

Quinpool Rd and Oxford St

MicroTraffic Video Diagnostic Findings and Recommendations

Contents



Intersection Overview



Collision Analysis



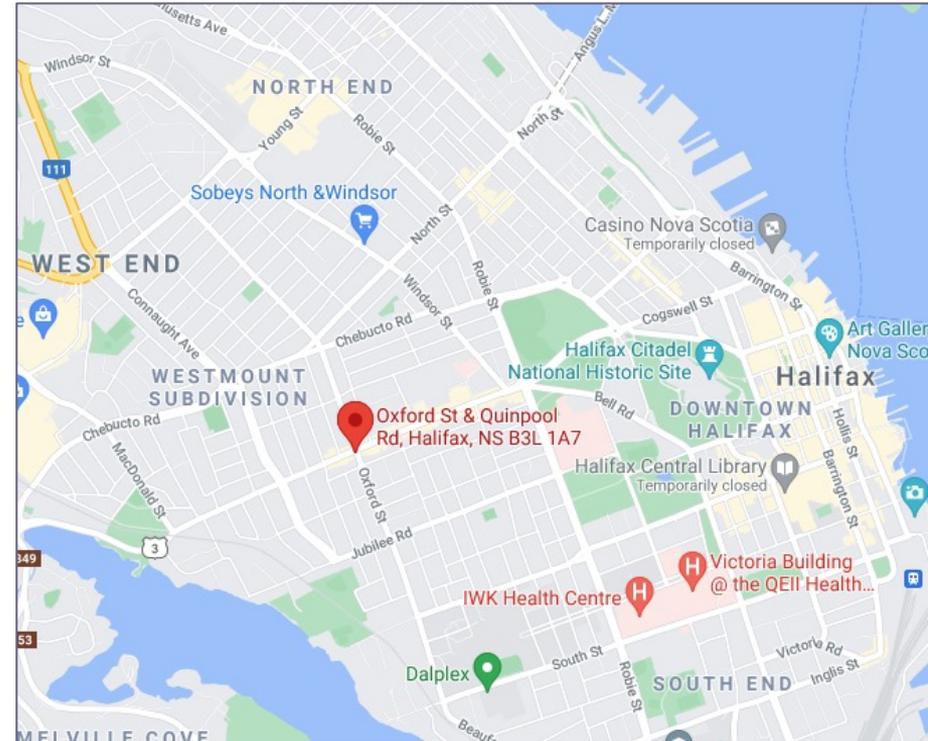
Video Conflict Analysis



Key Issues and Recommendations

Intersection Overview

- Quinpool Rd and Oxford St is located west from downtown Halifax.
- Quinpool Rd (Highway 3) provides access southeast from the Armdale Roundabout towards the Halifax Citadel. Oxford St extends north from Dalhousie University towards the West End.
- The land use directly surrounding the intersection is mixed, with commercial establishments along Quinpool Rd, and single- and multi-family residential areas beyond this.
- Video analytics indicates that the intersection is used by approximately 180 cyclists, 3835 pedestrians and 28,500 vehicles per day (from 5:00-24:00). Note that the counts were completed in November when VRU volumes may be depressed.



Quinpool Rd. Looking West



Quinpool Rd. Features:

- Two through lanes in each direction
- Far side bus stop westbound and eastbound
- 50 km/h posted speed limit (assumed)
- Three signal heads EB and WB with no reflective back plates. One signal head is cantilevered over the lane in each direction.
- Pedestrian countdown timers
- Eastbound/Westbound left turns not permitted from 4pm-6pm Monday to Friday. Otherwise, permissive-left turn signalization.
- Right turn on red is not restricted
- Sidewalks on both sides of the road.
- Hydro poles located <0.5m away from the roadway
- Petro-Canada accesses close to the intersection (NE quadrant)

