) to Cottingham Street (south intersection)	-	-	-
(I) - Cottingham Street (south intersection)	11	2	-
(MB) - Cottingham Street (south intersection) to McMaster Avenue	1	-	-
(I) - McMaster Avenue	1	-	-
(MB) - McMaster Avenue to Macpherson Avenue (north intersection)	-	-	-
(I) - Macpherson Avenue (north intersection)	19	-	3
(MB) - Macpherson Avenue (north intersection) to Macpherson Avenue (south intersection)	1	-	1
(I) - Macpherson Avenue (south intersection)	18	-	1
(MB) - Macpherson Avenue (south intersection) to Dupont Street	3	-	-
(I) - Dupont Street	80	-	1
(MB) - Dupont Street to Roxborough Street West	1	-	-
(I) - Roxborough Street West	48	2	-
(MB) - Roxborough Street West to Chicora Avenue	-	-	-
(I) - Chicora Avenue	3	-	-
(MB) - Chicora Avenue to Pears Avenue	3	-	-
(I) - Pears Avenue	24	3	2
(MB) - Pears Avenue to Davenport Road	10	-	-
Total	425	13 (3%)	10 (2%)

In review of the above collision data, no fatal collisions resulted from any of the 425 total collisions on Avenue Road, between St. Clair Avenue West and Davenport Road.

Rear-end and turning movement collision account for 28% and 27% of total collisions while five percent of total collisions involved a pedestrian and cyclist. Three out of the twenty-three pedestrian and cyclist collisions were classified as serious injuries resulting in victims being transported to a hospital to receive medical treatment.

It should be noted that of the 804 drivers involved in the 425 total collision, speeds too fast for condition were found to be the apparent action of 7 drivers (0.87%) while loss of control was found to be the apparent action of 10 drivers (1%).

Further review of intersections with high collisions determined more than half were a result of sideswipe and rear end impacts where sightline visibility was not an issue. As a result, no specific pattern to collisions were identified for the following intersecting streets on Avenue Road:

- Balmoral Avenue
- Edmund Avenue
- Macpherson Avenue
- Dupont Street
- Pears Avenue

In comparison, more than half of collisions intersecting Avenue Road at Farnham Avenue/Clarendon Avenue and Roxborough Street West, were comprised of the following turning movement impacts:

Farnham Avenue/Clarendon Avenue

- 33% of turning movement collisions were a result of SBLT and NBST movement
- 20% of turning movement collisions were a result of WBLT and NBST movement
- 17% of turning movement collisions were a result of WBLT and SBST movement
- 7% of turning movement collisions were a result of EBLT and WBLT movement

As a result of the time of day that these collisions occurred, the following turning prohibitions can be evaluated:

- Prohibit SBLT movements onto Farnham Avenue in the p.m. peak from 3:00 p.m. to 7:00 p.m.
- Prohibit WBLT movements onto Avenue Road in the p.m. peak from 4:00 p.m. to 7:00 p.m.

Roxborough Street West

- 72% of turning movement collisions were a result of SBLT and NBST movement
- 28% of turning movement collisions were a result of WBRT and NBST movement

As a result of the time of day that these collisions occurred, the following turning prohibitions can be evaluated:

- Prohibit SBLT movements onto Roxborough Street West in the p.m. peak from 3:00 p.m. to 7:00 p.m.

A further review of these two locations is required, including an assessment of the impacts of the displaced traffic resulting from these prohibitions. If supported, a follow-up report will be required to be submitted by Transportation Services to Toronto and East York Community Council.

Overall, there has been a decline in the number of collisions per year since 2012 with the exception of 2014, where the number of collisions was five more than the previous year.

Pavement Marking Review

Transportation Services have reviewed the existing pavement marking specifications and standards at the above noted intersections and have determined that the following improvements are needed:

- Refresh the eastbound approach stop bar/tail pavement markings and the north-south pedestrian crossing lines on the west leg of Pears Avenue and Avenue Road;
- Install north-south pedestrian crossing lines on Macpherson Avenue (north intersection); and
- Install the westbound approach stop bar/tail pavement markings and north-south pedestrian crossing lines on the east leg of Avenue Road and Foxbar Road.

