Chebucto Rd and Oxford St

MicroTraffic Video Diagnostic Findings and Recommendations

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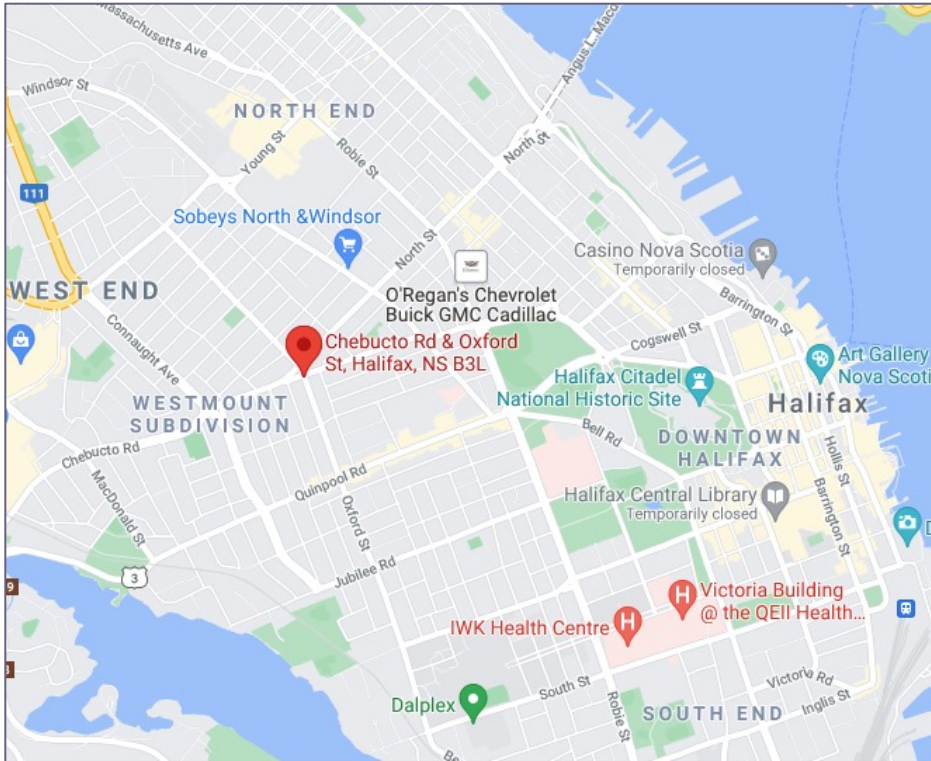
Intersection Overview

- Chebucto Rd and Oxford St is located near the West End, west from downtown Halifax.
- Chebucto Rd provides access east from the Armdale Roundabout. Oxford St extends north from Dalhousie University towards the West End.
- Less than 50m north of Chebucto Rd is the intersection at Oxford and North St.
- The land use directly surrounding the intersection is single-family residential in the SW and SE quadrants, with a park in the NW quadrant and a school with recreational courts on the NE quadrant.
- Video analytics indicates that the intersection is used by approximately 60 cyclists and 525 pedestrians (from 7:00 – 17:00), as well as 18,300 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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Chebucto Rd. Looking West

Chebucto Rd. Features:

- Eastbound: One through lane and one right turn auxiliary lane
- Westbound: One through lane
- Driveway accesses close to the intersection (south side of the road)
- Far side bus stop westbound and eastbound
- 50 km/h posted speed limit, 30 km/h when children present
- Two signal heads EB and WB with no reflective back plates – at same elevation and relatively low.
- Pedestrian countdown timers
- Eastbound left turns not permitted, westbound left turns are permissive only signalization
- Right turn on red is not restricted
- Narrow diagonal crosswalk curb cuts (NE, SW, SE) with no tactile surfaces.
- Sidewalks on both sides of the road east of the intersection and south side only west of the intersection.
- Hydro poles and trees located <0.5m away from the roadway
- Pedestrian corridor ~70m east of the intersection

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Oxford St. Features:

