

2015 January 26

File: CR201422

To: Viola Forrester, P. Eng.
Transportation Engineer, Network Planning, Transportation Planning

From: Tony Churchill, M.Sc., P. Eng.
Sr. Traffic Engineer, Traffic, Roads

Re: **Pedestrian Collision Review Summary**
Macleod Trail SE from 25 Avenue to Anderson Road

1.0 Background

This memo summarizes the Pedestrian Collision Review (CR) which was completed for the above mentioned segment of Macleod Trail in support of TT2014-0665. Specifically, a referral was made that the report be brought back in Q1 2015 with: 1. revised recommendations, 2. options for fast tracking elements of the report, and 3. alternative options for cost effectively increasing pedestrian safety along the corridor if the ultimate plan is wholly or in part rejected; part three of the referral is the subject of this memo.

To identify pedestrian collision prone locations and potential causes of these pedestrian collisions, the analysis and format used in the memo generally follows the City of Calgary internal guidelines for *Comprehensive Safety Review and Improvement*. However, since pedestrian collisions are rare compared to total collisions, a longer analysis period was reviewed to increase the sample size to get reliable analysis results. The most recent 14 years of collision data (2000-2013) was reviewed.

Based on available data, collision frequencies at each intersection or mid block locations are presented in Table 1, ranked by the number of collisions. Table 2 illustrates the type of collisions based on vehicle and pedestrian movements and right-of-way. Figure 1 illustrates the temporal distributions of collisions.

In general, the collisions along this segment of Macleod Trail are typical of roadways with high volumes of vehicles and pedestrians. There are a few intersections, however, where pedestrian collisions are over-represented, i.e. there are more pedestrian collisions than we would expect based on vehicle and pedestrian volumes. The main issues identified are conflicts involving turning vehicles (left and right), pedestrians crossing Macleod Trail mid-block, and pedestrians hit on sidewalks in mid-block accesses.

From 2000 to 2013, there were a total of 131 pedestrian collisions along this corridor: 5 resulted in fatalities, 108 resulted in injuries, and 18 resulted in property damage only. This distribution of collision severity indicates that fatal collisions are over-represented (3.8% compared to 1.9% City average) and that injury collisions are consistent with city wide averages (82.4% compared to 83.5% City average). The posted speed limits of 70 km/h or 60 km/h along Macleod trail likely contribute to the overrepresentation of fatal collisions (compared to 50km/h roads).

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Table 1: Pedestrian Collision Frequency and Severity by Location

Macleod Trail	Fatal	Injury	PDO	Total Collision
at 39 Ave SE	1	12	1	14
at 90 Ave SE	1	10	1	12
at Heritage Dr SE	1	4	3	8
at 94 Ave SE		7	1	8
at 58 Ave SE		6	1	7
at 25 Ave SE		5	1	6
at 61 Ave SE		6		6
at 86 Ave SE		6		6
at 42 Ave SE		4	1	5
at 50 Ave SE	1	3	1	5
at 71 Ave SE		4	1	5
btw 94 Ave-Southland Dr SE		4		4
at Southland Dr		3	1	4
at 45 Ave SE		2	1	3
at 53 Ave SE		3		3
btw 58-61 Ave SE		3		3
btw 61-67 Ave SE		3		3
btw 36-38 Ave SE		2		2
btw 39-42 Ave SE		2		2
btw 46-49 Ave SE		2		2
btw 90-94 Ave SE		1	1	2
btw 99-109 Ave SE		1	1	2
at 31 Ave SE			1	1
btw 34-36 Ave SE		1		1
at 36 Ave SE			1	1
at 38 Ave SE		1		1
btw 42-45 Ave SE		1		1
btw 45-46 Ave SE		1		1
at 46 Ave SE		1		1
btw 53-55 Ave SE		1		1
at 56 Ave SE		1		1
btw 56-57 Ave SE		1		1
at 67 Ave SE		1		1
at 68 Ave SE		1		1
btw 73-75 Ave SE		1		1
at 75 Ave SE		1		1
btw 86-90 Ave SE		1		1
btw Southland Dr-99 Ave SE		1		1
at 99 Ave SE			1	1
at 109 Ave SE		1		1
btw 109 Ave-Anderson Rd SE	1			1
TOTAL	5	108	18	131