The following lane widths are generally in place on this section of Avenue Road:

- Curb Lane: 3.2 to 3.3 metres
- Centre Lane: 3.0 to 3.1 metres
- Median Lane: 3.0 to 3.1 metres

As part of the City of Toronto's Lane Widths Guideline and TTC curb lane width requirements, the narrowing down of existing lanes through the use of pavement markings is not feasible as current lane widths are at the minimum with no extra space to accommodate a buffer.

Speed Review and Request for Toronto Police Services Enforcement

Three days of mid-block speed and volume studies were conducted at two locations on Avenue Road, between St. Clair Avenue West and Balmoral Avenue, and Dupont Street and Davenport Road in June 2017, and one location on Avenue Road, between Edmond Avenue and Cottingham Street (south intersection) in December 2016. The individual results of the three locations are summarized in the following table:

Table 2: Avenue Road Speed Data

Location	Direction	Speed Limit	School Speed Zone	85th percentile speed	
St. Clair Avenue West to Balmoral Avenue	NB	50 km/h	Not applicable	63 km/h	
	SB			68 km/h	
Edmond Avenue to Cottingham Street (south intersection)	NB		40 km/h	40 km/h	50 km/h
	SB				47 km/h
Dupont Street to Davenport Road	NB		Not applicable	Not applicable	65 km/h
	SB				56 km/h

The results of the vehicle speed studies revealed that the operating speeds, the speed at which 85% of the motorists are travelling at or below, were found to be in excess of the 50 km/h speed limit. The section of Avenue Road, between St. Clair Avenue West and Balmoral Avenue, includes a school speed zone. The operating speed for this section was recorded to be 50 km/h northbound and 47 km/h southbound.

The hourly breakdown of the operating vehicular within the school speed zone in December 2016 are summarized in the following table:

Table 3: Avenue Road (School Zone) Speed Data

Time	Operating Speed		Time	Operating Speed	
	NB	SB		NB	SB
8:00 a.m. to 8:59 a.m.	49	42	1:00 p.m. to 1:59 p.m.	46	47
9:00 a.m. to 9:59 a.m.	53	44	2:00 p.m. to 2:59 p.m.	45	47
10:00 a.m. to 10:59 a.m.	53	43	3:00 p.m. to 3:59 p.m.	43	42
11:00 a.m. to 11:59 a.m.	53	44	4:00 p.m. to 4:59 p.m.	43	42
12:00 p.m. to 12:59 p.m.	49	44			

When determining the appropriate speed limit on a roadway a number of factors are considered. This includes the pedestrian environment, specifically, the presence of schools and park lands and the provision of sidewalks; the road and traffic environment, including horizontal curves and hills, sight lines and parking; and collision history. The applicable City of Toronto policies with respect to speed limits on roadways were

reviewed. Given that the City of Toronto Road Classification System (approved by City Council in 2000) indicates that the minimum speed limit on major arterial roads would be 50 km/h, the warrant for the Implementation of a 40 km/h Speed Limit was not met based on the following:

- 40 km/h warrant applies to local, collector and minor arterial roads;
- 40 km/h speed limits are not effective on roads with a pavement width of 10.5 metres or more; and
- The operating speed of the road is greater than 50 km/h.

Notwithstanding, Appendix A entitled "40 km/h Warrant Summary" outlines with respect to an Elementary or Junior school abutting the road, the 40 km/h maximum speed limit must extend no less than 150 metres beyond the boundary of school property. In light of the above, the limits of the maximum 40 km/h when flashing zone, currently 30 metres north of Lynwood Avenue and 30 metres south of Balmoral Avenue should be reviewed so that the school speed zone is in line with the limits set forth in the warrant summary.

In view of the operating speeds consistently above the posted speed limits across all hours, Traffic Operations have requested Toronto Police Service to provide additional enforcement particularly during the hours when the 40 km/h school speed zone is in effect. In conjunction to enforcement, the following strategies may help mitigate excessive operating speeds along Avenue Road.

