

# Spring Garden Rd and South Park St

MicroTraffic Video Diagnostic Findings and Recommendations

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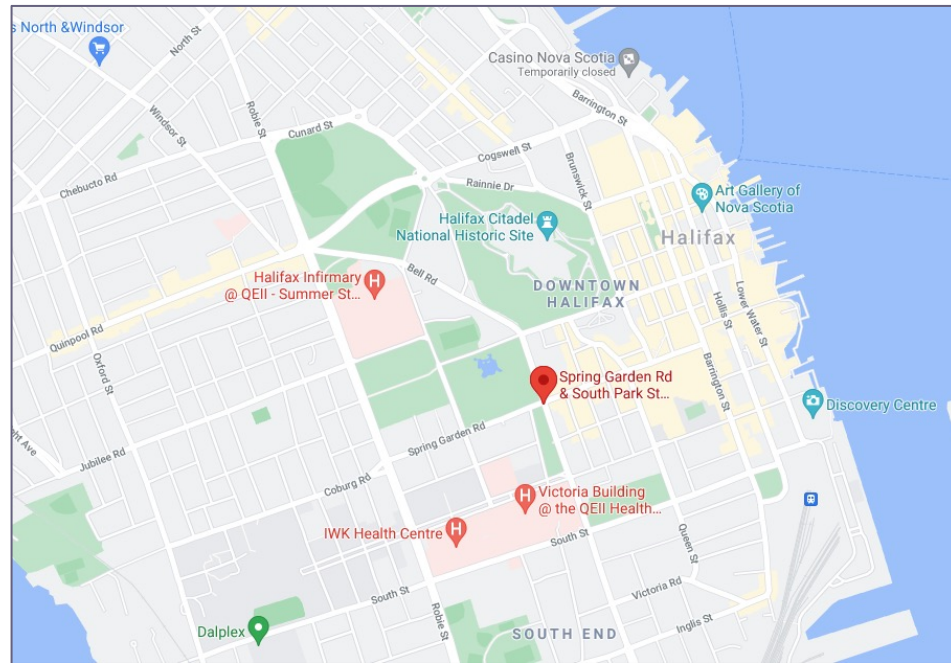
Video Conflict Analysis



Key Issues and Recommendations

# Intersection Overview

- Spring Garden Rd and South Park St is located in downtown Halifax.
- Spring Garden Rd runs east-west between Robie St and Barrington St. South Park St extends south from the Halifax Citadel.
- The land use surrounding the intersection is mixed, with commercial establishments along Spring Garden Road, the Halifax Public Gardens in the NW quadrant, Victoria Park in the SW quadrant and multi-family residential distributed throughout.
- Video analytics indicates that the intersection is used by approximately 30 cyclists and 3250 pedestrians (from 7:00-17:00 on the East, South and West Crossings only) as well as 15,750 vehicles per day (from 5:00-24:00). Note that the counts were completed in December when VRU volumes may be depressed.



## South Park St. Looking North



### South Park St. Features:

- Cross section according to Google Street View July 2019- Northbound: One shared through lane and right turn lane and a left turn lane. Southbound: One through lane, one right turn lane and one left turn auxiliary lane
- Green painted bike lane striping and far-side left turn bike box NB/SB (not shown in Google Street View)
- 50 km/h posted speed limit (assumed)
- Northbound and southbound left turn signalization permissive-only
- Three signal heads NB and SB (one nearside each)
- Nearside transit stop NB and farside transit stop SB
- The signals are black with no reflective back plates on signals
- No pedestrian countdown timer on East Crossing
- Right turn on red is not restricted
- Sidewalks on both sides of the road with boulevard separation
- Southbound right has higher turn radius (high speed)
- Hydro poles and trees located <0.5m away from the roadway