Oxford St. Looking North



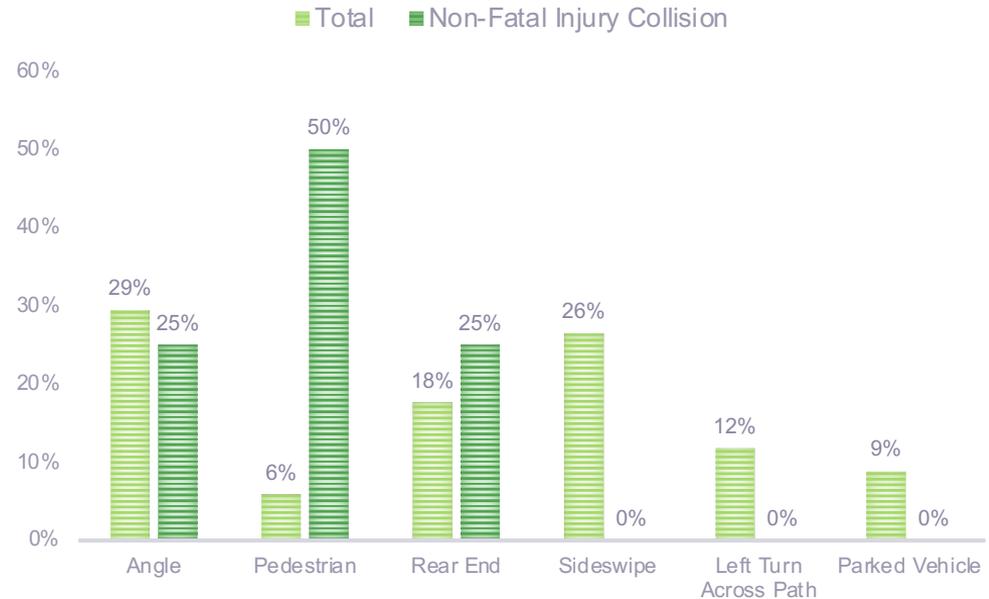
Oxford St. Features:

- Two through lanes NB (transitions to one lane north of the intersection). Two approaching through lanes SB, but only one receiving lane (~6m in width). No lane designation signs (pavement markings may have been present but faded in Google Streetview).
- 50 km/h posted speed limit
- Pedestrian countdown timers
- Two signal heads each NB and SB (cantilevered over lane in NB direction only)
- No reflective back plates on signals
- Southbound left turns not permitted from 4pm-6pm Monday to Friday. Otherwise, permissive-left turn signalization.
- Protective/permissive left turn signalization for NBL
- Sidewalks on both sides of the road
- Hydro poles and trees located <0.5m away from the roadway
- Nearside transit stop NB and farside transit stop SB
- Right turn on red is not restricted
- Petro-Canada accesses close to the intersection (NE quadrant)

Collision Analysis

- The provided collision data included 34 collision records from January 1, 2018 to April 12, 2021. Of the 34 records, 12% were classified as non-fatal injury collisions and 88% 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 50% (2 events) of the non-fatal injury collisions. The pedestrian collisions involved a westbound-through vehicle (midblock crossing) and a northbound-through vehicle (nearside); both events list that the pedestrians were crossing without the right-of-way.
- Angle collisions represent 29% (10) of total collisions. Two angle events include vehicles turning left from the gas station access. Three of the through vs through angle impact events list that the westbound vehicle ran the red light.
- Rear End collisions represent 18% of total collisions and 25% of the non-fatal injury collisions. Of the known directions, the distribution was 20%, 20% and 60% for Eastbound, Westbound and Northbound respectively.

Video Conflict Analysis – VEH-VEH

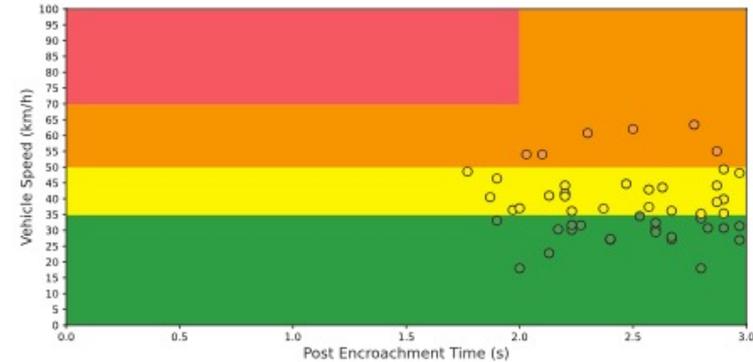
- 2 left-turning vs through from left conflicts were detected during the 57-hour analysis period (north-left vs east-through and south-left vs west-through).
- One through vs through right-angle conflict configuration was also detected (east-through vs north-through).
- These conflict types occurred at the end of a signal phase at relatively low through vehicle speeds.



