Portland St and Pleasant St

MicroTraffic Video Diagnostic Findings and Recommendations

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Contents

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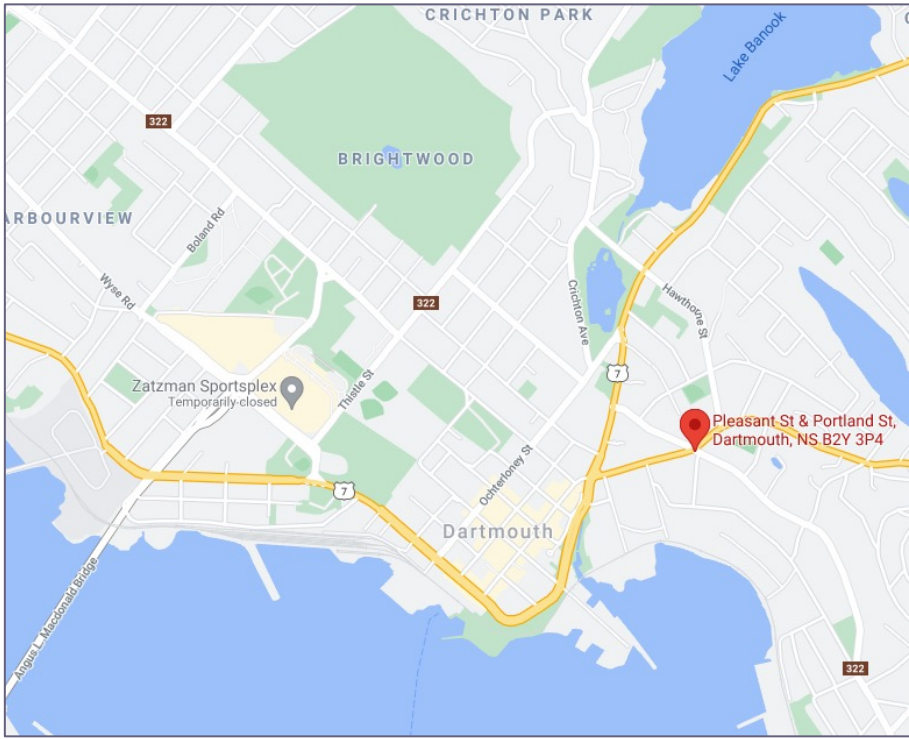
Intersection Overview

- Portland St and Pleasant St is located near downtown Dartmouth, across the inlet from Halifax.
- Portland St (Highway 207) runs east from Highway 7 in downtown Dartmouth. Pleasant St (Highway 322) extends southeast from Highway 7.
- The intersection is skewed (~45 degrees). Portland St was assumed to be in the North/South direction.
- The land use surrounding the intersection is primarily single- and multi-family residential.
- Albert St (southbound one-way) originates at Pleasant St less than 20m to the east of the intersection.
- Video analytics indicates that the intersection is used by approximately 50 cyclists, 450 pedestrians and 22,100 vehicles per day (from 5:00-24:00). Note that the counts were completed in November when VRU volumes may be depressed.



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Portland St. Features:

- Southbound: One through lane and a left turn auxiliary lane
- Northbound: One through lane and a right turn auxiliary lane
- 50 km/h posted speed limit (assumed)
- Northbound left turn not permitted
- Southbound left permissive only
- Four signal heads NB and SB (one nearside each)
- Right turn on red is not restricted
- No reflective back plates on signals
- Sidewalks on both sides of the road with boulevard separation
- Skewed intersection and large right turn radii exposes VRUs to vehicles turning at higher speeds
- Hydro poles and trees located <0.5m away from the roadway
- Several driveway accesses close to the intersection

Portland St. Looking North

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Pleasant St. Features:

- One through lane and a left turn auxiliary lane
- 50 km/h posted speed limit
- Eastbound and westbound left turn signalization protected/permissive
- Two signal heads EB and three signal heads WB (one nearside)
- Right turn on red is not restricted
- No reflective back plates on signals
- Sidewalks on both sides of the road with boulevard separation
- Hydro poles and trees located <0.5m away from the roadway
- Several driveway accesses close to the intersection