## Spring Garden Rd. Looking West



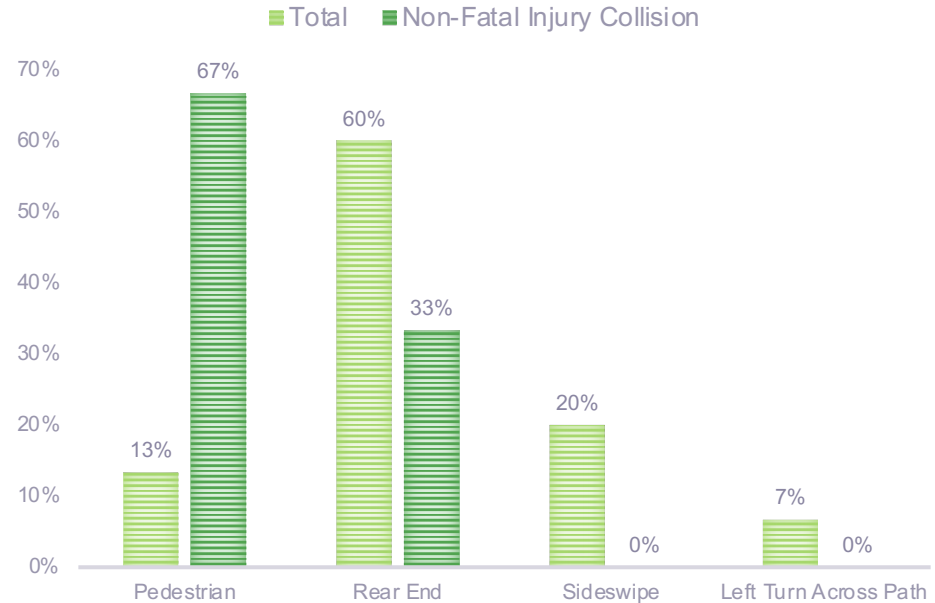
### Spring Garden Rd. Features:

- Cross section according to Google Street View July 2019- Westbound: two through lanes. Eastbound: one through lane, one left turn auxiliary lane and one right turn lane
- 50 km/h posted speed limit
- Eastbound and westbound left turn signalization permissive-only
- Three signal heads EB and WB (one nearside each direction)
- Nearside transit stop EB and WB
- The signals are black with no reflective back plates on signals
- Pedestrian countdown timers on north and south crossings
- Right turn on red is not restricted
- Sidewalks on both sides of the road
- Hydro poles and trees located <0.5m away from the roadway

# Collision Analysis

- The provided collision data included 15 collision records January 1, 2018 to April 12, 2021. Of the 15 records, 3 (20%) were classified as non-fatal injury collisions and 12 (80%) as property damage only collisions.
- The collisions were classified into the general descriptions shown in the adjacent figure based on the initial impact type and provided directional information.

## CONFIGURATION DISTRIBUTION OF COLLISIONS

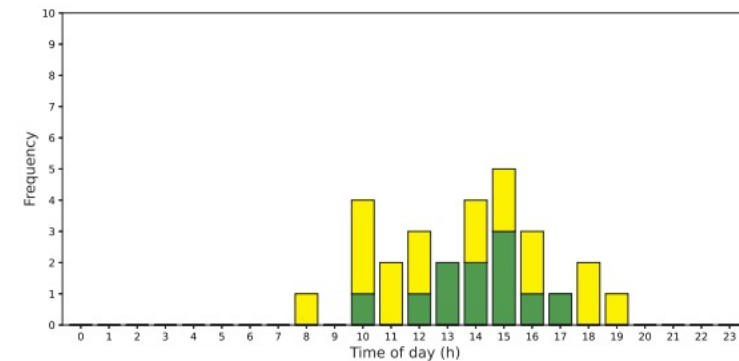


The collision data revealed the following key points:

- Pedestrian collisions represent 67% (2 events) of the non-fatal injury collisions. The pedestrian collisions involved a westbound-right vehicle and a southbound-left vehicle.
- Rear End collisions represent 60% of total collisions and 33% of the non-fatal injury collisions. Of the known directions, the distribution was equally split between the North/South and East/West directions.

