

# 1184-1196 Cummings Avenue Transportation Impact Assessment

Step 1 Screening Report

Step 2 Scoping Report

Step 3 Forecasting Report

Step 4 Strategy Report

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# 1 Screening

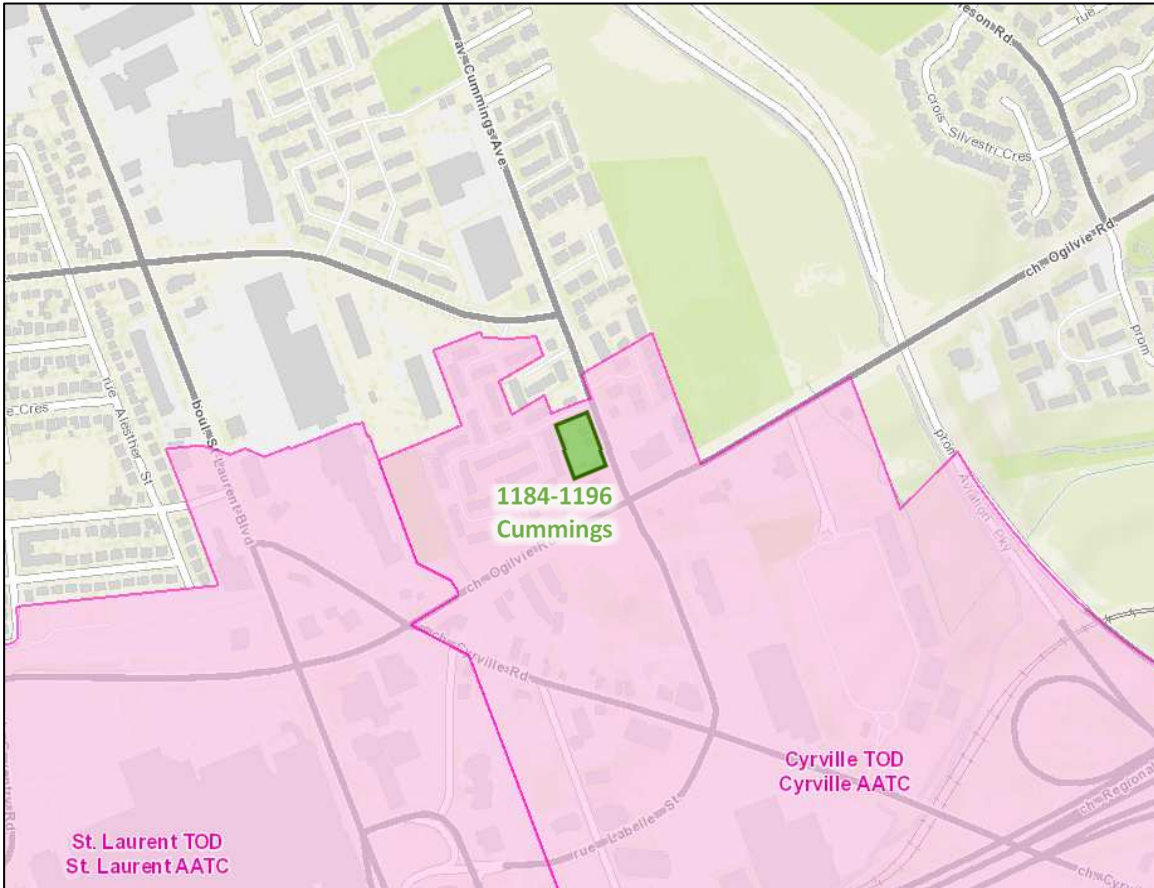
This study has been prepared according to the City of Ottawa’s 2017 Transportation Impact Assessment (TIA) Guidelines. Accordingly, a Step 1 Screening Form has been prepared and is included as Appendix A, along with the Certification Form for the TIA Study PM. As shown in the Screening Form, a TIA is required including the Design Review component and the Network Impact Component. This study has been prepared to support a zoning bylaw amendment and site plan applications.

# 2 Existing and Planned Conditions

## 2.1 Proposed Development

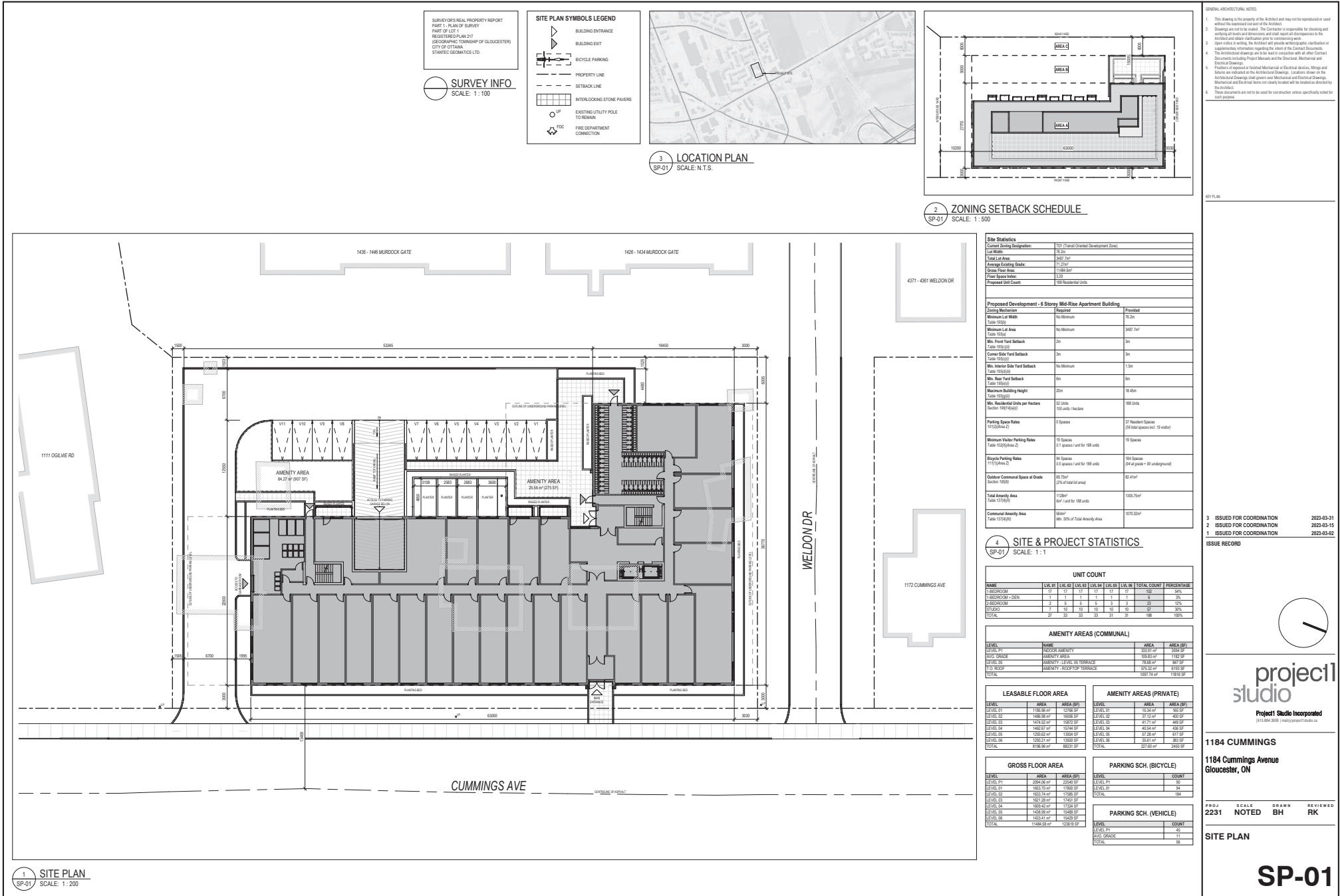
The development site is located at 1184, 1186 and 1196 Cummings Avenue, and it is zoned as Residential Third Density Zone (R3Y[708]). The development is proposed to redevelop existing residential units into a mid-rise apartment building totalling 188 units with 37 residential parking spaces, 19 visitor parking spaces, and 184 bicycle parking spaces. The proposed development will remove the existing site accesses on Cummings Avenue and propose a new access on at the south end of the site. The anticipated full build-out and occupancy horizon is 2026. The development site is within the Cyville TOD area and Inner East Lines 1 and 3 Stations secondary plan area. Figure 1 illustrates the study area context. Figure 2 illustrates the proposed concept plan.

Figure 1: Area Context Plan



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: March 3, 2023

Figure 2: Concept Plan



## 2.2 Existing Conditions

### 2.2.1 Area Road Network

*Cummings Avenue:* Cummings Avenue is a major collector road between Ogilvie Road and Donald Street, and north of Donald Street is a collector road, each with a two-lane urban cross-section. South of Ogilvie Road, Cummings Avenue is a City of Ottawa arterial road with a two-lane semi-urban cross section, curbed on its east side. North of Ogilvie Road, sidewalks are present on both sides of the road and south of Ogilvie Road, a sidewalk is present on the east side of the road and a 1.5-metre-wide gravel shoulder is on the west side. The posted speed limit is 50 km/h and the City-protected right of way is 26.0 metres between Ogilvie Road and Donald Street, 24.0 metres north of Donald Street, and 37.5 metres south of Ogilvie Road. Cummings Avenue south of Donald Street is a truck route.

*Ogilvie Road:* Ogilvie Road is a City of Ottawa arterial road with a four-lane, divided urban cross-section with curbside bike lanes and sidewalks on both sides of the road. The posted speed limit is 60 km/h and the City-protected right of way is 44.5 metres within the study area. Ogilvie Road is a truck route.

*Cyrville Road:* Cyrville Road is a City of Ottawa two-lane roadway, classified as an arterial south of Cummings Avenue/Labelle Street and a collector road to the north. Between St. Laurent Boulevard and Ogilvie Road, the cross-section includes a curb with a sidewalk on the east side and is uncurbed on the west side. Between Ogilvie Road and Cummings Avenue/Labelle Street, the cross-section is fully urban and includes a sidewalk and curb-side bike lane on each side of the road. South of Cummings Avenue/Labelle Street, the cross-section transitions to an uncurbed condition and includes a paved shoulder and sidewalk on the west side of the road and a mixed-use path on the east side of the road separated by a concrete rumble strip. The posted speed limit is 60 km/h. The City-protected right of way is 37.5 metres south of Cummings Avenue/Labelle Street and the existing right of way varies between 18.0 metres and 23.0 metres within the study area. Cyrville Road is a truck route.

*Donald Street:* Donald Street is a City of Ottawa major collector road with a two-lane urban cross-section, with sidewalks and curbside bike lanes on both sides of the road between Belgate Way and Alesther Street. The posted speed limit is 50 km/h and the existing right of way is 26.0 metres. Donald Street is a truck route within the study area.

### 2.2.2 Existing Intersections

The existing signalized area key intersections within 400 metres of the site have been summarized below:

#### *Ogilvie Road at Cummings Avenue*

The intersection of Ogilvie Road at Cummings Avenue is a signalized intersection. The northbound approach consists of an auxiliary left-turn lane and a shared through/channelized right-turn lane, and the southbound approach consists of an auxiliary left-turn lane and a shared through/right-turn lane. The eastbound and westbound approaches each consist of an auxiliary left-turn lane, a through lane, a shared through/right-turn lane, and a bike lane. No turn restrictions were noted.

#### *Donald Street at Cummings Avenue*

The intersection of Donald Street at Cummings Avenue is a signalized intersection. The northbound approach consists of an auxiliary left-turn lane and a through lane, and the southbound approach consists of a shared through/right-turn lane. The eastbound approach consists of an auxiliary left-turn lane, and a right-turn lane. No turn restrictions were noted.