Pleasant St. Looking East

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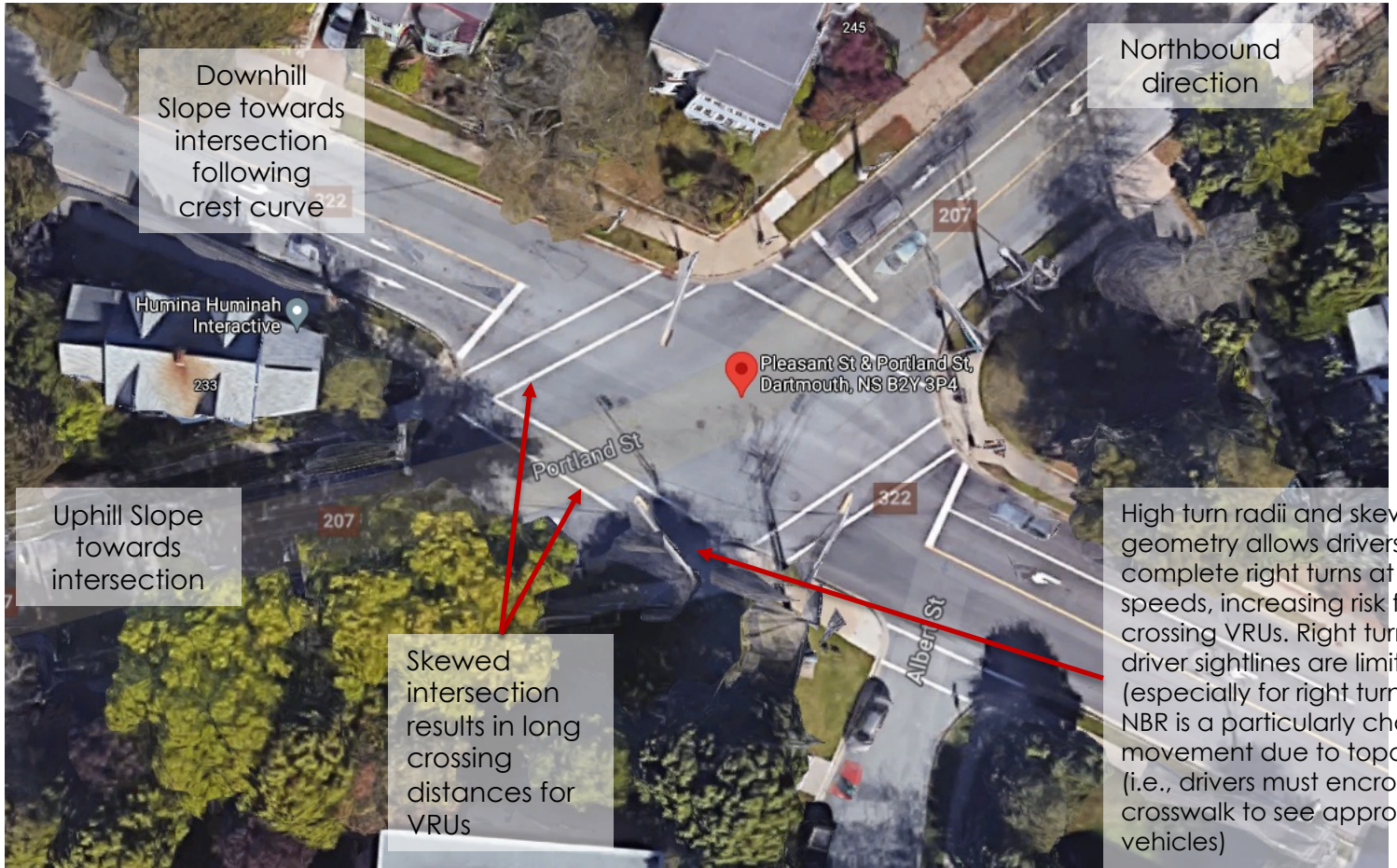