- Two through lanes NB/SB
- Adjacent intersection (at North St) is ~30m to the north.
- 50 km/h posted speed limit, 30 km/h when children present
- According to July 2019 Google Streetview, no pedestrian countdown timers (NB/SB)
- Two signal heads each NB and SB (cantilevered over lane in SB direction only)
- No reflective back plates on signals
- Left turn signalization: permissive only
- Sidewalks on both sides of the road with boulevard separation
- Hydro poles and trees located <0.5m away from the roadway
- Right turn on red is not restricted
- Driveway accesses close to the intersection (south of the intersection)

Oxford St. Looking North

Several signs are clustered near the intersection, which may overload drivers and cause them to miss key information (30 km/h speed limit, no left turn, right turn only). Important 30 km/h school zone speed sign has small font and is placed low on the pole and may be outside the primary line of sight for drivers.

Sightlines to VRUs-
Above: Poor sightline between northbound vehicles and westbound approaching vulnerable road users due to vegetation and house close to the intersection.

Left: There is also a reduced sightline between eastbound vehicles and the south crosswalk (hydro pole) and pedestrians approaching from the south.

The school zone begins at the start of Chebucto (at Windsor St). and ends after Oxford.

Two schools, two music schools and a community center are located along this portion of Chebucto.

No additional signage is placed to remind drivers of reduced speed limits and small font is is used on the 30 km/h sign.

At speeds of 50 km/h, there is a >80% chance of severe injury to a pedestrian (MAIS 3+).

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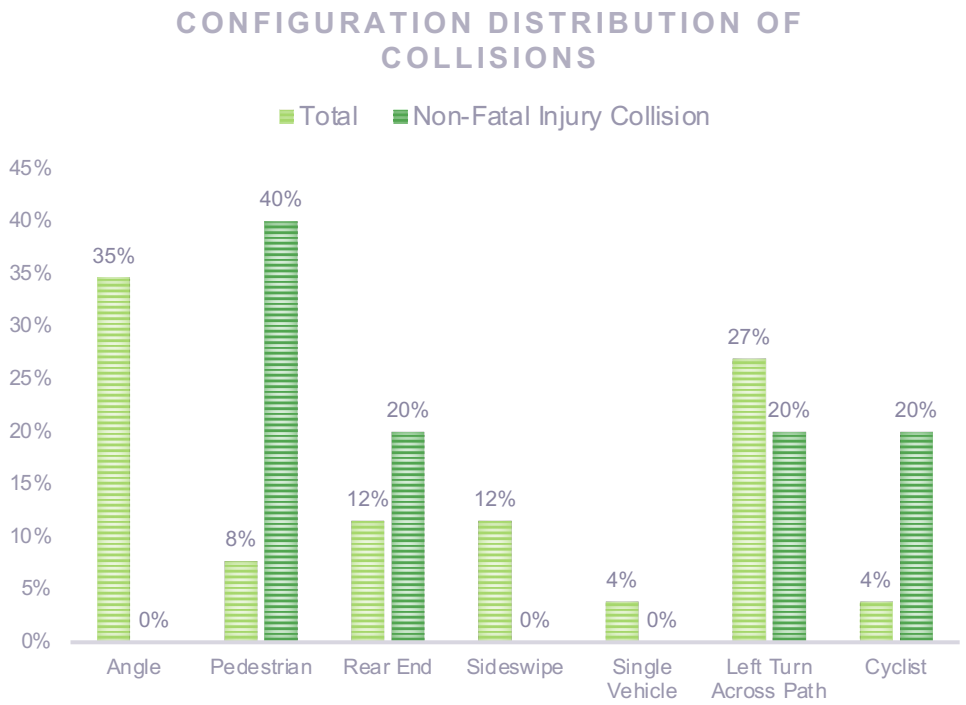
Collision Analysis