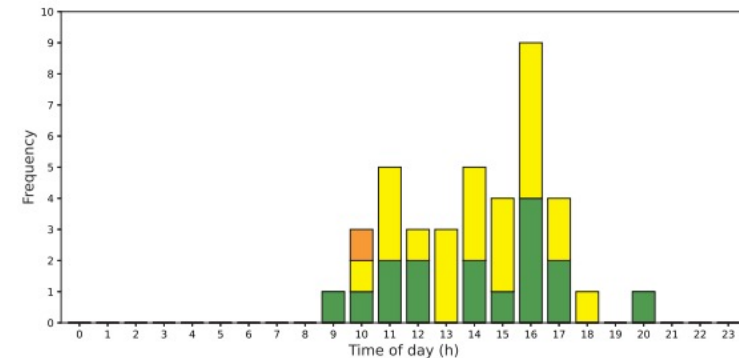
## Video Conflict Analysis – VEH-VEH

- 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:
  - 39 North-Left vs South-Through conflicts
  - 28 South-Left vs North-Through conflicts
  - 18 East-Left vs West-Through conflicts
  - 11 West-Left vs East-Through conflicts
- Only one of the left turn across path conflicts was high risk, but left turn conflicts and VRU conflicts are happening together (see subsequent videos).
- The signalization is permissive-only for all left turn movements



South-left vs North-through (above) and North-left vs South-through (below) data shows that left turn across path conflicts are spread throughout the day with a higher frequency of detected conflicts at peak PM periods.

The only high-risk vehicle-vehicle conflict was detected for NBL vs SBT with a through vehicle impact speed of approximately 55 km/h. At these impact speeds there is a 50% chance of severe injury (MAIS 3+) to the opposing turning driver.