East-through vs North-through: PET = 2.8s, vehicle speed 20 km/h
(low severity phase change clearance conflict)

Video Conflict Analysis – VEH-VEH

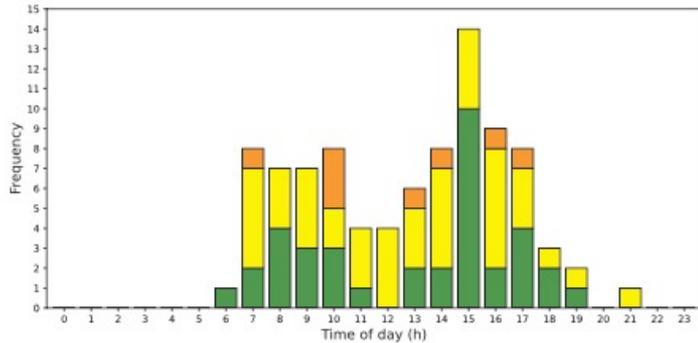
- Several left turn across path conflicts were detected during the 57-hour analysis period, as follows:
 - 90 North-Left vs South-Through conflicts
 - This movement is protected-permissive
 - 44 South-Left vs North-Through conflicts
 - 17 East-Left vs West-Through conflicts
 - 50 West-Left vs East-Through conflicts
- EBL, WBL and SBL turns are not permitted from 16:00 – 18:00 from Monday-Friday. Otherwise, these have permissive-only signalization.



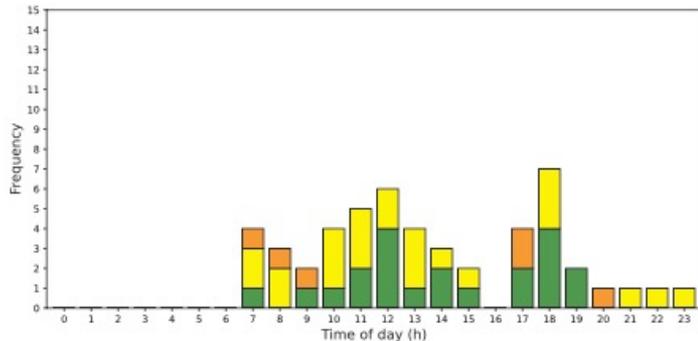
West-left vs East-through conflict data shows several conflicts occurring with through vehicle speeds exceeding the 50 km/h posted speed limit (up to 65 km/h).

At impact speeds of 50 km/h, opposing drivers have a 40% chance of a severe injury (MAIS 3+), which increases to >75% at 65 km/h.

Video Conflict Analysis – VEH-VEH



North-Left vs South-Through hourly temporal distribution



West-Left vs East-Through hourly temporal distribution

| | NBL | SBL | WBL | EBL |
|---|-----|-----|-----|-----|
| Left turns completed from 16:00-18:00 (obtained from 24-hour TMC on Nov. 20, 2020) | 407 | 21* | 11* | 9* |
| LTAP conflicts detected from 16:00-18:00 on 2 weekdays (Nov. 19-20, 2020) | 17 | 3 | 4 | 1 |
| * EBL, WBL and SBL turns are not permitted from 16:00 – 18:00 from Monday-Friday. This table shows compliance problems and related risks. | | | | |