- The provided collision data included 26 collision records from January 1, 2018 to April 12, 2021. Of the 26 records, 19% were classified as non-fatal injury collisions and 81% as property damage only collisions.
- Collisions with cyclists that were listed as property damage only were modified to non-fatal injury collisions.
- 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 40% (2 events) of the non-fatal injury collisions. The pedestrian collisions involved a southbound-left vehicle and a southbound-through vehicle (nearside); both events list that the pedestrians were crossing without the right-of-way. The 1 cyclist collision included a southbound-left vehicle.
- Left turn across path collisions represent 27% (7) of total collisions and 20% (1) of the non-fatal injury collisions. The direction distribution is 14%, 14%, and 71% for Westbound-left, Southbound-left, and Northbound-left respectively.
- Angle collisions represent 35% of total collisions. Red light running was listed as a contributing factor for every event that involved two through vehicles. The red light running vehicles were in the eastbound direction (5), the westbound direction (2) and the southbound direction (1).

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Video Conflict Analysis – VEH-VEH

- 2 left-turning vs through from left conflicts were detected during the 47-hour analysis period (north-left vs east-through and south-left vs west-through).
- These conflict types typically occur at the end of a signal phase at relatively low through vehicle speeds.
- No through vs through right-angle conflict configurations were detected during the 47-hour observation period.

South-left vs West-through: PET = 3.0s, vehicle speed 25 km/h
(low risk conflict)

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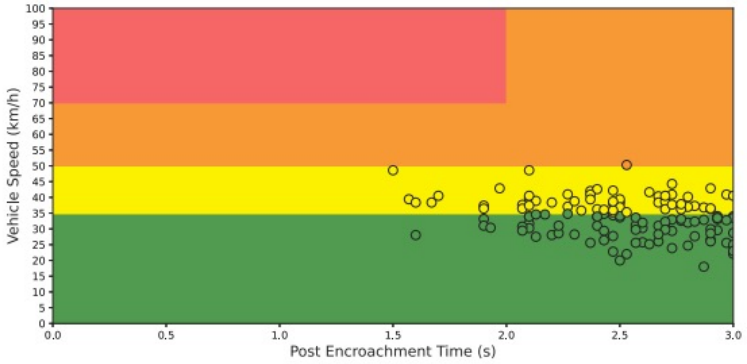
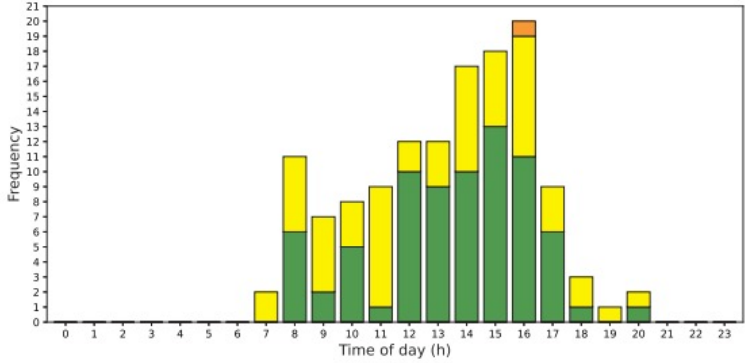
Video Conflict Analysis – VEH-VEH

- Several left turn across path conflicts were detected during the 47-hour analysis period, as follows:
  - 131 North-Left vs South-Through conflicts
  - 36 South-Left vs North-Through conflicts
  - 27 West-Left vs East-Through conflicts
- East-Left turns are not permitted and this movement was not measured. According to the 24-hour TMC counts, 4 vehicles violated this signage and completed EBL turns.
- The signalization is permissive-only for NBL, SBL and WBL.
- When comparing the conflict rates of LTAP movements to benchmark values for similar sites across North America, left-turning drivers at Chebucto and Oxford are 2.0x,1.6x and 2.6x more likely to be involved in a low-risk (or higher) conflict event for NBL, SBL and WBL respectively.
- Most LT conflicts here are not high risk to vehicle occupants due to low speeds but the conflicts do interfere with focus on pedestrians.



North-left vs South-through data shows a high frequency of detected conflicts over a 47-hour period. The temporal plot indicates that the maximum number of events occurred from 2:00-4:00pm, when students are typically released from school.