Creation of a Buffer

Staff has evaluated the existing lane widths on Avenue Road, between St. Clair Avenue West and Davenport Road against the City of Toronto's Lane Widths Guideline (June 2017), to determine the feasibility of implementing narrowed lanes through the use of pavement markings.

The following pavement widths are generally in place on this section of Avenue Road:

- Between St. Clair Avenue West to Balmoral Avenue - 19.5 metres
- Between Poplar Plains Crescent to Macpherson Avenue- 20.7 metres
- Between Macpherson to Davenport Road - 19.6 metres

Current lane widths for both directions of travel on this section of Avenue Road are as follows:

- Curb Lane: 3.2 to 3.3 metres
- Centre Lane: 3.0 to 3.1 metres
- Median Lane: 3.0 to 3.1 metres

In review of the existing lane width against the Lane Width Guidelines, it is determined that the existing minimum lane width of about 3.0 metres for the through lanes, and a minimum width of 3.3 metres for the curb lane to accommodate TTC transit bus service along the corridor is appropriate in accommodating multiple uses within a limited right-of-way.

Enhancements to be undertaken on Avenue Road, between Lynwood Avenue and Balmoral Avenue include a one-year geometric road design pilot project that was adopted by City Council on July 4, 5, 6 and 7, 2017 to re-align the southbound lanes of Avenue Road, providing a separation between the flow of traffic and pedestrians on the west side of the road, which includes two schools. The plan intends for planter boxes to occupy the southbound curb lane, essentially making avenue road two lanes southbound on this stretch of road. Flexible bollards will be placed along the edge of the closed area to create a separated buffer between sidewalk fronting the entrance to Brown Junior Public school and the travelled portion of road, and to deter unwanted parking related activity.

On-Street Parking in the Off-Peak Hours

On-street parking is a natural form of traffic calming that reduces the travelled portion of the road and creates the perception for motorists that the roadway is narrower than it appears. Current 'No Parking Anytime' sections on the west side of Avenue Road may be converted into on-street parking, with exception to the vertical alignment between Edmund Avenue and Poplar Plains Crescent that does not allow sidewalk access from the roadway. However due to the lack of adjacent land-use that would generate on-street parking, the intended effect of on-street parking may not be fully utilized as the east side of Avenue Road has sections of unsigned maximum three-hour parking that is rarely seen parked with vehicles in the off-peak hours.

Traffic Control Signal (TCS) Review

Staff has reviewed the feasibility of installing traffic control signals on all remaining un-signalized intersections along Avenue Road, between St. Clair Avenue West and Davenport Road. Eight-hour turning movement counts were analyzed against the technical requirements for the installation of traffic control signals. In order for traffic control signals to be technically justified, at least one justification must be 100 percent satisfied or both the Minimum Vehicular Volume and Delay to Cross Traffic Justifications satisfied to 80 percent. Based on the results, none of the technical requirements for the installation of traffic control signals are not justified at any of the remaining un-signalized intersections

It is worth noting that the intersection of Avenue Road and Farnham Avenue/Clarendon Avenue and Avenue Road and Roxborough Street West each experienced fifteen or more collisions over a thirty-six month period. However, based on the technical requirements, the average of five or more collisions susceptible to correction by TCS per twelve-month period, over a total of thirty-six months period was not achieved.

Notwithstanding, a preliminary analysis indicates a high number of turn movement collisions at Avenue Road and Farnham Avenue/Clarendon Avenue and Avenue Road and Roxborough Street West. Staff recommends further investigating the feasibility of turn movement prohibitions during the peak hours as angled collisions make-up at least half of the overall collisions at their respective intersections. In addition to the above noted initiatives, Transportation Services will continue to evaluate and the monitor existing signal timing plans, sight line concerns, pavement markings conditions, traffic control signal justification, parking inventory and collision data.