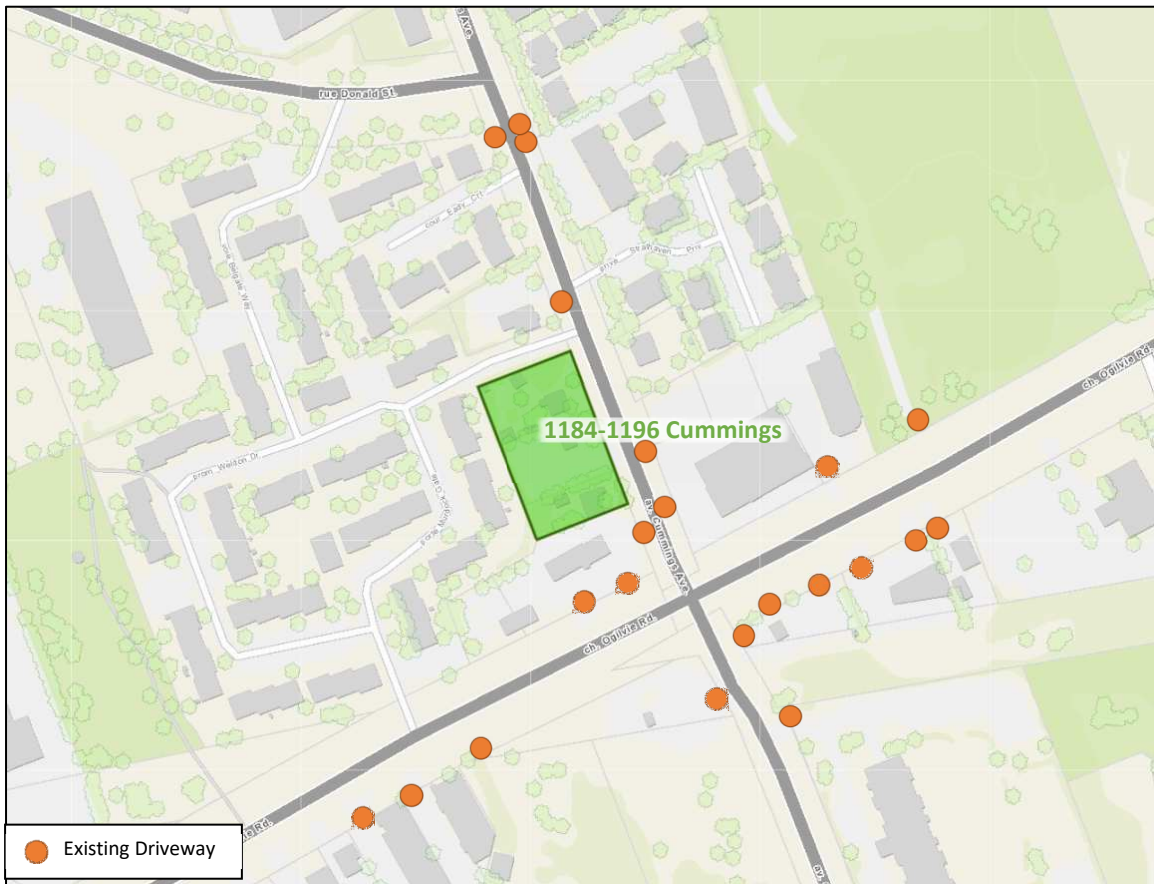
*Ogilvie Road at Cyrville Road*

The intersection of Ogilvie Road at Cyrville Road is a signalized intersection. The northbound approach of Cyrville Road consists of an auxiliary left-turn lane, a shared through/right-turn lane, and a bike lane and the southbound consists of an auxiliary left-turn lane and a shared through/channelized right-turn lane. The eastbound approach consists of two through lanes, a bike lane, and an auxiliary right-turn lane and the westbound approach consists of an auxiliary left-turn lane, two through lanes, a bike lane, and an auxiliary right-turn lane. Eastbound left turns are restricted at this intersection.

2.2.3 Existing Driveways

Within 200 metres of the site accesses, driveways to gas stations, restaurant land uses, attached and detached residential land uses, a vacant lot, and a mid-rise residential land use exist on Cummings Avenue. Driveways to gas stations, a vacant lot, a community center, retail plazas, restaurant land uses, and a park exist on Ogilvie Road. Figure 3 illustrates the existing driveways.

Figure 3: Existing Driveways



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: March 3, 2023

2.2.4 Cycling and Pedestrian Facilities

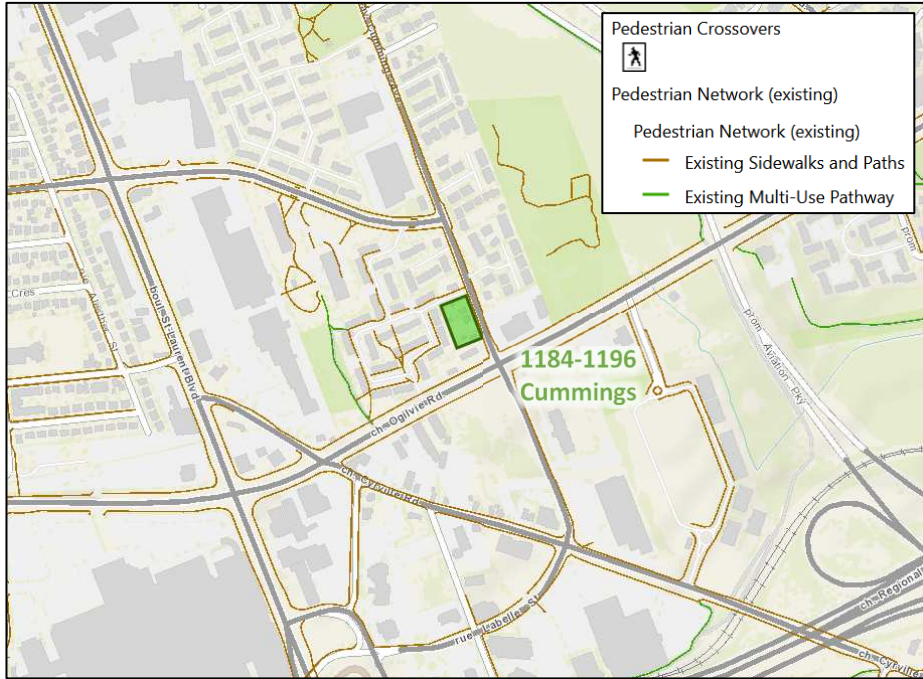
Figure 4 illustrates the pedestrian facilities in the study area and Figure 5 illustrates the cycling Facilities in the study area.

Sidewalks are provided along the east side of Cummings Avenue south of Ogilvie Road and both sides of Cyrville Road, Ogilvie Road, Donald Street, and Cummings Avenue north of Ogilvie Road.



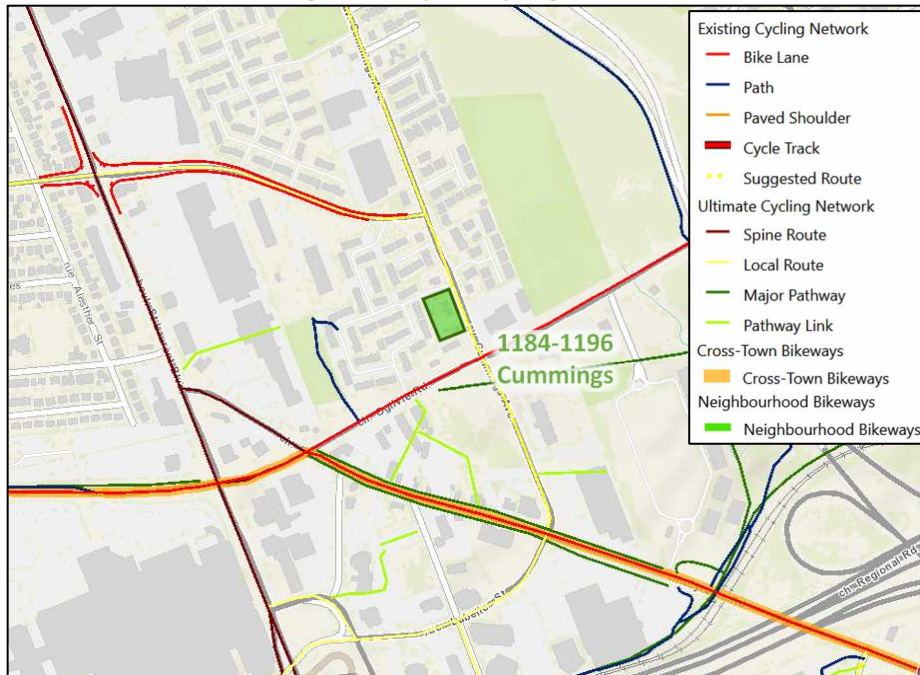
Cycling facilities include bike lanes along Cyrville Road south of Ogilvie Road, Ogilvie Road, and Donald Street. Within the ultimate cycling network, Ogilvie Road and Cyrville Road are spine routes and Donald Street and Cummings Avenue are local routes. Cyrville Road south of Ogilvie Road and Ogilvie Road west of Cyrville Road form part of a crosstown bikeway.

Figure 4: Study Area Pedestrian Facilities



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: March 3, 2023

Figure 5: Study Area Cycling Facilities



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: March 3, 2023

Pedestrian and cyclist volumes included in study area intersection counts, presented in Section 2.2.7, have been compiled and are illustrated in Figure 6 and Figure 7, respectively.

Figure 6: Existing Pedestrian Volumes

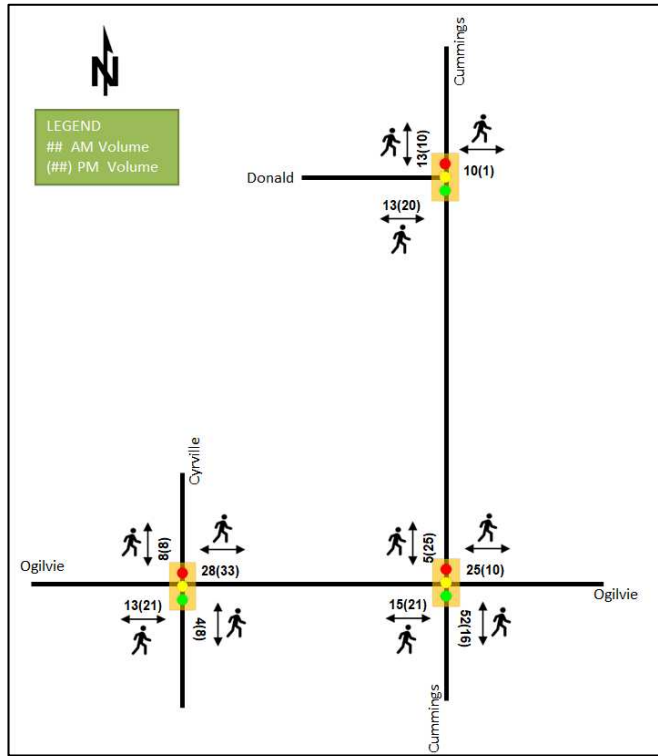
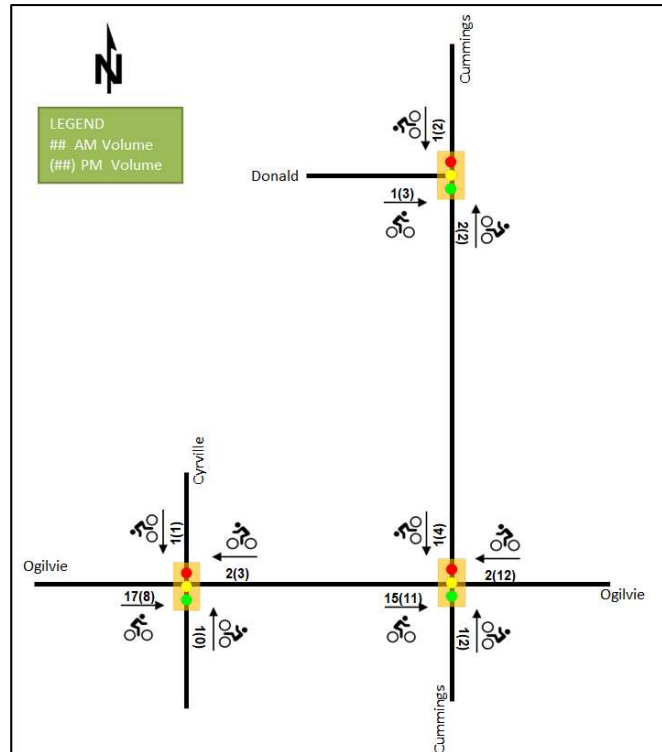