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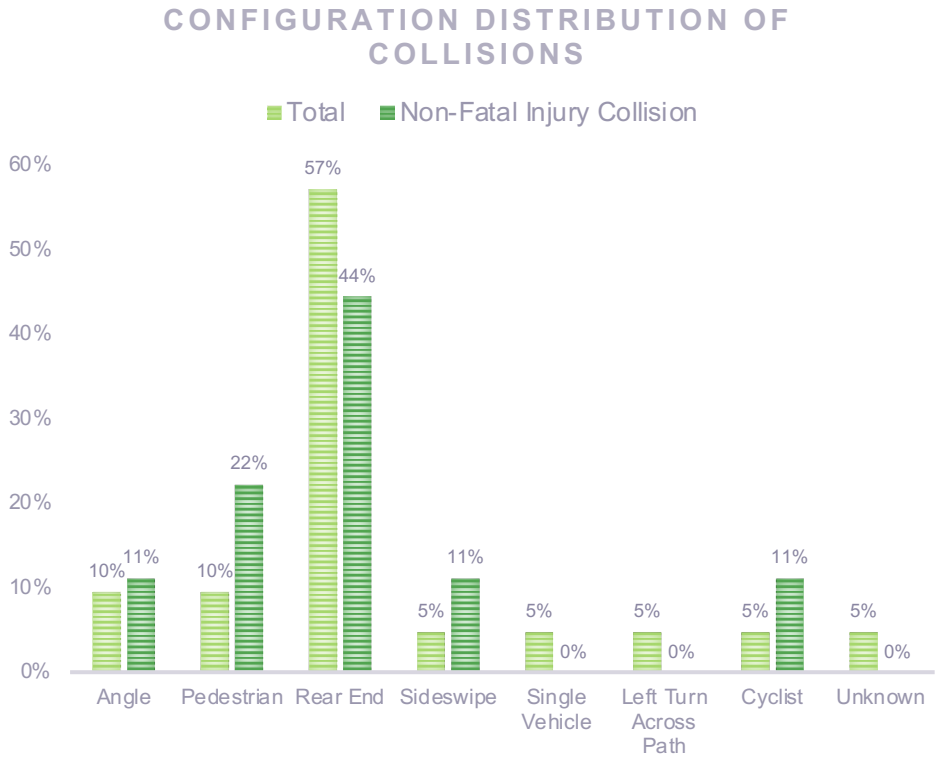
Collision Analysis

- The provided collision data included 21 collision records from January 1, 2018 to April 12, 2021. Of the 21 records, 43% (9) were classified as non-fatal injury collisions, and 57% (12) as property damage only collisions.
- The percentage of non-fatal injury collisions is elevated at this site compared to the other analyzed locations in Halifax.
- Due to the skewed intersection, there may have been some discrepancies in directional reporting depending on the person recording the collision event. For consistency with the conflict data, Portland was assumed to be in the North/South direction.
- The collisions were classified into the general descriptions shown in the adjacent figure based on the initial impact type and provided directional information.



The collision data revealed the following key points:

- Pedestrian collisions represent 22% (2 events) of the non-fatal injury collisions. Both pedestrian collisions involved a northbound-right vehicle. The 1 cyclist collision event included a westbound-left vehicle.
- Rear End collisions represent 57% of total collisions and 44% of the non-fatal injury collisions. Of the known directions, the distribution was approximately equal between all four directions.
- Angle collisions represent 10% (2) of total collisions and 11% of the non-fatal injury collisions. Both events included a westbound through vehicle (on Pleasant) running the red light and colliding with a northbound through vehicle.

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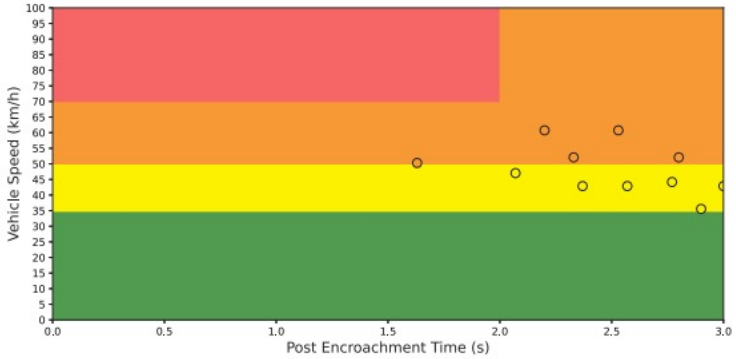
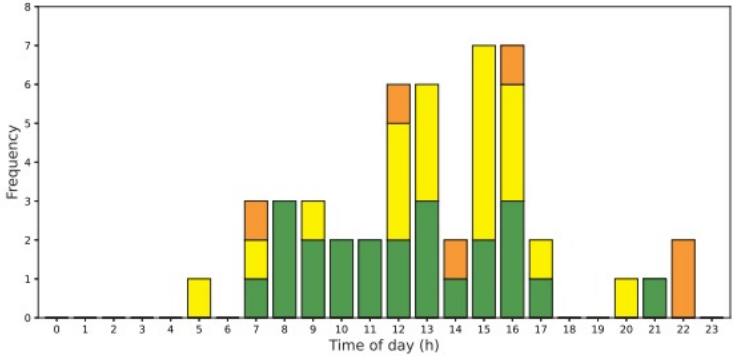
Video Conflict Analysis – VEH-VEH