Several conflicts were detected at speeds exceeding the 30 km/h school zone speed limit during school hours (see yellow in temporal plot below).



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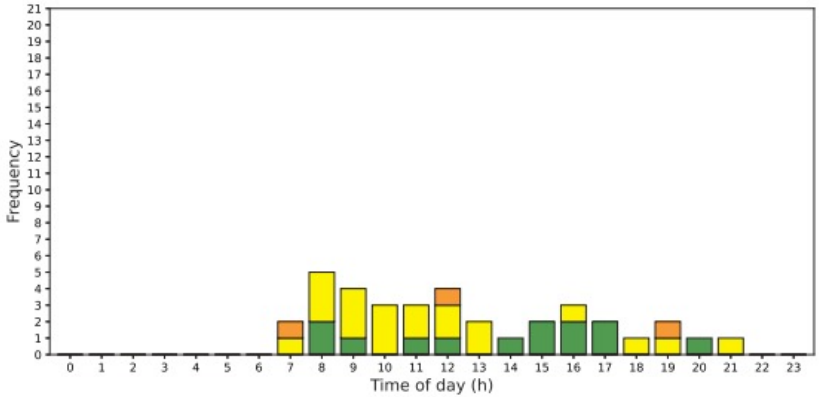
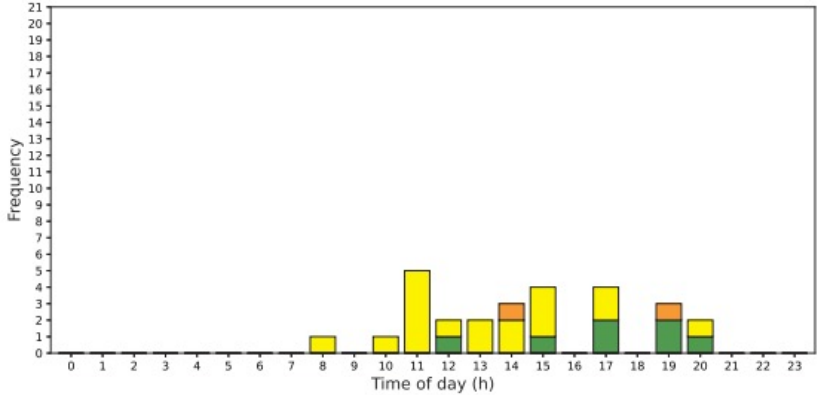
Video Conflict Analysis – VEH-VEH (LTAP)

- South-left vs North-through (left) and West-left vs East-through (right) conflicts are distributed throughout the day. Several are occurring at impact speeds > 35 km/h (yellow) and >50 km/h (orange).
- At impact speeds of 50 km/h, opposing drivers have a 40% chance of a severe injury (MAIS 3+).





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Video Conflict Analysis – VEH-VEH (LTAP)

North-left vs South-through: PET = 2.5s, vehicle speed 50 km/h

South-left vs North-through: PET = 2.0s, vehicle speed 54 km/h

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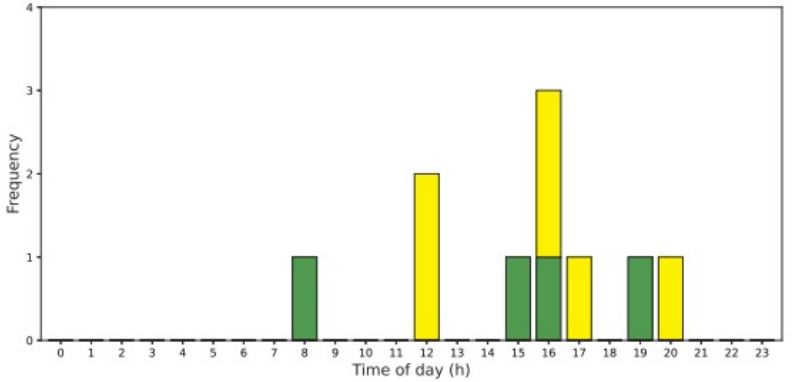
Video Conflict Analysis – VEH-VRU