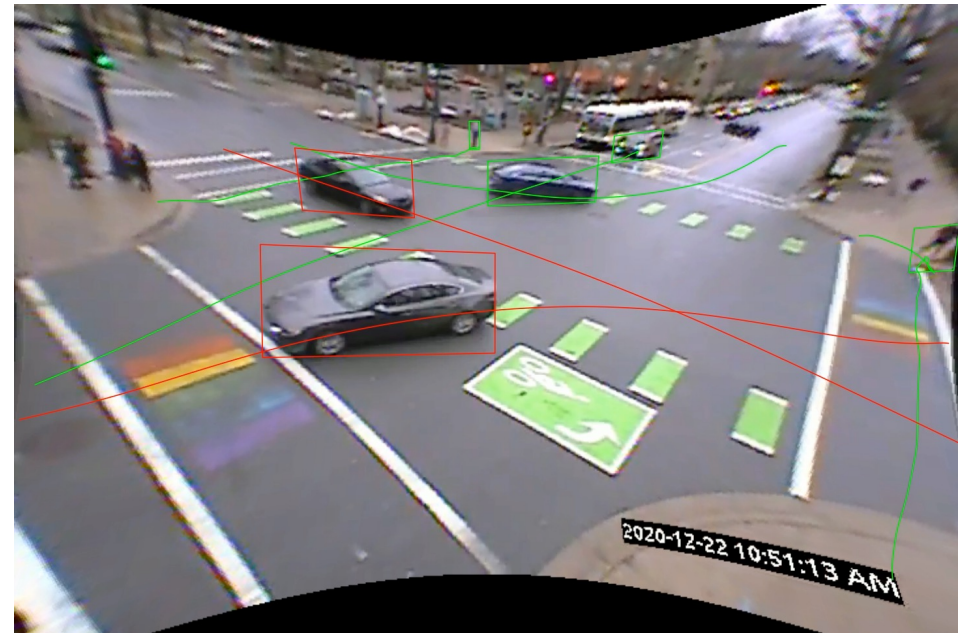


# Video Conflict Analysis – VEH-VEH



North-left vs South-through: PET = 2.3s, vehicle speed = 53km/h

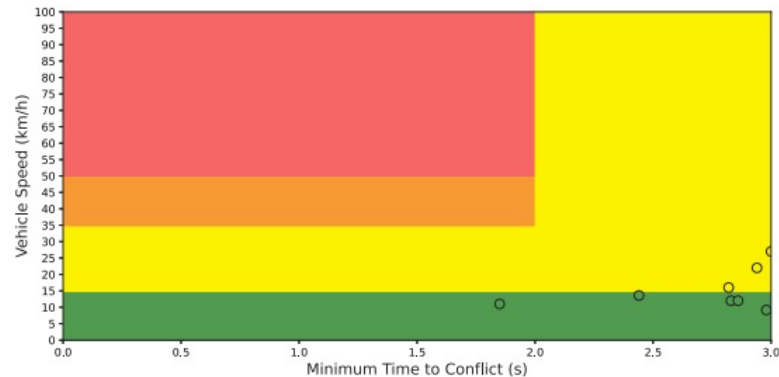
The left turning driver did not notice the crossing pedestrian until they initiated their permissive left turn movement. As they yielded to the right-of-way pedestrian, they were placed in conflict with an oncoming through vehicle.



South-left vs North-through: PET = 1.9s, vehicle speed = 44km/h

# Video Conflict Analysis – VEH-VRU

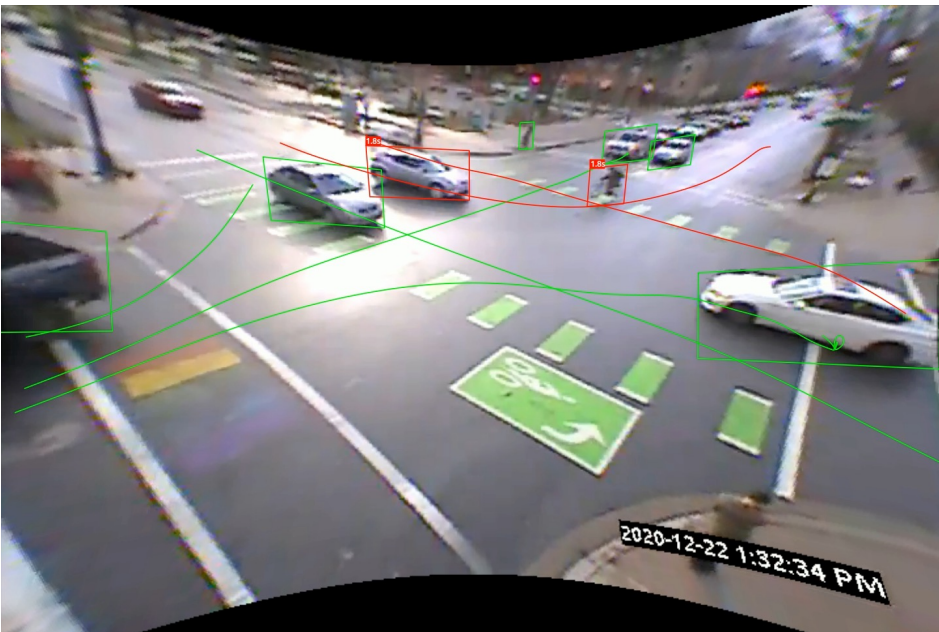
- Near-side VRU conflicts were not measured due to camera placement and limited approach view.
- *North crossing conflicts (north far-side, west-right and east-left) were not measured due to lens distortion at the edge of the camera.*
- 1 cyclist conflict was detected during the 47-hour analysis period for a north-left hook. The video collection occurred in December and the 24-hour cyclist counts indicate a low volume of cyclists crossing the intersection.
- Several pedestrian conflicts were detected during the 47-hour analysis period, as follows:
  - 8 North-Left Hook conflicts
  - 13 North-Right Hook conflicts
  - 11 East-Right Hook conflicts
  - 3 South-Left Hook conflicts
  - 1 South-through Far side conflict
  - 3 West-left Hook conflicts



Pedestrian North-Left Hook conflict data show conflicts occurring with through vehicle speeds of nearly 30km/h.

At impact speeds of 30 km/h, pedestrians have a 25% chance of a severe injury (MAIS 3+).