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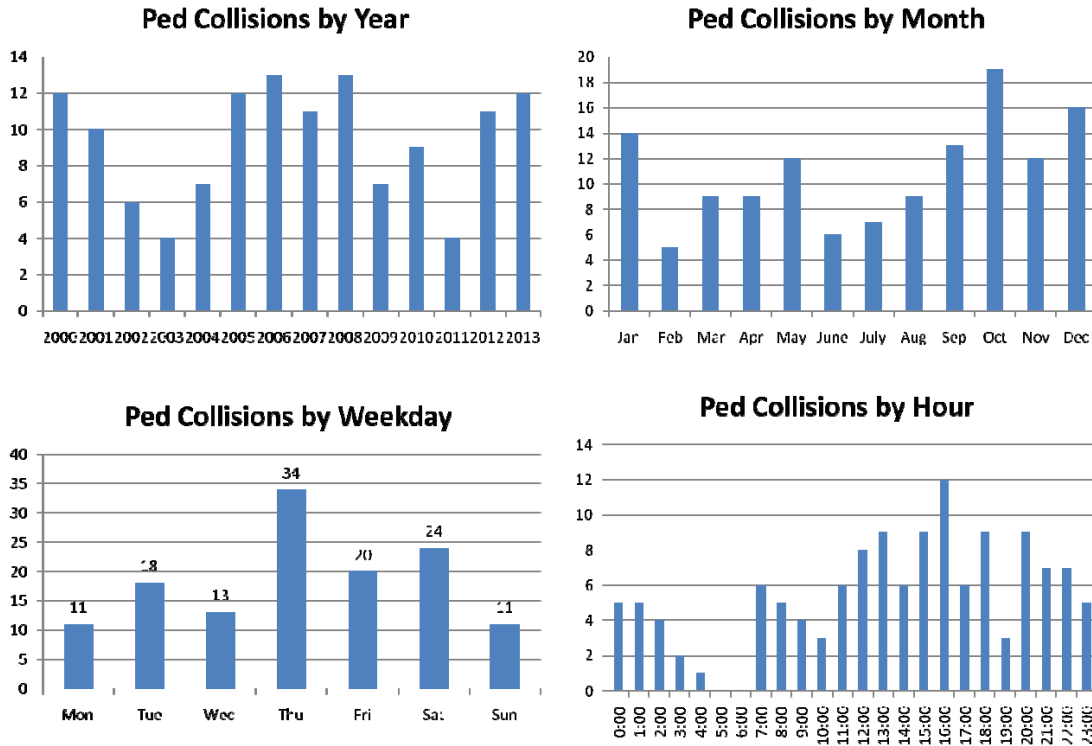
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Table 2: Pedestrian Collision Classification

Collision Description	Number of Collisions	Proportion of Collisions
Intersection Location		
Vehicle Turns Left		
Pedestrian crosses on Xwalk, with right of way	18	14%
Pedestrian crosses on Xwalk, without right of way	1	1%
Pedestrian crosses on Xwalk, right of way unknown	2	2%
Others (i.e. peds on sidewalk or unknown location at intersection, or jaywalk at intersection)	1	1%
Vehicle Turns Right		
Pedestrian crosses on Xwalk, with right of way	30	23%
Pedestrian crosses on Xwalk, without right of way	2	2%
Pedestrian crosses on Xwalk, right of way unknown	4	3%
Others (i.e. peds on sidewalk or unknown location at intersection, or jaywalk at intersection)	5	4%
Vehicle Goes Through		
Pedestrian crosses on Xwalk, with right of way	6	5%
Pedestrian crosses on Xwalk, without right of way	14	11%
Pedestrian crosses on Xwalk, right of way unknown	3	2%
Others (i.e. peds on sidewalk or unknown location at intersection, or jaywalk at intersection)	3	2%
Vehicle Unknown Direction		
Pedestrian crosses on Xwalk, with right of way	1	1%
Pedestrian crosses on Xwalk, without right of way	1	1%
Pedestrian crosses on Xwalk, right of way unknown	4	3%
Subtotal	95	73%
Mid-block Location		
Pedestrian hit at sidewalk	9	7%
Pedestrian hit at bus stop	2	2%
Pedestrian hit while Jaywalking	19	15%
Others	3	2%
Subtotal	33	25%
Other/Unknown		
LRT cross ped walk	1	1%
Others or Unknown	2	2%
Subtotal	3	2%
TOTAL	131	100%