Conclusion

As a result of our review, the following is recommended:

- Extend the south limit of the existing School Speed Zone in effect 8:00 a.m. to 5:00 p.m., Monday to Friday on Avenue Road, to become approximately 100 metres longer than the existing zone and to be in effect from a point just south of St. Clair Avenue West to just south of Clarendon Avenue;
- Request the Toronto Police Service to provide additional enforcement, particularly during the hours when the 40 km/h School Speed Zone is in effect;
- Refresh and enhance the pavement markings on Pears Avenue, on Macpherson Avenue (north intersection) and on Foxbar Road where they intersection Avenue Road;
- Further investigate and consult with the area Councillor on the feasibility of turn movement prohibitions during the peak hours for southbound and westbound motorists at Avenue Road and Farnham Avenue/Clarendon Avenue;
- Further investigate and consult with the area Councillor on the feasibility of turn movement prohibitions during the peak hours for southbound motorists on Avenue Road at Roxborough Street West;
- Implement a one-year geometric road design pilot project to re-align the southbound lanes of Avenue Road, between Lynwood Avenue and Balmoral Avenue, in order to provide a separation between the flow of traffic and pedestrians on the west side of the road;
- Examine converting the current 'No Parking Anytime' sections on the west side of Avenue Road to allow on-street parking;
- Examine the opportunity for additional "Pay and Display" parking spaces on Avenue Road;
- Continue to evaluate and the monitor existing signal timing plans, sight line concerns, pavement markings conditions, traffic control signal warrants, parking inventory and collision data in this area; and
- Continue to review this corridor for enhancements as part of the City of Toronto, Vision Zero (2017 to 2021).

Councillor Joe Cressy, Councillor Josh Matlow and Councillor Kristyn Wong-Tam have been advised of the recommendations in this staff report.

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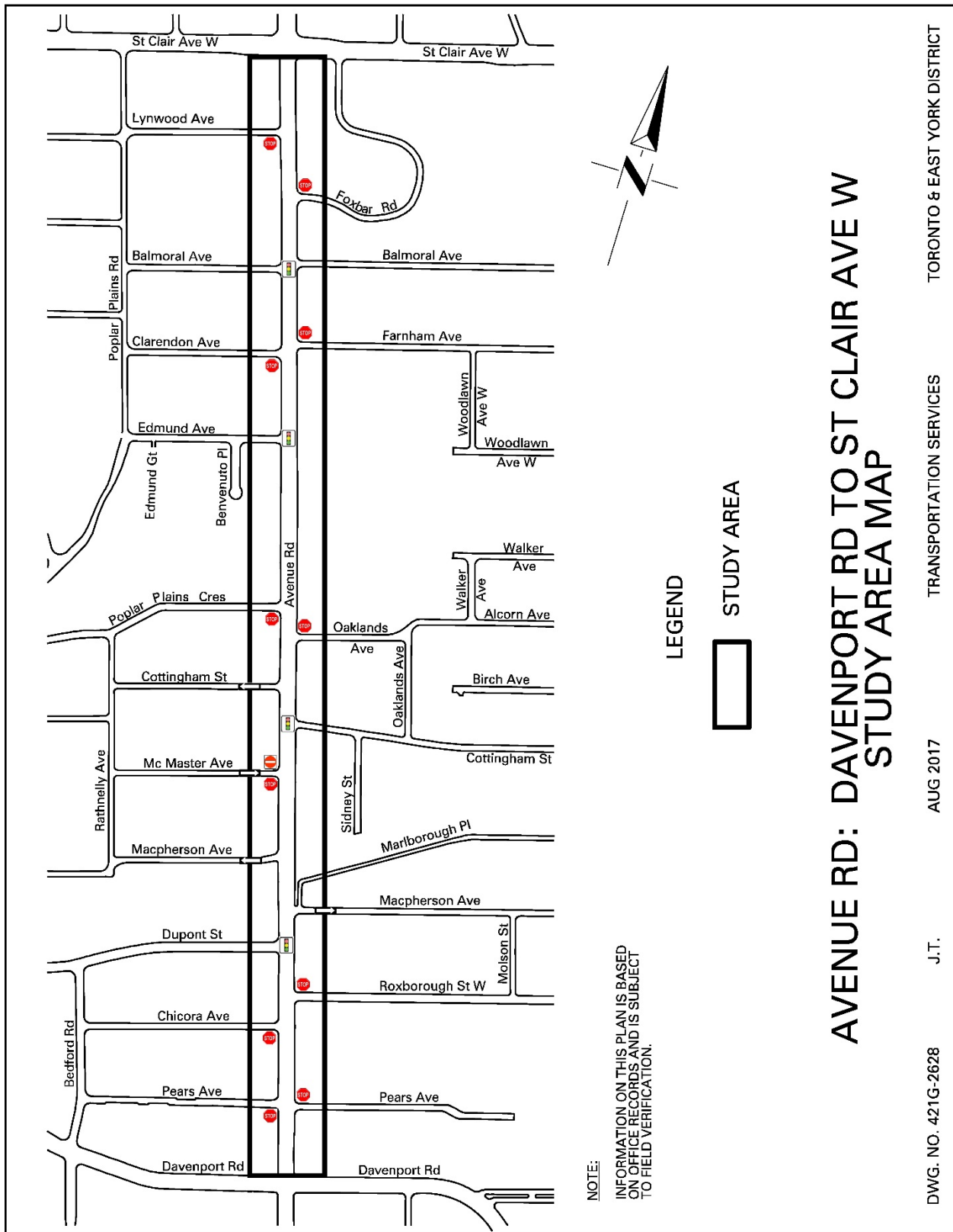
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Dave Twaddle, C.E.T.
Acting Director, Transportation Services
Toronto and East York District