# Video Conflict Analysis – VEH-VRU



Cyclist North-Left Hook:  $T_2 = 1.8s$ , vehicle speed = 17 km/h

Cyclists on the painted bike lane can travel at higher speeds (cyclist speed = 17 km/h). Additionally, there is less lateral offset between the bike lane and turning vehicles, placing cyclists at higher risk of conflict. In this event, the driver was aware of approaching cyclist and waited prior to initiating their left turn. The green pavement markings increase driver awareness of cyclists in the intersection.



Pedestrian North-Right Hook:  $T_2 = 2.2s$ , vehicle speed = 19 km/h

The right turning driver approached the intersection and initiated their turn at a higher speed; however, the lateral offset between vehicle travel lanes and the crosswalk provided sufficient space for the vehicle to observe the pedestrian, slow down and yield.



# Video Conflict Analysis – VEH-VRU



Pedestrian South-through Far-side:  $T_2 = 1.6s$ , vehicle speed = 27km/h

The pedestrian violated the signal and came in close conflict with higher speed southbound vehicle. If the driver had not been attentive, this could have been a severe collision.



Pedestrian North-Left Hook:  $T_2 = 1.9s$ , vehicle speed = 11km/h

The left turning driver did not notice the crossing pedestrian until they initiated their permissive left turn movement. The lateral offset between travel lanes and the crosswalk provided sufficient space for the vehicle to slow and yield to the pedestrian, otherwise this may have been a higher risk event.

# Key Issues and Recommendations

Key Issue	Recommendation
<p><b>Pedestrian Safety:</b></p> <ul style="list-style-type: none"><li>• There is a very high volume of pedestrians crossing the intersection due to its proximity to several points of interest (Halifax Citadel, public gardens, commercial establishments along Spring Garden, etc.).</li><li>• 2 pedestrian collisions were recorded in the collision data, involving a westbound-right vehicle and a southbound-left vehicle</li><li>• Nearly 40 conflicts were detected for pedestrians, generally including turning vehicles.</li><li>• Southbound right has a fairly high turn radius, allowing vehicles to complete their turns at higher speeds.</li><li>• There are several uncontrolled pedestrian crosswalks and midblock crossing desire lines along Spring Garden, east of the intersection.</li><li>• Considering the above, general improvements to pedestrian safety and visibility would be valuable at this location.</li></ul>	<p>Include ped countdowns all 4 crossings if not yet done.</p> <p>Add LPIs to any crosswalks that do not have them (from Google, it appears that the north crosswalk has an LPI).</p> <p>Restrict RTOR</p> <p>Reduce operating speed to 30 to 40 km/h due to multimodal nature of corridor.</p> <p>Provide centerline median hardening using vertical delineator posts to calm through and left turn speeds.</p> <p>Consider low cost curb extensions using vertical delineator posts that further reduce right turn radius.</p> <p>Consider left turn prohibitions or protected only left turns in areas like this with high pedestrian activity.</p>



# Key Issues and Recommendations

Key Issue	Recommendation
<p><b>Cyclist Safety:</b></p> <ul style="list-style-type: none"><li>• 1 conflict with a cyclist was detected, involving a north-left vehicle. The December cyclist volumes were low and may not be indicative of typical volumes at the intersection.</li><li>• The green painted pavement markings and bike boxes improve the visibility of cyclists crossing the intersection.</li><li>• However, the bike lane is placed adjacent to vehicle turn lanes with no lateral or physical separation between vehicles driving at a 50 km/h posted speed limit (cyclists impacted by a vehicle at this speed have a &gt;80% chance of severe injury). Several conflict clips with pedestrians showed vehicles initiating their turns prior to recognizing a present VRU. These vehicles typically encroached on the bike lane before yielding.</li><li>• Safety improvements to slow turning vehicles and further improve cyclist visibility would be valuable if this intersection is more utilized by cyclists in the warmer months.</li></ul>	<p>Suggestions for pedestrians are also applicable to mitigate cyclist risks.</p> <p>The issue of permissive left turn vehicles pausing in the bike lane to yield to pedestrians after clearing opposing vehicular travel lanes can only be solved by left turn prohibition, protected only left turns, or further increasing the crosswalk setback (and we would not recommend the latter).</p>

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