- Near-side conflicts were not measured due to camera placement and limited approach view. East-left hook conflicts were not measured due to the restricted movement.
- Several cyclist conflicts were detected during the 47-hour analysis period, as follows:
  - 8 North-Left Hook conflicts
  - 1 West-Right Hook conflict
- Several pedestrian conflicts were detected during the 47-hour analysis period, as follows:
  - 10 North-Left Hook conflicts
  - 2 East-Right Hook conflicts
  - 1 West-Right Hook conflict



Pedestrian North-Left Hook conflict data shows a distribution of events throughout the day. Several medium-risk conflicts were detected (vehicle impact speed > 15 km/h).

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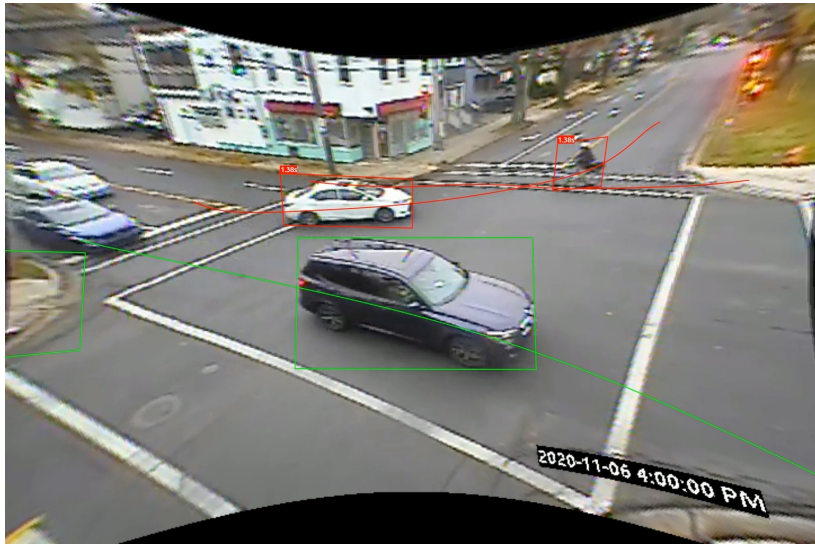
Video Conflict Analysis – VEH-VRU (North-Left Hook)

- A relatively low volume of cyclists were recorded in the exposure counts (<20 per crossing). Despite this, 8 north-left hook cyclist conflicts were detected during the 47-hour analysis period. Nearly 7% and 11% of all cyclists using the west crossing were involved in medium-risk and low-risk north-left hook conflicts, respectively.
- 10 north-left hook pedestrian conflicts were detected during the analysis period. 1.5% of all pedestrians using the west crossing were involved in a medium-risk conflict.
- Conflict events with vehicle impact speeds exceeding 20 km/h were detected. At these speeds VRUs have a >10% chance of a severe injury (MAIS 3+).
- The VRU conflicts were distributed throughout the day from 8:00am – 20:00pm.