Figure 1: Pedestrian Collision of Temporal Summary



2.0 Identification of Pedestrian Safety Issues and Potential Mitigation Measures

2.1 Education and awareness - A general issue common to all pedestrian collisions is awareness and responsibility of both motorists and pedestrians to watch out for each other, regardless of “right-of-way”. Review and revitalization of education and awareness campaigns and temporary educational signage (for motorists and pedestrians) in the right of way on this subject are underway. Other programs including a pilot of “LOOK” markings on sidewalks at intersections to remind pedestrians to scan for turning vehicles are also being considered.

2.2 Right turns – Pedestrian conflicts can occur when right turning motorists are facing either a green light, or a red light (after stopping) and are looking to their left for a gap in traffic. Accordingly, the measures to address these situations are different. Engineering treatments that may be cost effective at reducing right turning collisions (situation specific) include:

- Leading pedestrian signal (pedestrians get a ‘head start’ before general traffic);
- Revision of right turn channelization to geometry consistent with yield traffic control (separated right turning vehicles at a lower speed);
- Prohibit right turns on red (separate movements); and
- Revise roadway geometry (reduction of speeds).

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2.3 Left turns – Pedestrian conflicts occur primarily when left turning drivers are facing green lights and looking for a gap in oncoming traffic rather than looking for pedestrians in the crosswalk. Engineering treatments that may be cost effective at reducing left turning collisions (situation specific) include:

- Protected left turn signal (green arrow, pedestrian movement separated);
- Installation of left turn bays (safe spot for motorists to wait for a gap in traffic); and
- Prohibit left turns and accommodate movement in another way.

2.4 Mid-block pedestrian crossings – Pedestrian crossings mid-block are prohibited in the City of Calgary by a City bylaw. As a result, this is largely an education, awareness and enforcement issue. In many cases, however, the land use and resulting origins and destinations for pedestrians result in ‘desire lines’ that are not consistent with roadway traffic control and this may be the root cause of the issue. As vehicle operating speeds increase, the risk of mid-block crossings increases. Engineering treatments that may be cost effective at reducing mid-block pedestrian collisions (situation specific) include:

- Educational signage to direct pedestrians to safe crossing locations;
- Landscaping or physical measures to encourage crossings at safe locations; and
- In extreme cases possibly traffic control or pedestrian over/underpasses.

2.5 Pedestrians on Sidewalks at Access – The majority of accesses to land uses along Macleod trail are limited to right-in and right-out accesses. As a result, the collision types and contributing factors are similar to right turns. Closely spaced accesses increase the number of conflict points for pedestrians. Engineering treatments that may be cost effective at reducing pedestrian conflicts on sidewalks (situation specific) include:

- Revision of access geometry to promote lower speeds;
- Combining accesses where on-site traffic circulation is possible; and
- Access closure where alternate access is possible/preferable from side streets.

3.0 Actions

Roads Traffic will continue to improve pedestrian safety on a priority basis within existing programs and budgets, including implementation of the measures which have been identified as cost effective through this review. The Traffic Safety group is also providing direct input to the Calgary pedestrian strategy ‘Step Forward’, and will promote the application of network wide improvements to increase the safety of pedestrians and all road users.

4.0 Closing

This collision review has been prepared based on the available collision information in the City of Calgary’s RACE collision database system. While every attempt has been made to provide accurate collision analysis, the available collision data is based on police reported collisions and may be subject to data quality issues or under-reporting of collisions. Should you have any questions, please feel free to contact the undersigned.



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TC/tc