Figure 7: Existing Cyclist Volumes



2.2.5 Existing Transit

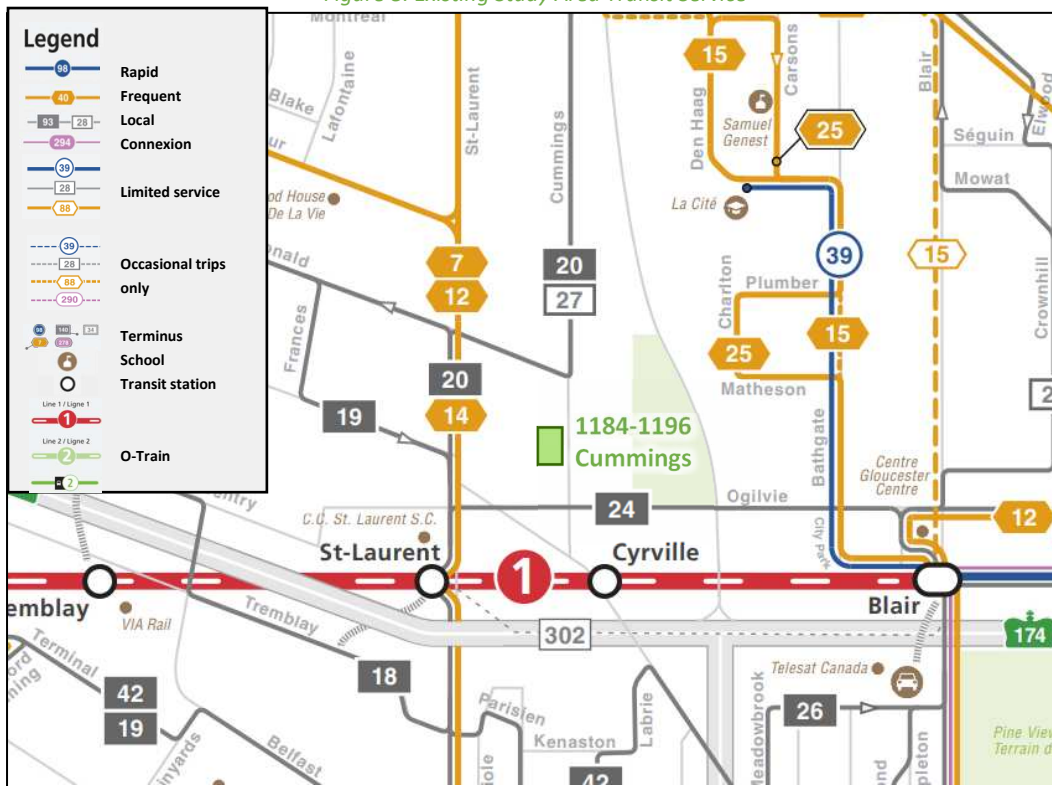
Figure 8 illustrates the transit system map in the study area and Figure 9 illustrates nearby transit stations and stops. All transit information is from March 3, 2023 and is included for general information purposes and context to the surrounding area.

Within the study area, routes #24 and #N39 travel along Ogilvie Road and routes #20 and #27 travel along Donald Street and Cummings Avenue to the north. The frequency of these routes within proximity of the proposed site based on March 3, 2023 service levels are:

- Route #20 – 30-minute service all day
- Route #24 – 15-minute service during peak hours, 30-minute service all day
- Route #27 – nine buses in each peak direction/period
- Route #N39 – seven-to-eight overnight buses per direction when the O-Train Line 1 does not run overnight

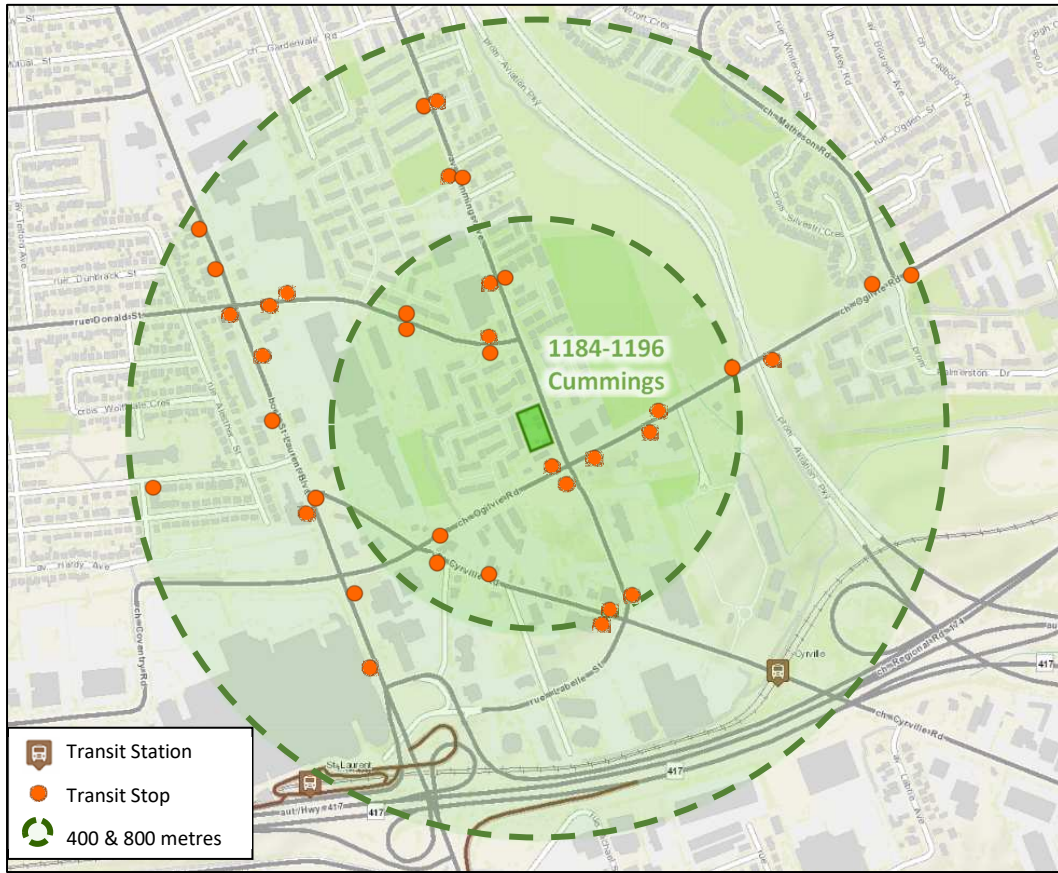
Additionally, the site is less than one kilometre walking distance to Cyrville Station, on the Confederation LRT Line.

Figure 8: Existing Study Area Transit Service



Source: <http://www.octranspo.com/> Accessed: March 3, 2023

Figure 9: Existing Study Area Transit Stations and stops



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: March 3, 2023

2.2.6 Existing Area Traffic Management Measures

There are no existing area traffic management measures within the study area.

2.2.7 Existing Peak Hour Travel Demand

Existing turning movement counts were acquired from the City of Ottawa for the existing study area key intersections. Table 1 summarizes the intersection count dates.

Table 1: Intersection Count Date

| Intersection                     | Count Date                |
|----------------------------------|---------------------------|
| Ogilvie Road at Cyrville Road    | Wednesday, April 11, 2018 |
| Donald Street at Cummings Avenue | Wednesday, April 11, 2018 |
| Ogilvie Road at Cummings Avenue  | Wednesday, April 11, 2018 |

Figure 10 illustrates the existing traffic counts and Table 2 summarizes the existing intersection operations. The level of service for signalized intersections is based on volume to capacity ratio (v/c) calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection. Detailed turning movement count data is included in Appendix B and the Synchro worksheets are provided in Appendix C.