- Through vehicle vs through vehicle and left-turning vehicle vs through vehicle from left configurations were measured, but no conflicts were detected during the 47-hour analysis period. These conflict types require a signal violation, which are typically infrequent events (or they occur at low speeds at the end of a signal phase).
- Several left turn across path conflicts were detected during the 47-hour analysis period, as follows:
  - 3 North-Left vs South-Through conflicts
  - 27 South-Left vs North-Through conflicts
  - 11 East-Left vs West-Through conflicts
  - 48 West-Left vs East-Through conflicts
- The signalization is protected/permissive for WBL and EBL, permissive-only for SBL and NBL turns are not permitted.
- The 24-hour TMC indicates that 6 vehicles completed NBL turns. The 3 NBL violations resulting in conflicts with SBT vehicles occurred between 10:00 and 14:00.



Above: East-left vs West-through data shows that several conflicts occurred with through vehicle speeds exceeding the 50 km/h posted speed limit (up to 60 km/h). At impact speeds of 50 km/h, opposing drivers have a 40% chance of a severe injury (MAIS 3+), which increases to >65% at 60 km/h.

Below: West-left vs East-through conflict data also has high-risk events (speeds > 50 km/h). There is a concentration of conflicts around noon and during peak PM periods.



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Video Conflict Analysis – VEH-VEH

North-Left vs South-Through: PET= 2.5s, vehicle speed 42 km/h

NBL is a restricted movement. Due to the skewed intersection, this movement requires a near U-turn maneuver to complete the turn.

South-Left vs North-Through: PET= 1.9s, vehicle speed 52 km/h

The sightline between permissive SBL vehicles and oncoming NB vehicles is moderately obstructed due to the bend in the roadway.

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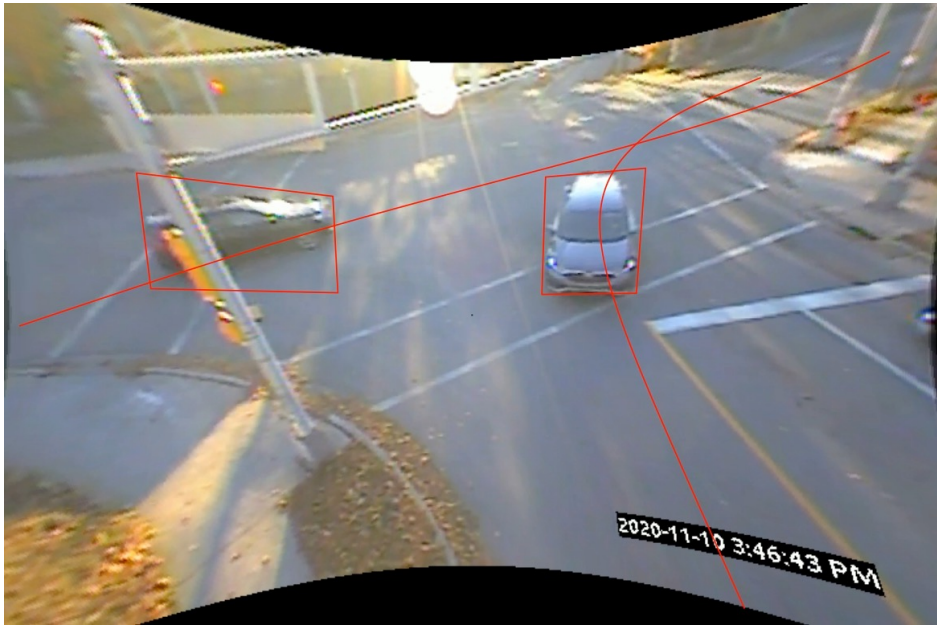
Video Conflict Analysis – VEH-VEH

West-Left vs East-Through: PET= 2.5s, vehicle speed 55 km/h
Eastbound travelling vehicles may approach the intersection with higher speeds than expected due to downgrade in topography. The skewed geometry also impacts driver sightlines as they cross the intersection. Crest curve impacts sightlines.