Cyclist North-Left Hook: T2 = 1.4s, vehicle speed = 16 km/h

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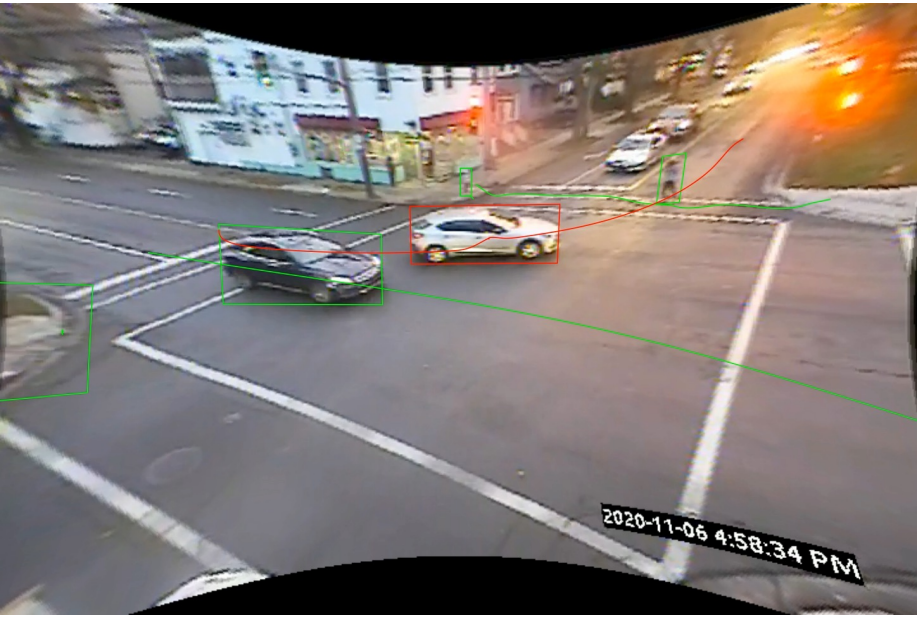

Pedestrian North Left-Hook: T2 = 2.9s, vehicle speed 13 km/h

The driver initiated the left-turn without checking for crossing pedestrians. Delay from the pedestrian crossing with the right-of-way resulted in a conflict event with an oncoming southbound through vehicle.

Pedestrian West Right-Hook: T2 = 2.9s, vehicle speed 9 km/h

Low light conditions and low contrast sensitivity make pedestrians harder to detect by drivers.

Vegetation interferes with street light and casts shadow on crossing area at NE quadrant

Key Issues and Recommendations

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Key Issue	Recommendation

VRU Safety:
• An elementary school is located on the NE quadrant, indicating that young pedestrians may be cycling or walking across the intersection.
• Sightlines between drivers and VRUs are limited at some locations due to buildings and vegetation (EBR and NBR).
• Previous collision data records 2 southbound-left hook collisions and 1 southbound-through collision.
• Conflict data indicates clusters of VRU north-left hook conflicts for PED/CYC, as well as a few east-right and west-right hook conflicts.
• 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.
• Several conflicts were detected at speeds greater than 30 km/h. The 30 km/h school zone signs are infrequently placed and may be missed by drivers due to other sign clutter and low placement on pole (especially for trucks).
 	
General improvements to pedestrian visibility at the crossing would be valuable, especially considering the young pedestrian use and surrounding residential areas.
	• Improve emphasis on 30 km/h school zone
	  • More signs with larger font
	  • Speed feedback signs
	  • 24-7 applicability vs ambiguous 'when children present'
	• Physical calming measures
	• Added speed signs or feedback signs along Chebucto
	• Add NB/SB ped countdown timers
	• Check illumination levels for compliance with TAC 2006 Guide, and in particular trim interfering vegetation on NE quadrant.
	• Consider restricting right turn on red and introducing leading pedestrian interval.
	• Add zebra crosswalk markings.

Key Issues and Recommendations

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Key Issue	Recommendation
Left Turn Across Path (LTAP): • LTAP collisions make up nearly 30% of all collisions. NBL vs SBT is the most prominent configuration. • 194 LTAP conflicts were detected during the 47-hour analysis period. NBL vs SBT is also the most prominent conflict configuration. • North-Left turning vehicles were involved in nearly 20 conflict events with VRUs.	• NBL could be considered for protected or protected-permissive phasing. Primary goal would be reducing chance of secondary conflicts with VRUs. • Alternatively, the VRU strategies on previous slide may be sufficient.
Red light running: • Angle collisions make up 35% of all collisions. Red light running was listed as a contributing factor for every event that involved two through vehicles (primarily in EB and WB directions). • No through vs through conflicts were detected in the 47-hour analysis period, but general improvements to signal visibility would be valuable. • The signals do not have a reflective backplate and are not cantilevered over the travel lane. Sunlight glare may cause signal perception failure at certain times of day.	• Cantilever arm on signals • Signal back plates with reflective edge • Provide signals at higher elevations and more than one elevation, especially in EB and WB directions

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