Figure 10: Existing Traffic Counts

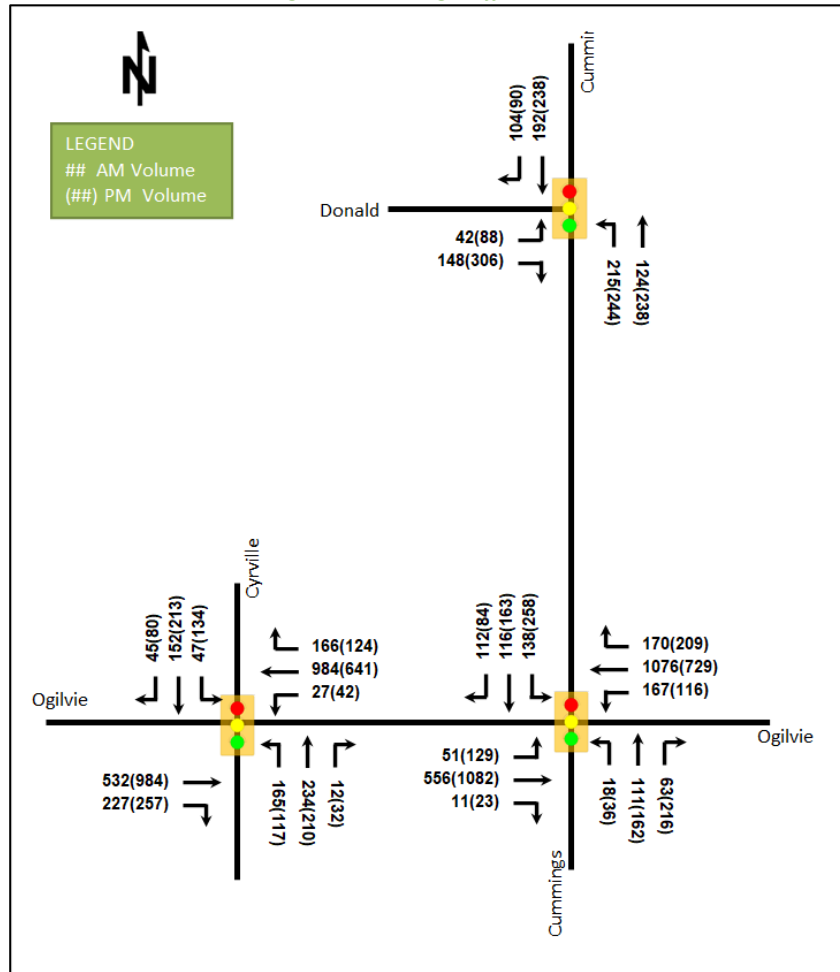


Table 2: Existing Intersection Operations

| Intersection                                      | Lane           | AM Peak Hour |             |             |                       | PM Peak Hour |             |              |                       |
|---|----------------|--------------|-------------|-------------|-----------------------|--------------|-------------|--------------|-----------------------|
|   |                | LOS          | V/C         | Delay (s)   | Q (95 <sup>th</sup> ) | LOS          | V/C         | Delay (s)    | Q (95 <sup>th</sup> ) |
| Ogilvie Road at<br>Cyrville Road<br>Signalized    | EBT            | A            | 0.28        | 10.7        | 49.3                  | A            | 0.51        | 13.3         | 105.7                 |
|   | EBR            | A            | 0.27        | 2.2         | 11.3                  | A            | 0.29        | 2.2          | 11.7                  |
|   | WBL            | A            | 0.07        | 3.3         | m0.9                  | A            | 0.20        | 22.6         | m8.5                  |
|   | WBT            | A            | 0.51        | 3.5         | 14.7                  | A            | 0.33        | 18.8         | m61.7                 |
|   | WBR            | A            | 0.20        | 0.3         | m0.0                  | A            | 0.15        | 9.7          | m11.3                 |
|   | NBL            | E            | 0.92        | <b>88.3</b> | <b>#65.1</b>          | <b>F</b>     | <b>1.05</b> | <b>138.2</b> | <b>#60.9</b>          |
|   | NBT            | B            | 0.65        | 46.8        | 75.8                  | B            | 0.65        | 46.0         | 73.6                  |
|   | SBL            | A            | 0.31        | 38.9        | 19.4                  | D            | 0.87        | <b>84.5</b>  | 54.2                  |
|   | SBT            | A            | 0.55        | 40.9        | 59.0                  | C            | 0.80        | 54.1         | 89.9                  |
| <b>Overall</b>                                    | <b>B</b>       | <b>0.62</b>  | <b>17.6</b> | -           | <b>B</b>              | <b>0.66</b>  | <b>29.1</b> | -            |                       |
| Donald Street at<br>Cummings Avenue<br>Signalized | EBL            | A            | 0.12        | 14.8        | 11.0                  | A            | 0.25        | 17.3         | 19.4                  |
|   | EBR            | A            | 0.35        | 5.8         | 12.0                  | A            | 0.57        | 6.9          | 16.9                  |
|   | NBL            | A            | 0.57        | 15.5        | 31.8                  | B            | 0.67        | 18.8         | 38.4                  |
|   | NBT            | A            | 0.19        | 8.3         | 14.6                  | A            | 0.36        | 9.4          | 27.0                  |
|   | SBT/R          | A            | 0.45        | 8.9         | 29.3                  | A            | 0.50        | 10.2         | 35.9                  |
|   | <b>Overall</b> | <b>A</b>     | <b>0.39</b> | <b>10.3</b> | -                     | <b>A</b>     | <b>0.50</b> | <b>11.5</b>  | -                     |

| Intersection   | Lane     | AM Peak Hour |             |           |                       | PM Peak Hour |             |           |                       |
|--|----------|--------------|-------------|-----------|-----------------------|--------------|-------------|-----------|-----------------------|
|  |          | LOS          | V/C         | Delay (s) | Q (95 <sup>th</sup> ) | LOS          | V/C         | Delay (s) | Q (95 <sup>th</sup> ) |
| Ogilvie Road at Cummings Avenue<br><i>Signalized</i> | EBL      | A            | 0.37        | 30.2      | 20.5                  | C            | 0.73        | 49.5      | #46.2                 |
|  | EBT      | A            | 0.39        | 18.2      | 50.6                  | F            | 1.06        | 76.8      | #221.4                |
|  | WBL      | A            | 0.48        | 18.4      | 33.1                  | B            | 0.69        | 42.3      | #40.4                 |
|  | WBT      | D            | 0.84        | 33.2      | #207.0                | E            | 0.93        | 52.2      | #170.7                |
|  | NBL      | A            | 0.09        | 35.8      | 10.1                  | A            | 0.15        | 34.7      | 16.2                  |
|  | NBT      | A            | 0.56        | 41.8      | 57.2                  | E            | 0.93        | 66.1      | #141.1                |
|  | SBL      | A            | 0.52        | 35.3      | 41.4                  | E            | 0.94        | 65.4      | #95.6                 |
|  | SBT      | A            | 0.48        | 29.3      | 60.8                  | A            | 0.38        | 22.2      | 58.4                  |
| <b>Overall</b>                                       | <b>C</b> | <b>0.75</b>  | <b>29.3</b> | -         | <b>F</b>              | <b>1.01</b>  | <b>60.4</b> | -         |                       |

Notes: Saturation flow rate of 1800 veh/h/lane  
Queue is measured in metres  
Peak Hour Factor = 0.90

Delay = average vehicle delay in seconds  
m = metered queue  
# = volume for the 95th %ile cycle exceeds capacity

During the PM peak hour, the study area intersections experience capacity issues on the northbound left at the intersections of Ogilvie Road at Cyrville Road and on the eastbound through at Ogilvie Road at Cummings Avenue.

At the intersection of Ogilvie Road and Cyrville Road, the northbound left-turn movement may be subject to high delays and extended queues during both peak hours, where during the PM peak hour this movement is over theoretical capacity and the southbound left-turn movement may be subject to high delays.

The Ogilvie Road at Cummings Avenue intersection may be subject to extended queues on the westbound through movement during the AM peak hour and eastbound left, eastbound through, westbound left, westbound through, northbound through, and southbound left-turn movements during the PM peak hour. The overall intersection and the eastbound through movement are additionally over theoretical capacity where the eastbound through movement may also be subject to high delays during the PM peak hour.

### 2.2.8 Collision Analysis

Collision data have been acquired from the City of Ottawa open data website (data.ottawa.ca) for five years prior to the commencement of this TIA for the surrounding study area road network. Table 3 summarizes the collision types and conditions in the study area, Figure 11 illustrates the intersections and segments analyzed, and Table 4 summarizes the total collisions for each of these locations. Collision data are included in Appendix D.

Table 3: Study Area Collision Summary, 2016-2020

|                               |                             | Number     | %           |
|-------------------------------|-----------------------------|------------|-------------|
| <b>Total Collisions</b>       |                             | <b>110</b> | <b>100%</b> |
| <b>Classification</b>         | <b>Fatality</b>             | 0          | 0%          |
|                               | <b>Non-Fatal Injury</b>     | 23         | 21%         |
|                               | <b>Property Damage Only</b> | 87         | 79%         |
| <b>Initial Impact Type</b>    | <b>Angle</b>                | 24         | 22%         |
|                               | <b>Rear end</b>             | 34         | 31%         |
|                               | <b>Sideswipe</b>            | 16         | 15%         |
|                               | <b>Turning Movement</b>     | 29         | 26%         |
|                               | <b>SMV Other</b>            | 5          | 4%          |
|                               | <b>Other</b>                | 2          | 2%          |
| <b>Road Surface Condition</b> | <b>Dry</b>                  | 71         | 65%         |
|                               | <b>Wet</b>                  | 17         | 15%         |
|                               | <b>Loose Snow</b>           | 6          | 5%          |
|                               | <b>Slush</b>                | 2          | 2%          |
|                               | <b>Packed Snow</b>          | 4          | 4%          |

|                            |     | Number     | %           |
|----------------------------|-----|------------|-------------|
| <b>Total Collisions</b>    |     | <b>110</b> | <b>100%</b> |
|                            | Ice | 10         | 9%          |
| <b>Pedestrian Involved</b> |     | <b>2</b>   | <b>2%</b>   |
| <b>Cyclists Involved</b>   |     | <b>6</b>   | <b>5%</b>   |

Figure 11: Study Area Collision Records

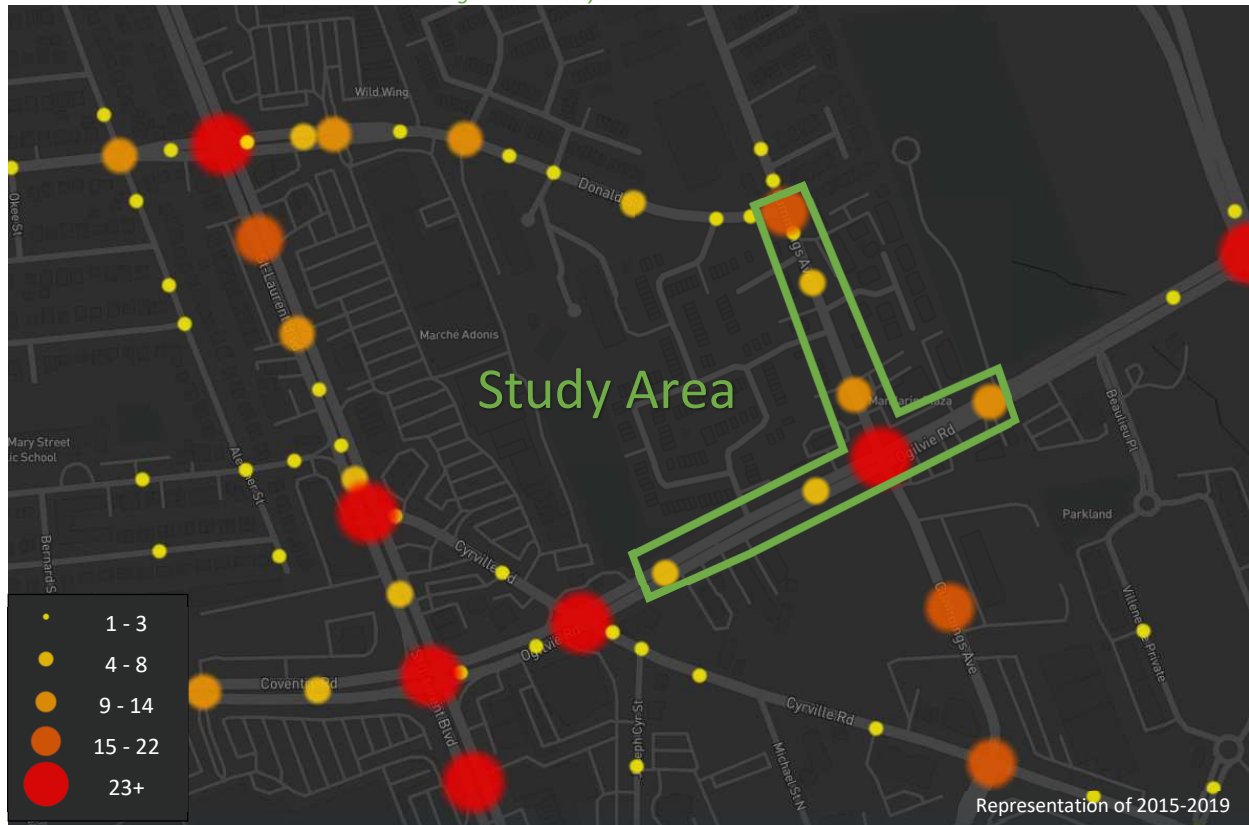


Table 4: Summary of Collision Locations, 2016-2020

| Intersections / Segments                                | Number    | %          |
|---|-----------|------------|
| <b>Cummings Ave @ Ogilvie Rd</b>                        | <b>57</b> | <b>52%</b> |
| <b>Cummings Ave @ Donald St</b>                         | <b>17</b> | <b>15%</b> |
| <b>Cummings Ave btwn Weldon Dr &amp; Ogilvie Rd</b>     | <b>11</b> | <b>10%</b> |
| <b>Ogilvie Rd btwn Murdock Gt &amp; Cummings Ave</b>    | <b>10</b> | <b>9%</b>  |
| <b>Ogilvie Rd btwn Cummings Ave &amp; Beaulieu Pl</b>   | <b>9</b>  | <b>8%</b>  |
| <b>Cummings Ave btwn Eady Crt &amp; Strathaven Priv</b> | <b>4</b>  | <b>4%</b>  |
| <b>Cummings Ave btwn Donald St &amp; Eady Crt</b>       | <b>2</b>  | <b>2%</b>  |

Within the study area, the intersection of Cummings Avenue at Ogilvie Road and Cummings Avenue at Donald Street are noted to have experienced higher collisions than other locations. Table 5 and Table 6 summarize the collision types and conditions for each location.