East-Left vs West-Through: PET= 1.6s, vehicle speed 50 km/h
The skewed geometry impacts driver sightlines as they cross the intersection.

According to 2019 Google Street View, two signs were provided to advise drivers of the restricted NBL turn. The nearside sign appears to be in poor condition and the far-side sign may be outside the driver line of sight (if they are focused on oncoming vehicles to their left). Signs with improved retroreflectivity and more prominent placements may reduce the number of northbound-left turn violations.

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Video Conflict Analysis – VEH-VRU

- No cyclist conflicts were detected during the 47-hour analysis period. However, the video collection occurred in November and the 24-hour cyclist counts indicate a low volume of cyclists crossing the intersection.
- 2 pedestrian hook conflicts were detected during the analysis period, one south-left and one north-right hook.

VRU visibility on the east crossing is slightly blocked due to street signage and poles in the foreground

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Video Conflict Analysis – VEH-VRU

Pedestrian South-Left Hook: T2 = 2.3s, vehicles speed = 15 km/h

The left turning driver did not notice the crossing pedestrian until they initiated their permissive left turn movement. As they yielded to the right-of-way pedestrian, they were placed in conflict with oncoming through vehicles.

Pedestrian North-Right Hook: T2 = 3.0s, vehicles speed = 12 km/h

Key Issues and Recommendations

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Key Issue	Recommendation
VRU Safety: • 2 pedestrian collisions with north-right vehicles and 1 cyclist collision with a west-left vehicle were recorded in the collision data. • Limited conflicts were detected during the 47-hour conflict analysis in November (1 north-right and one south-left (both on the east crossing). • The skewed intersection and surrounding topography creates sightline challenges for vehicles making permissive turns (permissive left or right turn on red). This increased driver workload may place VRUs at additional risk as drivers focus on finding safe gaps in traffic. • VRUs are exposed to longer crossing distances with the skewed crosswalks and vehicles may also perform right turns at higher speeds due to larger turn radii and low turn deflection.	Prohibit northbound right turn on red. Provide actuated leading pedestrian intervals. Provide turning vehicle yield bicycles and pedestrians sign (RB-38) on NB approach. This turn may be considered an 'exceptional case' per the MUTCDC A2.2.4 because of very heavy skew and low turn deflection promoting high speeds. Any attempts to reduce NBR speed through geometry would be useful but this may be difficult to achieve.
Angle collisions: • Two angle collisions were recorded in the collision data, both included a westbound vehicle running a red light. • Signal perception improvements would be valuable, especially in the EB/WB directions when sun glare may contribute to signal perception failure.	Add reflective backplates to signals.

Key Issues and Recommendations

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Key Issue	Recommendation
Rear ends: • Rear End collisions represent 57% of total collisions and 44% of the non-fatal injury collisions, these were approximately evenly distributed in each direction • The skewed intersection and resulting sightline limitations increase driver workload and drivers turning right onto Albert St. may also result in unexpected stoppages	Consider applying high friction surface treatment on approaches.
Left Turn Across Path • 89 LTAP conflicts were detected during the 47-hour analysis period. • Due to the skewed intersection, limited sightlines and sloping topography, drivers performing permissive left-turn movements have an increased mental workload. • Several NBL turn violations resulted in conflict events- this may be due to drivers being unaware of the prohibited movement.	Replace NBL prohibition signs with high reflectivity signs, and potentially add one more sign on far side left pole. We don't feel the LTAP conflict risk is sufficient to warrant protected only phasing. However, corridor speed management strategies to achieve operating speeds of 40 km/h or lower on these roads would reduce LTAP risk and make the streets safer for all users.

Note that the intersection recommendations have been looked at in isolation and will require further analysis by the municipality to determine complete network impacts.