Video Conflict Analysis – VEH-VEH



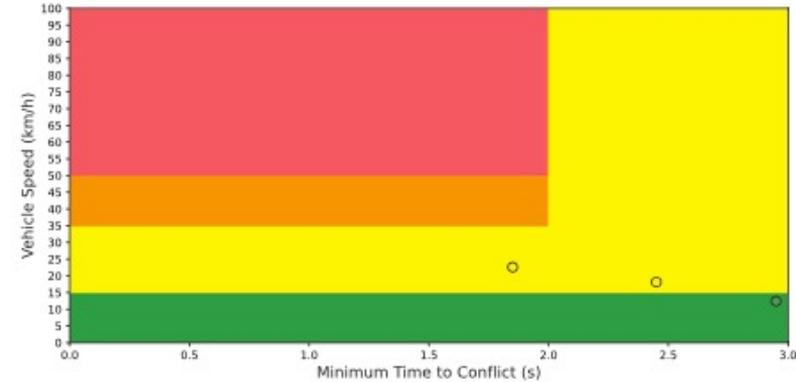
East-left vs West-through: PET = 1.8, vehicle speed 36 km/h



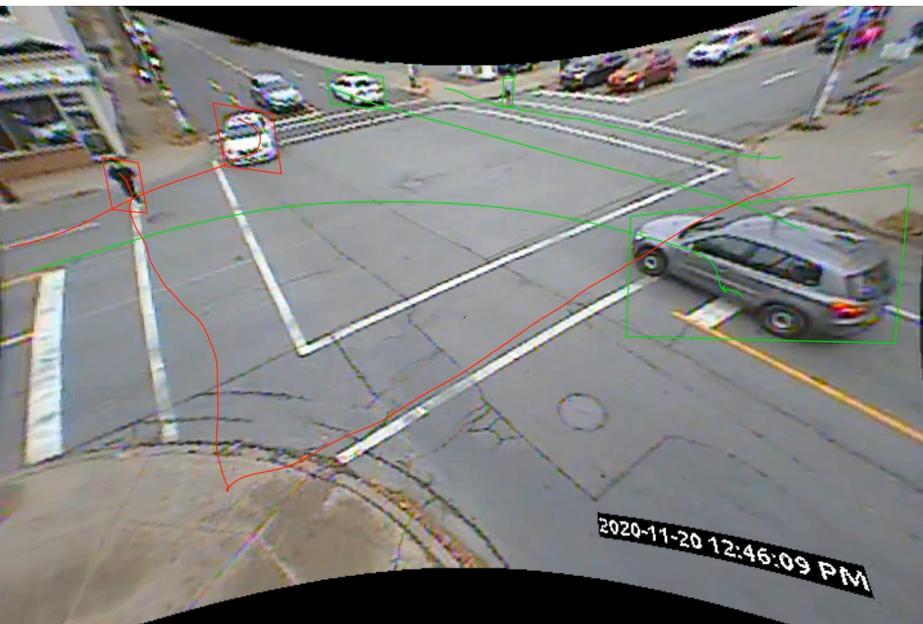
North-left vs South-through: PET = 2.5s, vehicle speed 52 km/h

Video Conflict Analysis – VEH-VRU

- 2 cyclist conflicts were detected during the 57-hour analysis period:
 - 1 North-Left Hook conflict
 - 1 North-Through Far-side conflict
- Several pedestrian conflicts were detected during the 57-hour analysis period, as follows:
 - 2 North-Left Hook conflicts
 - 2 East-Left Hook conflicts
 - 3 South-Left Hook conflicts
 - 5 South-Right Hook conflict
 - 1 West-Left Hook conflict
- The VRU conflicts generally occurred throughout the day from 7:00-16:00



Pedestrian South-Left Hook conflict data shows conflicts occurring with through vehicle speeds of nearly 25 km/h. At impact speeds of 25km/h, pedestrians have a ~15% chance of a severe injury (MAIS 3+).



Pedestrian South-Right Hook: $T_2 = 1.8$, vehicle speed 14 km/h

The building on the NW quadrant is close to the corner of the intersection and may restrict the sightline between SB drivers and EB pedestrians. In this conflict event, the pedestrian emerged from behind the building just prior to stepping onto the roadway. This event may have been higher risk if the vehicle was moving faster and the driver was not paying close attention.



Pedestrian South-Left Hook: $T_2 = 1.9s$, vehicle speed 23 km/h

The SBL driver quickly initiated their permissive left turn to beat the transit bus, coming in close conflict with a pedestrian crossing with the right-of-way. This situation would benefit from a leading pedestrian interval (LPI).