Table 5: Cummings Avenue at Ogilvie Road Collision Summary

|                               |                             | Number    | %           |
|-------------------------------|-----------------------------|-----------|-------------|
| <b>Total Collisions</b>       |                             | <b>57</b> | <b>100%</b> |
| <b>Classification</b>         | <b>Fatality</b>             | 0         | 0%          |
|                               | <b>Non-Fatal Injury</b>     | 11        | 19%         |
|                               | <b>Property Damage Only</b> | 46        | 81%         |
| <b>Initial Impact Type</b>    | <b>Angle</b>                | 5         | 9%          |
|                               | <b>Rear end</b>             | 23        | 40%         |
|                               | <b>Sideswipe</b>            | 8         | 14%         |
|                               | <b>Turning Movement</b>     | 18        | 32%         |
|                               | <b>SMV Other</b>            | 1         | 2%          |
|                               | <b>Other</b>                | 2         | 4%          |
| <b>Road Surface Condition</b> | <b>Dry</b>                  | 36        | 63%         |
|                               | <b>Wet</b>                  | 6         | 11%         |
|                               | <b>Loose Snow</b>           | 5         | 9%          |
|                               | <b>Packed Snow</b>          | 3         | 5%          |
|                               | <b>Ice</b>                  | 7         | 12%         |
| <b>Pedestrian Involved</b>    |                             | 1         | 2%          |
| <b>Cyclists Involved</b>      |                             | 4         | 7%          |

The Ogilvie Road at Cummings Avenue intersection had a total of 57 collisions during the 2016-2020 time period, with 46 involving property damage only and the remaining eleven having non-fatal injuries. The collision types are most represented by rear end with 23 collisions, followed by turning movement with 18, sideswipe with eight, angle with five, other with two and SMV (other) with one.

The City’s Cycling Safety Review of High-Volume Intersections (March 2020) completed a review of this intersection for pedestrian and cycling-related observations and movements. The report suggests improvements such as the removal of the northbound right-turn channel, the addition of a westbound right-turn lane, signal phasing changes, and ultimately a protected intersection configuration, which may help address a variety of collisions noted at this intersection. This report does not recommend any additional changes to those planned by the City. No further examination is required as part of this study.

Table 6: Cummings Avenue at Donald Street Collision Summary

|                               |                             | Number    | %           |
|-------------------------------|-----------------------------|-----------|-------------|
| <b>Total Collisions</b>       |                             | <b>17</b> | <b>100%</b> |
| <b>Classification</b>         | <b>Fatality</b>             | 0         | 0%          |
|                               | <b>Non-Fatal Injury</b>     | 4         | 24%         |
|                               | <b>Property Damage Only</b> | 13        | 76%         |
| <b>Initial Impact Type</b>    | <b>Angle</b>                | 3         | 18%         |
|                               | <b>Rear end</b>             | 7         | 41%         |
|                               | <b>Sideswipe</b>            | 1         | 6%          |
|                               | <b>Turning Movement</b>     | 4         | 24%         |
|                               | <b>SMV Other</b>            | 2         | 12%         |
| <b>Road Surface Condition</b> | <b>Dry</b>                  | 12        | 71%         |
|                               | <b>Wet</b>                  | 1         | 6%          |
|                               | <b>Loose Snow</b>           | 1         | 6%          |
|                               | <b>Ice</b>                  | 3         | 18%         |
| <b>Pedestrian Involved</b>    |                             | 1         | 6%          |
| <b>Cyclists Involved</b>      |                             | 0         | 0%          |



The Cummings Avenue at Donald Street intersection had a total of 17 collisions during the 2016-2020 time period, with 13 involving property damage only and the remaining four having non-fatal injuries. The collision types are most represented by rear end with seven collisions, followed by turning movement with four, turning angle with three, SMV other with two, and sideswipe with one. The collision rates have been generally consistent through the years with 2017 and 2018 peaking with five and four collisions respectively. Weather conditions do not affect collisions at this location. No further examination is required as part of this study.

### 2.3 Planned Conditions

#### 2.3.1 Changes to the Area Transportation Network

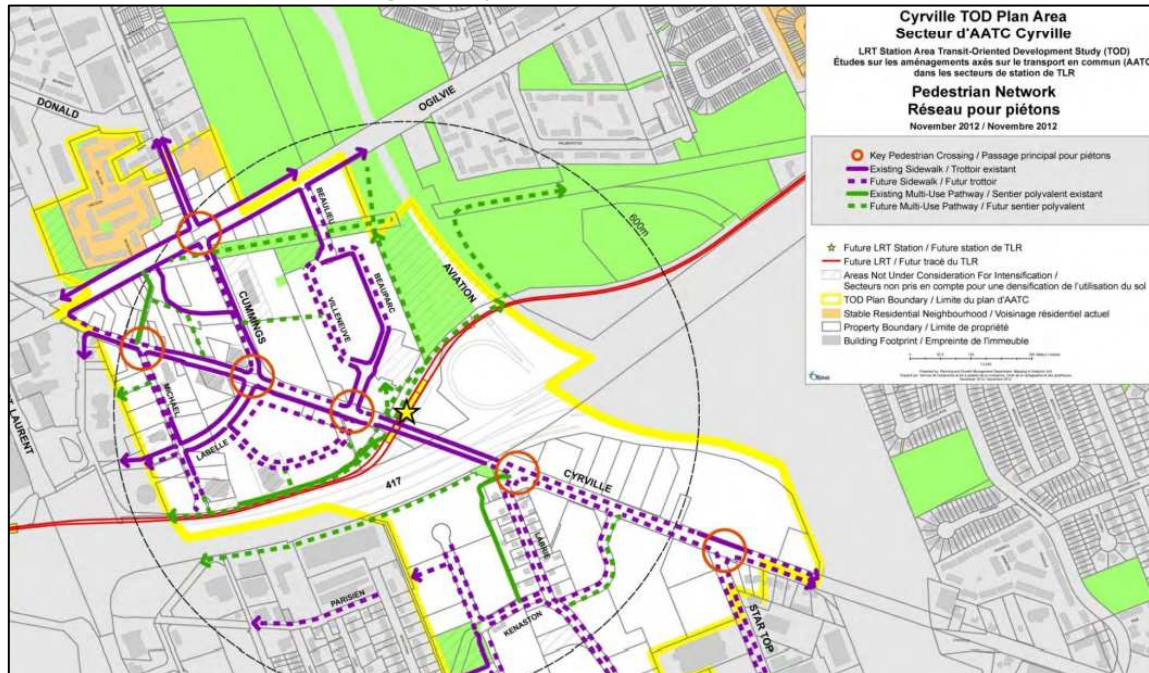
##### 2.3.1.1 New Official Plan (2021)

Within the Transit and Network Ultimate diagram, transit priority corridor is identified along Ogilvie Road.

##### 2.3.1.2 Cyrville TOD Plan area

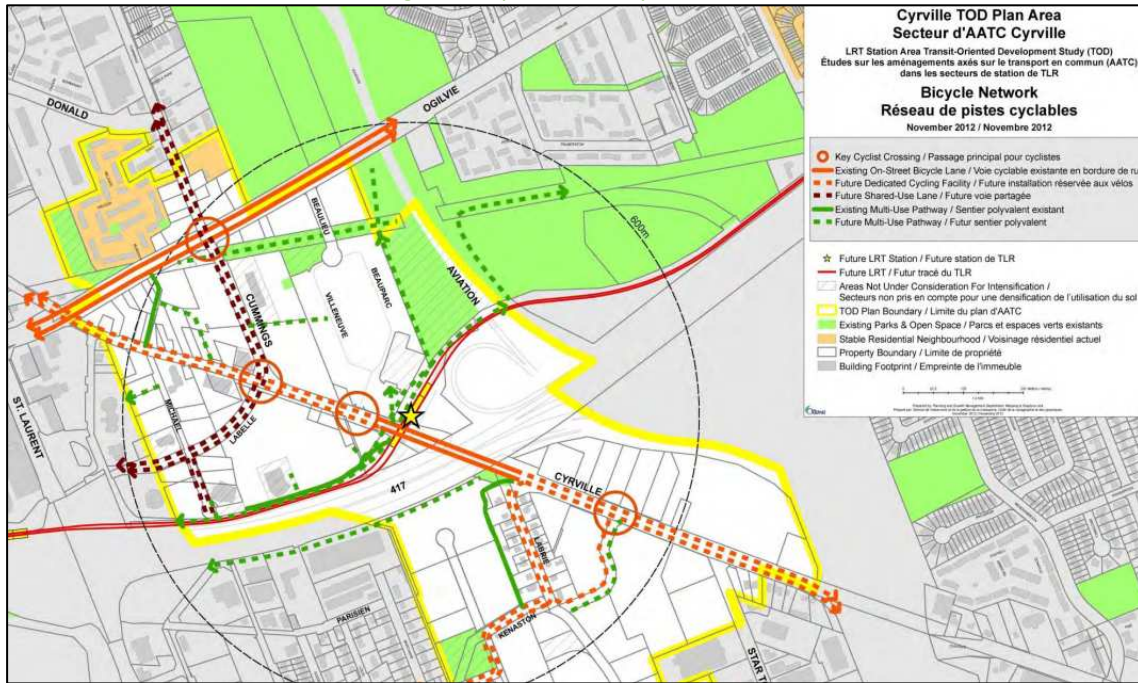
The Cyrville TOD plan outlines a future sidewalk on the west side of Cummings Avenue south of Ogilvie Road and future shared-use lanes along Cummings Avenue. Figure 12 and Figure 13 illustrate the Cyrville pedestrian and cycling TOD plans.

Figure 12: Cyrville TOD Pedestrian Network



Source: <https://ottawa.ca/en/transit-oriented-development-tod-plans> Accessed: March 3, 2023

Figure 13: Cyrville TOD Bicycle Network

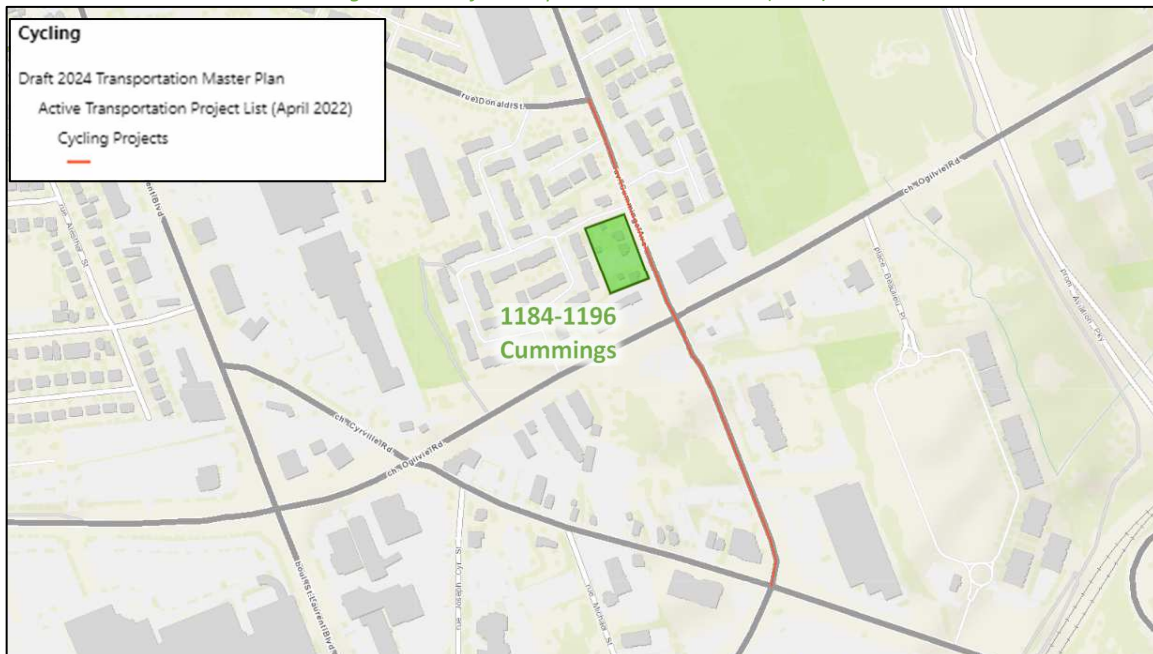


Source: <https://ottawa.ca/en/transit-oriented-development-tod-plans> Accessed: March 3, 2023

2.3.1.3 Draft Transportation Master Plan (2024)

In the Active Transportation project List (April 2022), cycling facilities are identified along Cummings Avenue between Donald Street and Cyrville Road. Based on the Cyrville TOD Plan area, it is assumed that this cycling facility would be a shared-use lane. Figure 14 illustrates the Draft Transportation Master Plan (2024).