ATTACHMENTS

1. Drawing No. 421G-2628, dated August 2017
2. Appendix A - 40 km/h Warrant Summary

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APPENDIX A

40 km/h Warrant Summary

A permanent 40 km/h maximum speed limit may be implemented on a street where **one or more of the following warrants A&B OR A&C are met.**

Warrant "A" – WIDE ROADS	
Pavement width is less than 10.5 metres	Yes <input type="checkbox"/> or No <input type="checkbox"/>

AND ONE OF THE FOLLOWING

Warrant "B" – PEDESTRIAN ENVIRONMENT	
Elementary or junior high school abuts the road. *	Yes <input type="checkbox"/> or No <input type="checkbox"/>
OR	
Parkland abuts the road which is contiguous to and used to gain access to an elementary or junior high school. *	Yes <input type="checkbox"/> or No <input type="checkbox"/>
OR	
No sidewalk on either side of the road or a major portion of the road.	Yes <input type="checkbox"/> or No <input type="checkbox"/>
OR	
The sidewalk is immediately adjacent to and not separated from the flow of motor vehicles by long term parking (>3 Hours) or bike lanes, where the travelled portion of the road width is less than 5.7 metres for two way operation or less than 4.0 metres for one way operation	Yes <input type="checkbox"/> or No <input type="checkbox"/>

Warrant "C" – ROAD & TRAFFIC ENVIRONMENT	
Two or more locations of concern where: <ul style="list-style-type: none"> • Grades are greater than 5%; and/or • Safe speed on curves is less than 50 km/h 	Yes <input type="checkbox"/> or No <input type="checkbox"/>
OR	
Lack of sufficient distance to stop safely at two or more locations when traveling at 50 km/h.	Yes <input type="checkbox"/> or No <input type="checkbox"/>
OR	
Pattern of collisions where vehicle speed was identified as a factor: <ul style="list-style-type: none"> • Local streets – 3 or more over 3 years • Other streets – 5 or more over 3 years 	Yes <input type="checkbox"/> or No <input type="checkbox"/>
OR	
Where long term parking (>3 Hours) is permitted on one or both sides and the remaining traveled portion of the road is less than 5.7 metres for two way operation or 4.0 metres for one way operation.	Yes <input type="checkbox"/> or No <input type="checkbox"/>

OVERALL WARRANT SUMMARY

Warrants "A" and "B" or "A and "C" must be met	Yes <input type="checkbox"/> or No <input type="checkbox"/>
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*Note: 40 km/h maximum speed limit must extend no less than 150 metres beyond the boundary of school property and/or contiguous parkland.