Cyclist Northbound Far-side: T2 = 1.6, vehicle speed 17 km/h

The cyclist maintained a dominant lane position to perform a SBL turn and came in close conflict with a vehicle maneuvering around the NBL vehicle. Due to the negative left turn offset, it is more difficult to detect oncoming road users.



Pedestrian(Skateboarder) East-Left Hook:
T2 = 2.4s, vehicle speed 11 km/h

The EBL driver initiated the left-turn without checking for crossing pedestrians. The driver yielded to the skateboarder and waited in opposing travel lanes, coming in conflict with a westbound oncoming vehicle.

The diagonal curb ramp directed the skateboarder into the intersection.

Key Issues and Recommendations

| Key Issue | Recommendation |
|--|--|
| <p>VRU Safety:</p> <ul style="list-style-type: none">• Approximately 3850 pedestrians were observed crossing the intersection in a 24 – hour period in November. More than 1000 trips were made across the North and South crosswalks.• Two pedestrian collisions were recorded since 2018 and a wide range of conflict types were detected during the 57-hour analysis period, including all 4 left hook movements. Some conflict clips indicate that permissive left turning drivers did not initially observe pedestrians crossing with the right-of-way and encroached on their crossing area.• Sightlines between drivers and VRUs are limited for SBR due to a building close to the intersection.• Diagonal curb ramps direct pedestrians with mobility aids and skateboarders into the intersection. <p>General improvements to pedestrian visibility at the crossing would be valuable, especially considering the high volume of pedestrians and the detected conflict events.</p> | <ul style="list-style-type: none">• It seems like Quinpool would be a good candidate for a complete streets / AT-supportive road diet with ADT approximately 17,000.• Directional curb ramps with tactile (consider as systemic treatment in HRM)• Zebra crossing markings• Right turn on red restrictions• Leading Pedestrian Interval• Reduction of speeds in this multimodal commercial corridor – ideally to 40 km/h or below posted limit and operating speed. |

Key Issues and Recommendations

| Key Issue | Recommendation |
|--|--|
| <p>Left Turn Across Path (LTAP):</p> <ul style="list-style-type: none">• LTAP collisions represent 12% of all collisions.• 201 LTAP conflicts were detected during the 57-hour analysis period. NBL vs SBT is the most prominent conflict configuration.• There is a negative offset, resulting in reduced visibility for left-turning vehicles, especially when facing established opposing left-turning vehicles.• Left turns are restricted for SBL, WBL and EBL during weekdays from 4:00-6:00pm. Several turn violations were detected in the TMC counts and conflicts were detected during these hours. High conflicts were also detected in adjacent hours.• SBL had the highest number of violations. The violations may result from drivers being unaware of the turn restrictions. There is not a cantilevered signal head with a no left turn sign prominently displayed for the southbound drivers. | <ul style="list-style-type: none">• Extend turn restriction to 7 PM.• Improve turn restriction signage to include left-hand far side.• Speed management or road diet mentioned on previous slide for VRUs will reduce this risk also, and road diets more easily allow for protected permissive phasing as needed. |
| <p>Angle Collisions:</p> <ul style="list-style-type: none">• Angle collisions make up ~30% of all collisions. Three of the through vs through angle collisions record that a WB vehicle ran the red light. General improvements to signal visibility would be valuable.• Two angle collisions included vehicles turning left from the Petro Canada in the NE quadrant close to the intersection. Conflicts related to this were not within the camera field of view and were not monitored. | <ul style="list-style-type: none">• Reflective backplates.• Add cantilevered SB signal head in addition to low side-mounted signals.• Consider restricting left turn exits from gas station during same times that intersection left turns are prohibited due to low headways. |

Key Issues and Recommendations

| Key Issue | Recommendation |
|--|---|
| <p>Rear Ends:</p> <ul style="list-style-type: none">• Rear End collisions represent 18% of all collisions, the majority of these are in the Northbound direction• The nearside transit stop is right at the intersection and when a loading bus is combined with a NBL vehicle waiting for a turn opportunity, the NB through movements become completely blocked. Unexpected stoppages on a green light may result in rear ends or cause driver frustration/aggression. | <ul style="list-style-type: none">• Check feasibility of moving transit stop to far side. |

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