Figure 14: Draft Transportation Master Plan (2024)



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: February 6, 2023

### 2.3.2 Other Study Area Developments

#### *1098 Ogilvie Road, 1178 Cummings Avenue*

The proposed development application includes a site plan for a two-phase development with occupancy horizons of 2022 and 2024, comprising three residential towers and one hotel for 850 residential dwelling units and 175 hotel rooms. The development is expected to generate 148 new AM peak hour two-way auto trips and 130 new PM peak hour two-way auto trips. (Parsons, 2020)

#### *1298 Ogilvie Road*

The proposed development application includes a site plan for seven townhome buildings comprising 78 residential units. The development is expected to generate 39 new AM peak hour two-way auto trips and 40 new PM peak hour two-way auto trips. The build-out horizon is assumed to be 2023 (Parsons, 2018)

#### *1155 Joseph Cyr Street, 1082 Cyrville Road*

The proposed development includes a Zoning by-law amendment and site plan application to construct a six-storey mixed-use building with 116 residential dwelling units and a 1425 sq. ft. ground floor commercial component to be built in a single phase by 2023. The development is predicted to generate eight new AM and nine new PM two-way peak-hour auto trips. (CGH Transportation, 2020)

#### *1209 St Laurent Boulevard, 1200 Lemieux Street*

The proposed development includes a site plan application to construct two 30-storey residential buildings including 644 units to be built by 2026. The development is expected to generate 35 new AM peak hour two-way auto trips and 38 new PM peak hour two-way auto trips. (CGH Transportation, 2022)

#### *1209 St Laurent Boulevard, 1200 Lemieux Street*

The proposed development includes a site plan application to construct two 30-storey residential buildings including 644 units to be built by 2026. The development is expected to generate 35 new AM peak hour two-way auto trips and 38 new PM peak hour two-way auto trips. (CGH Transportation, 2022)

#### 1125 - 1149 Cyrville Road

The proposed development application includes a site plan to construct two residential buildings with a total of 354 units. The development is predicted to generate 22 new AM and 21 new PM two-way peak-hour auto trips. The anticipated build-out horizon is 2023. (Stantec, 2021)

## 3 Study Area and Time Periods

### 3.1 Study Area

The study area will include the intersections of:

- Donald Street at:
  - Cummings Avenue
- Ogilvie Road at:
  - Cyrville Road
  - Cummings Avenue
- Cummings Avenue at Site Access (future conditions)

The boundary roads will be Cummings Avenue and no screenlines are present within proximity to the site.

### 3.2 Time Periods

As the proposed development is composed entirely of residential units the AM and PM peak hours will be examined.

### 3.3 Horizon Years

The anticipated build-out year is 2026. As a result, the full build-out plus five years horizon year is 2031.

## 4 Exemption Review

Table 7 summarizes the exemptions for this TIA.

*Table 7: Exemption Review*

| Module                                      | Element                       | Explanation  | Exempt/Required |
|---|-------------------------------|--|-----------------|
| <b>Design Review Component</b>              |                               |  |                 |
| <b>4.1 Development Design</b>               | 4.1.2 Circulation and Access  | Only required for site plans   | Required        |
|   | 4.1.3 New Street Networks     | Only required for plans of subdivision   | Exempt          |
| <b>4.2 Parking</b>                          | 4.2.1 Parking Supply          | Only required for site plans   | Required        |
|   | 4.2.2 Spillover Parking       | Only required for site plans where parking supply is 15% below unconstrained demand  | Exempt          |
| <b>Network Impact Component</b>             |                               |  |                 |
| <b>4.5 Transportation Demand Management</b> | All Elements                  | Not required for site plans expected to have fewer than 60 employees and/or students on location at any given time   | Required        |
| <b>4.6 Neighbourhood Traffic Management</b> | 4.6.1 Adjacent Neighbourhoods | Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds                              | Exempt          |
| <b>4.8 Network Concept</b>                  |                               | Only required when proposed development generates more than 200 person-trips during the peak hour in excess of equivalent volume permitted by established zoning | Exempt          |

### 4.1 TIA Stepped Process

Being located within the Cyrville TOD area and the site proposed small number of residential units, the expected new auto trips will be minimal to the study area. Given the existing conditions identified no barriers to the development of the proposed site, the remaining TIA stepped process has been included within the submission for a fulsome review by the City.

## 5 Development-Generated Travel Demand

### 5.1 Mode Shares

Examining the mode shares recommended in the TRANS Trip Generation Manual (2020) for the subject district, derived from the most recent National Capital Region Origin-Destination survey (OD Survey), the existing average district mode shares by land use for Ottawa East have been summarized in Table 8.

Table 8: TRANS Trip Generation Manual Recommended Mode Shares – Ottawa East

| Travel Mode    | Multi-Unit (High-Rise) |             |
|----------------|------------------------|-------------|
|                | AM                     | PM          |
| Auto Driver    | 40%                    | 40%         |
| Auto Passenger | 8%                     | 14%         |
| Transit        | 38%                    | 28%         |
| Cycling        | 2%                     | 3%          |
| Walking        | 13%                    | 15%         |
| <b>Total</b>   | <b>100%</b>            | <b>100%</b> |

Being within 600 metres of the Cyrville LRT station and within one kilometre of the St. Laurent LRT station, a higher transit mode is considered achievable at this location. A 17% shift to transit mode taken from the auto mode is proposed. The proposed modified mode share targets are summarized in Table 9.

Table 9: Proposed Development Mode Shares

| Travel Mode    | Multi-Unit (High-Rise) |             |
|----------------|------------------------|-------------|
|                | AM                     | PM          |
| Auto Driver    | 23%                    | 23%         |
| Auto Passenger | 7%                     | 14%         |
| Transit        | 55%                    | 45%         |
| Cycling        | 2%                     | 3%          |
| Walking        | 13%                    | 15%         |
| <b>Total</b>   | <b>100%</b>            | <b>100%</b> |

## 5.2 Trip Generation

This TIA has been prepared using the vehicle and person trip rates for the residential dwellings using the TRANS Trip Generation Manual (2020). Table 10 summarizes the person trip rates for the proposed residential land uses for each peak period.

Table 10: Trip Generation Person Trip Rates

| Land Use               | Land Use Code     | Peak | Peak Period       |                   |
|------------------------|-------------------|------|-------------------|-------------------|
|                        |                   |      | Vehicle Trip Rate | Person Trip Rates |
| Multi-Unit (High-Rise) | 221 & 222 (TRANS) | AM   | -                 | 0.80              |
|                        |                   | PM   | -                 | 0.90              |

Using the above person trip rates, the total person trip generation has been estimated. Table 11 summarizes the total person trip generation for the residential land uses.

Table 11: Total Person Trip Generation

| Land Use               | Units | AM Peak Period |     |       | PM Peak Period |     |       |
|------------------------|-------|----------------|-----|-------|----------------|-----|-------|
|                        |       | In             | Out | Total | In             | Out | Total |
| Multi-Unit (High-Rise) | 188   | 47             | 104 | 151   | 98             | 71  | 169   |

Using the above mode share targets for a LRT area, the person trips by mode have been projected. Trip generation by peak hour has been forecasted using the prescribed peak period conversion factors presented in the TRANS Trip Generation Manual (2020) for the residential component. Table 12 summarizes the residential trip generation by mode and peak hour.

Table 12: Trip Generation by Mode

| Travel Mode               |                | AM Peak Hour |           |           |           | PM Peak Hour |           |           |           |
|---------------------------|----------------|--------------|-----------|-----------|-----------|--------------|-----------|-----------|-----------|
|                           |                | Mode Share   | In        | Out       | Total     | Mode Share   | In        | Out       | Total     |
| Multi-Unit<br>(High-Rise) | Auto Driver    | 23%          | 5         | 12        | 17        | 23%          | 10        | 7         | 17        |
|                           | Auto Passenger | 7%           | 1         | 3         | 4         | 14%          | 6         | 4         | 10        |
|                           | Transit        | 55%          | 14        | 31        | 45        | 45%          | 21        | 15        | 36        |
|                           | Cycling        | 2%           | 1         | 1         | 2         | 3%           | 1         | 1         | 2         |
|                           | Walking        | 13%          | 3         | 8         | 11        | 15%          | 8         | 6         | 14        |
|                           | <b>Total</b>   | <b>100%</b>  | <b>24</b> | <b>55</b> | <b>79</b> | <b>100%</b>  | <b>46</b> | <b>33</b> | <b>79</b> |

As shown above, a total of 17 AM and 17 PM new peak hour two-way vehicle trips are projected as a result of the proposed development.

### 5.3 Trip Distribution

To understand the travel patterns of the subject development, the OD Survey has been reviewed to determine the travel for the residential component, and these patterns were applied based on the build-out of Ottawa East. Table 13 below summarizes the distributions.

Table 13: OD Survey Distribution – Ottawa East

| To/From      | Residential % of Trips |
|--------------|------------------------|
| North        | 15%                    |
| South        | 20%                    |
| East         | 15%                    |
| West         | 50%                    |
| <b>Total</b> | <b>100%</b>            |

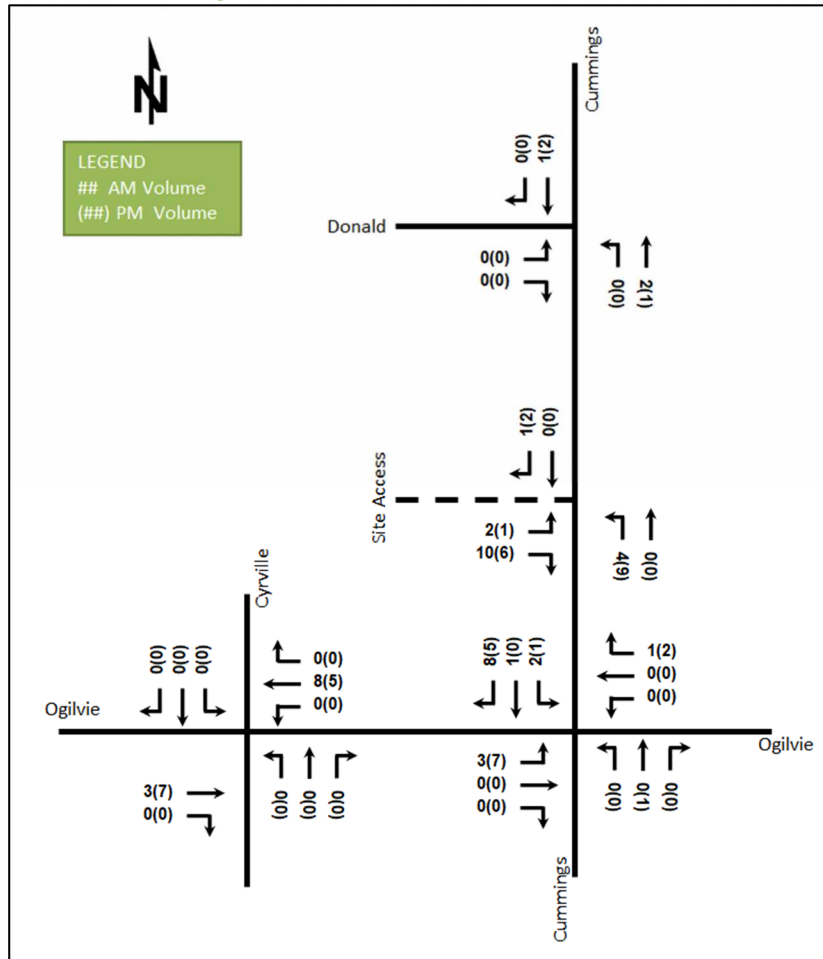
### 5.4 Trip Assignment

Using the distribution outlined above, turning movement splits, and access to major transportation infrastructure, the trips generated by the site have been assigned to the study area road network. Table 14 summarizes the proportional assignment to the study area roadways, and Figure 15 illustrates the new site generated volumes.

Table 14: Trip Assignment

| To/From      | Via                                       |
|--------------|---|
| North        | 15% Cummings Ave (N)                      |
| South        | 5% Cummings Ave (N)<br>15% Ogilvie Rd (W) |
| East         | 15% Ogilvie Rd (E)                        |
| West         | 50% Ogilvie Rd (W)                        |
| <b>Total</b> | <b>100%</b>                               |

Figure 15: New Site Generation Auto Volumes



## 6 Background Network Travel Demands

### 6.1 Transportation Network Plans

The transportation network plans were discussed in Section 2.3 and will not have any notable impact on the study area traffic volumes and travel patterns.

### 6.2 Background Growth

A review of the background projections from the City’s TRANS Regional Model for the 2011 and 2031 horizons was completed to determine the background growth for each of the study area roadways. The volumes along Donald Street are significantly underestimated when compared to traffic counts and should not be considered for the area. The background TRANS model growth rates are summarized in Table 15 and the TRANS model plots are provided in Appendix E.

Table 15: TRANS Regional Model Projections – Study Area Growth Rates

| Street       | TRANS Rate |            | 2011 to Existing |            | Existing to 2031 |            |
|--------------|------------|------------|------------------|------------|------------------|------------|
|              | Eastbound  | Westbound  | Eastbound        | Westbound  | Eastbound        | Westbound  |
| Ogilvie Rd   | 0.29%      | 0.32%      | -1.31%           | 0.81%      | 1.17%            | 0.05%      |
| Donald St    | -          | -          | -                | -          | -                | -          |
|              | Northbound | Southbound | Northbound       | Southbound | Northbound       | Southbound |
| Cummings Ave | 0.21%      | 1.02%      | 3.55%            | 4.46%      | -1.55%           | -0.79%     |
| Cyrville Rd  | 0.36%      | 1.17%      | 0.70%            | 2.17%      | -0.26%           | 0.96%      |

In general, the growth rates in the study area derived from the two TRANS model horizons are projected to be positive along all roadways. A conservative 1.00% growth will apply to Donald Street. A comparison of the 2011 to Existing volumes and the Existing to 2031 volumes illustrates a situation that development has not progressed linearly along Cummings Avenue. It is unlikely that the growth rates will decrease or become negative as the Existing to 2031 summary outlines, therefore it is expected that they will be lower than the 2011 to Existing rates that have been experienced. Table 16 summarizes the recommended growth rates to be considered within the study area.

Table 16: Recommended Area Growth Rates

| Street       | AM Peak Hour |            | PM Peak Hour |            |
|--------------|--------------|------------|--------------|------------|
|              | Eastbound    | Westbound  | Eastbound    | Westbound  |
| Ogilvie Rd   | 0.25%        | 0.25%      | 0.25%        | 0.25%      |
| Donald St    | 1.00%        | 1.00%      | 1.00%        | 1.00%      |
|              | Northbound   | Southbound | Northbound   | Southbound |
| Cummings Ave | 0.25%        | 1.00%      | 1.00%        | 0.25%      |
| Cyrville Rd  | 0.25%        | 1.00%      | 1.00%        | 0.25%      |

### 6.3 Other Developments

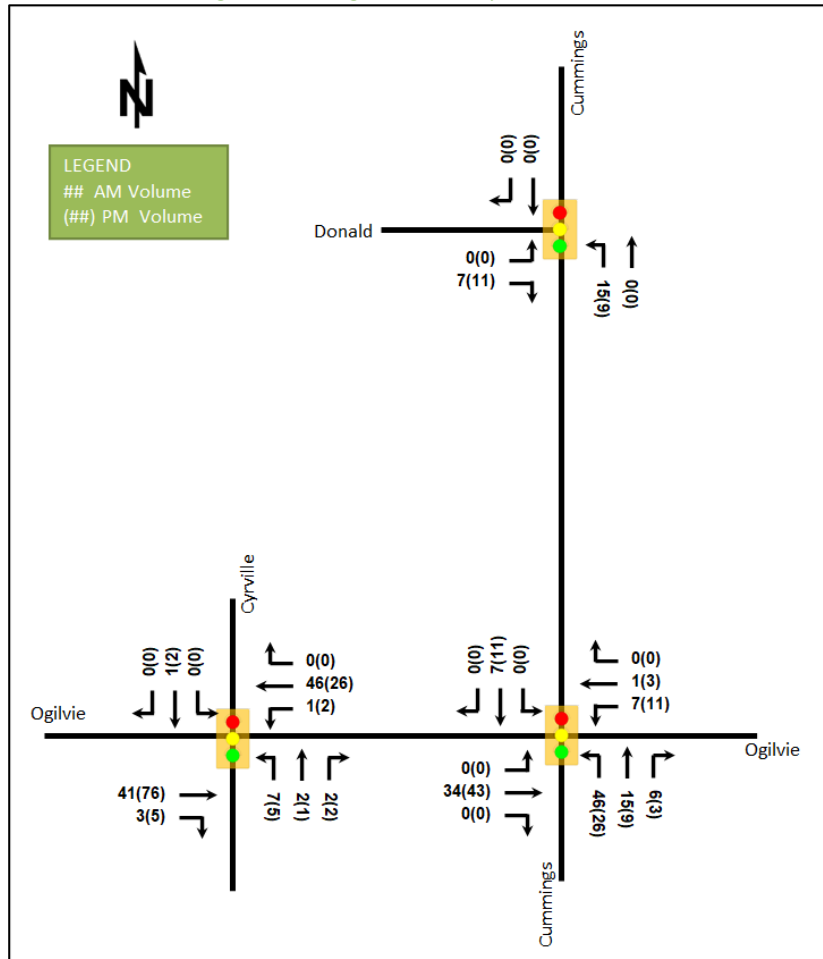
The background developments explicitly considered in the background conditions (Section 6.2) include:

- 1098 Ogilvie Road, 1178 Cummings Avenue
- 1298 Ogilvie Road
- 1155 Joseph Cyr Street, 1082 Cyrville Road
- 1209 St Laurent Boulevard, 1200 Lemieux Street
- 1125 - 1149 Cyrville Road

Figure 16 illustrates the background development volumes, and the background development volumes within the study area have been provided in Appendix F.



Figure 16: Background Development Volumes



## 7 Demand Rationalization

### 7.1 2026 Future Background Operations

Figure 17 illustrates the 2026 background volumes and Table 17 summarizes the 2026 background intersection operations. The level of service for signalized intersections is based on v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection. The synchro worksheets for the 2026 future background horizon are provided in Appendix G.

Figure 17: 2026 Future Background Volumes

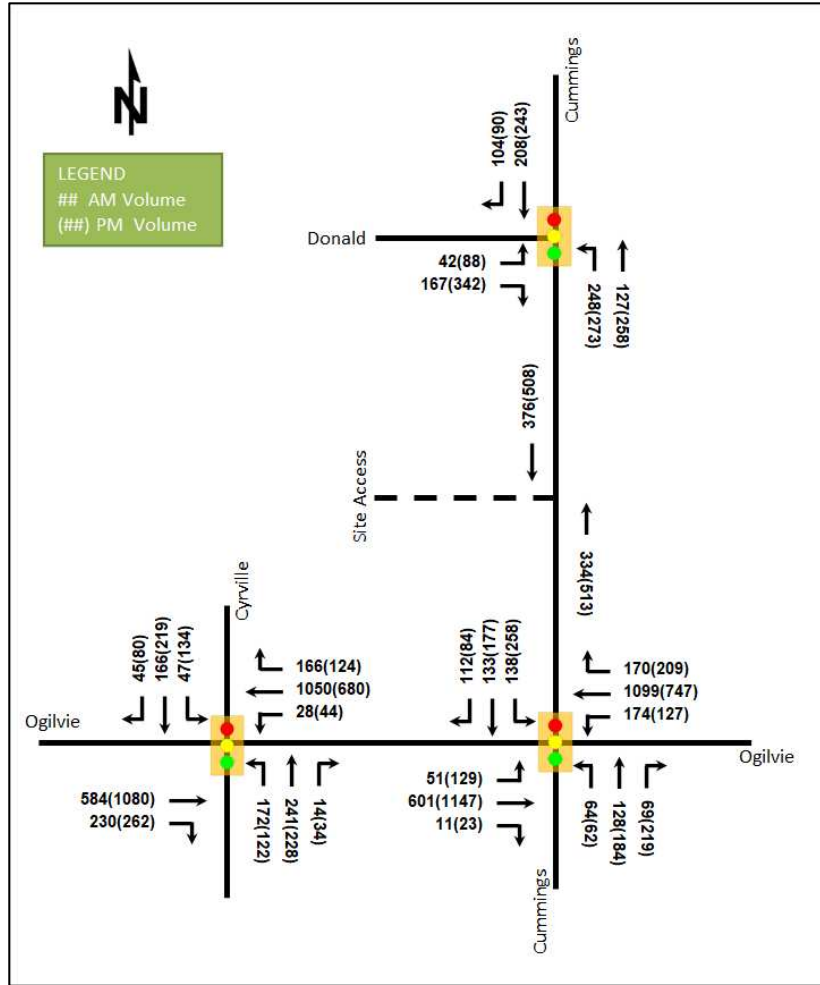


Table 17: 2026 Future Background Intersection Operations

| Intersection                                   | Lane     | AM Peak Hour |             |             |                       | PM Peak Hour |             |              |                       |
|--|----------|--------------|-------------|-------------|-----------------------|--------------|-------------|--------------|-----------------------|
|  |          | LOS          | V/C         | Delay (s)   | Q (95 <sup>th</sup> ) | LOS          | V/C         | Delay (s)    | Q (95 <sup>th</sup> ) |
| Ogilvie Road at<br>Cyrville Road<br>Signalized | EBT      | A            | 0.27        | 10.1        | 48.6                  | A            | 0.49        | 12.4         | 103.7                 |
|  | EBR      | A            | 0.24        | 2.2         | 10.8                  | A            | 0.27        | 2.1          | 11.4                  |
|  | WBL      | A            | 0.06        | 4.3         | m1.2                  | A            | 0.17        | 20.6         | m9.0                  |
|  | WBT      | A            | 0.48        | 4.6         | 19.3                  | A            | 0.31        | 16.5         | m65.9                 |
|  | WBR      | A            | 0.18        | 0.3         | m0.1                  | A            | 0.14        | 8.7          | m11.4                 |
|  | NBL      | D            | 0.90        | <b>85.9</b> | 59.6                  | E            | 0.95        | <b>113.5</b> | <b>#52.3</b>          |
|  | NBT      | B            | 0.64        | 47.1        | 70.3                  | B            | 0.66        | 48.1         | 71.5                  |
|  | SBL      | A            | 0.28        | 38.6        | 17.7                  | D            | 0.84        | <b>81.1</b>  | 48.1                  |
|  | SBT      | A            | 0.56        | 42.2        | 57.1                  | C            | 0.77        | 53.5         | 81.7                  |
| <b>Overall</b>                                 | <b>A</b> | <b>0.59</b>  | <b>17.8</b> | -           | <b>B</b>              | <b>0.61</b>  | <b>26.8</b> | -            |                       |

| Intersection   | Lane           | AM Peak Hour |             |             |                       | PM Peak Hour |             |             |                       |
|--|----------------|--------------|-------------|-------------|-----------------------|--------------|-------------|-------------|-----------------------|
|  |                | LOS          | V/C         | Delay (s)   | Q (95 <sup>th</sup> ) | LOS          | V/C         | Delay (s)   | Q (95 <sup>th</sup> ) |
| <b>Donald Street at Cummings Avenue<br/>Signalized</b> | EBL            | A            | 0.11        | 14.8        | 10.1                  | A            | 0.22        | 16.7        | 17.8                  |
|  | EBR            | A            | 0.35        | 5.9         | 12.0                  | A            | 0.57        | 6.8         | 17.0                  |
|  | NBL            | A            | 0.58        | 15.6        | 33.0                  | B            | 0.67        | 18.5        | 37.8                  |
|  | NBT            | A            | 0.17        | 8.1         | 13.6                  | A            | 0.35        | 9.4         | 26.4                  |
|  | SBT/R          | A            | 0.42        | 8.6         | 27.9                  | A            | 0.46        | 9.7         | 32.3                  |
|  | <b>Overall</b> | <b>A</b>     | <b>0.40</b> | <b>10.3</b> | -                     | <b>A</b>     | <b>0.50</b> | <b>11.2</b> | -                     |
| <b>Ogilvie Road at Cummings Avenue<br/>Signalized</b>  | EBL            | A            | 0.28        | 22.1        | 17.0                  | B            | 0.61        | 33.5        | 29.4                  |
|  | EBT            | A            | 0.38        | 18.1        | 48.3                  | E            | 0.99        | 57.5        | #205.4                |
|  | WBL            | A            | 0.45        | 17.3        | 31.1                  | B            | 0.68        | 42.0        | #40.2                 |
|  | WBT            | C            | 0.77        | 29.7        | 166.6                 | D            | 0.83        | 42.6        | #147.8                |
|  | NBL            | A            | 0.28        | 40.2        | 24.5                  | A            | 0.24        | 36.8        | 23.2                  |
|  | NBT            | A            | 0.56        | 42.4        | 58.7                  | E            | 0.92        | 64.7        | #133.2                |
|  | SBL            | A            | 0.47        | 33.7        | 37.8                  | D            | 0.83        | 46.1        | #75.3                 |
|  | SBT            | A            | 0.46        | 29.5        | 59.6                  | A            | 0.37        | 22.3        | 55.7                  |
| <b>Overall</b>   | <b>B</b>       | <b>0.69</b>  | <b>27.5</b> | -           | <b>E</b>              | <b>0.92</b>  | <b>48.6</b> | -           |                       |

Notes: Saturation flow rate of 1800 veh/h/lane  
Queue is measured in metres  
Peak Hour Factor = 1.00

Delay = average vehicle delay in seconds  
m = metered queue  
# = volume for the 95th %ile cycle exceeds capacity

Intersections within the study area will operate similar to existing condition with the incremental improvement to the intersection operations. It is predominantly a result of the peak hour factor adjustment to 1.00 for forecasted conditions. No additional capacity issues are noted.

Similar to the existing condition, the northbound left-turn movement at the intersection of Ogilvie Road and Cyrville Road may be subject to high delays during both peak hours and extended queues during the PM peak hours. The Ogilvie Road at Cummings Avenue intersection may be subject to extended queues on the eastbound through, westbound left, westbound through, northbound through, and southbound left-turn movements during the PM peak hour.

### 7.2 2031 Future Background Operations

Figure 18 illustrates the 2031 background volumes and Table 18 summarizes the 2031 background intersection operations. The level of service for signalized intersections is based on v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection. The synchro worksheets for the 2031 future background horizon are provided in Appendix H.

Figure 18: 2031 Future Background Volumes

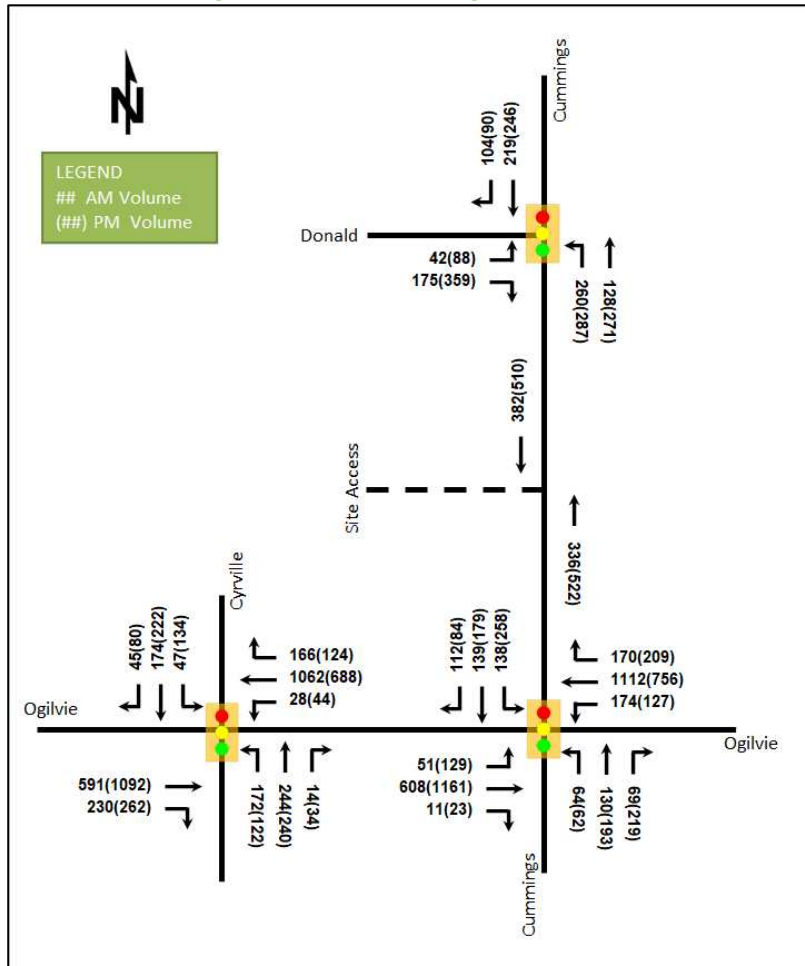


Table 18: 2031 Future Background Intersection Operations

| Intersection  | Lane           | AM Peak Hour |             |             |                       | PM Peak Hour |             |              |                       |
|---|----------------|--------------|-------------|-------------|-----------------------|--------------|-------------|--------------|-----------------------|
|   |                | LOS          | V/C         | Delay (s)   | Q (95 <sup>th</sup> ) | LOS          | V/C         | Delay (s)    | Q (95 <sup>th</sup> ) |
| Ogilvie Road at Cyrville Road<br><i>Signalized</i>    | EBT            | A            | 0.28        | 10.3        | 49.3                  | A            | 0.50        | 12.6         | 105.5                 |
|   | EBR            | A            | 0.24        | 2.2         | 10.8                  | A            | 0.27        | 2.1          | 11.4                  |
|   | WBL            | A            | 0.06        | 4.3         | m1.2                  | A            | 0.18        | 20.9         | m8.6                  |
|   | WBT            | A            | 0.49        | 4.6         | 19.5                  | A            | 0.31        | 16.9         | m65.2                 |
|   | WBR            | A            | 0.18        | 0.3         | m0.1                  | A            | 0.14        | 8.9          | m11.2                 |
|   | NBL            | E            | 0.91        | <b>88.8</b> | 60.3                  | E            | 0.96        | <b>114.7</b> | <b>#52.7</b>          |
|   | NBT            | B            | 0.64        | 46.9        | 71.3                  | B            | 0.69        | 49.3         | 75.1                  |
|   | SBL            | A            | 0.28        | 38.3        | 17.7                  | D            | 0.88        | <b>88.9</b>  | 49.2                  |
|   | SBT            | A            | 0.57        | 42.5        | 59.2                  | C            | 0.78        | 53.7         | 82.4                  |
|   | <b>Overall</b> | <b>A</b>     | <b>0.60</b> | <b>18.1</b> | -                     | <b>B</b>     | <b>0.62</b> | <b>27.5</b>  | -                     |
| Donald Street at Cummings Avenue<br><i>Signalized</i> | EBL            | A            | 0.11        | 15.0        | 10.1                  | A            | 0.23        | 17.3         | 18.1                  |
|   | EBR            | A            | 0.36        | 5.9         | 12.3                  | A            | 0.59        | 7.1          | 17.9                  |
|   | NBL            | B            | 0.61        | 16.5        | 35.5                  | B            | 0.69        | 19.1         | 40.6                  |
|   | NBT            | A            | 0.17        | 8.1         | 13.7                  | A            | 0.36        | 9.4          | 27.5                  |
|   | SBT/R          | A            | 0.43        | 8.8         | 29.2                  | A            | 0.46        | 9.5          | 32.5                  |
|   | <b>Overall</b> | <b>A</b>     | <b>0.42</b> | <b>10.6</b> | -                     | <b>A</b>     | <b>0.52</b> | <b>11.4</b>  | -                     |

| Intersection  | Lane     | AM Peak Hour |             |           |                       | PM Peak Hour |             |             |                       |
|---|----------|--------------|-------------|-----------|-----------------------|--------------|-------------|-------------|-----------------------|
|   |          | LOS          | V/C         | Delay (s) | Q (95 <sup>th</sup> ) | LOS          | V/C         | Delay (s)   | Q (95 <sup>th</sup> ) |
| <b>Ogilvie Road at Cummings Avenue</b><br><i>Signalized</i> | EBL      | A            | 0.29        | 22.8      | 17.3                  | B            | 0.62        | 35.8        | 30.6                  |
|   | EBT      | A            | 0.39        | 18.2      | 49.4                  | <b>F</b>     | <b>1.02</b> | <b>63.3</b> | <b>#209.4</b>         |
|   | WBL      | A            | 0.45        | 17.4      | 31.1                  | B            | 0.68        | 41.3        | <b>#39.6</b>          |
|   | WBT      | C            | 0.78        | 30.1      | 169.7                 | D            | 0.85        | 44.0        | <b>#150.2</b>         |
|   | NBL      | A            | 0.28        | 40.2      | 24.5                  | A            | 0.24        | 36.6        | 23.2                  |
|   | NBT      | A            | 0.57        | 42.9      | 59.5                  | E            | 0.93        | 66.1        | <b>#138.7</b>         |
|   | SBL      | A            | 0.47        | 33.7      | 37.8                  | D            | 0.84        | 47.0        | <b>#76.8</b>          |
|   | SBT      | A            | 0.47        | 30.1      | 61.9                  | A            | 0.37        | 22.2        | 56.2                  |
| <b>Overall</b>  | <b>B</b> | <b>0.70</b>  | <b>27.8</b> | -         | <b>E</b>              | <b>0.93</b>  | <b>51.4</b> | -           |                       |

Notes: Saturation flow rate of 1800 veh/h/lane  
 Queue is measured in metres  
 Peak Hour Factor = 1.00  
 Delay = average vehicle delay in seconds  
 m = metered queue  
 # = volume for the 95th %ile cycle exceeds capacity

Intersections within the study area will operate similar to existing condition during peak hours. No additional capacity issues are noted.

Similar to the existing condition, the northbound left-turn movement at the intersection of Ogilvie Road and Cyrville Road may be subject to high delays during both peak hours and extended queues during the PM peak hours.

Similar to the existing condition, the Ogilvie Road at Cummings Avenue intersection may be subject to extended queues on eastbound left, eastbound through, westbound left, westbound through, northbound through, and southbound left-turn movements during the PM peak hour. The eastbound through movement is additionally over theoretical capacity where the eastbound through movement may also be subject to high delays during the PM peak hour.

### 7.3 2026 Future Total Operations

Figure 19 illustrates the 2026 total volumes and Table 19 summarizes the 2026 total intersection operations. The level of service for signalized intersections is based on v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection, and average delay for unsignalized intersections. The synchro worksheets for the 2026 total horizon are provided in Appendix I.

Figure 19: 2026 Future Total Volumes

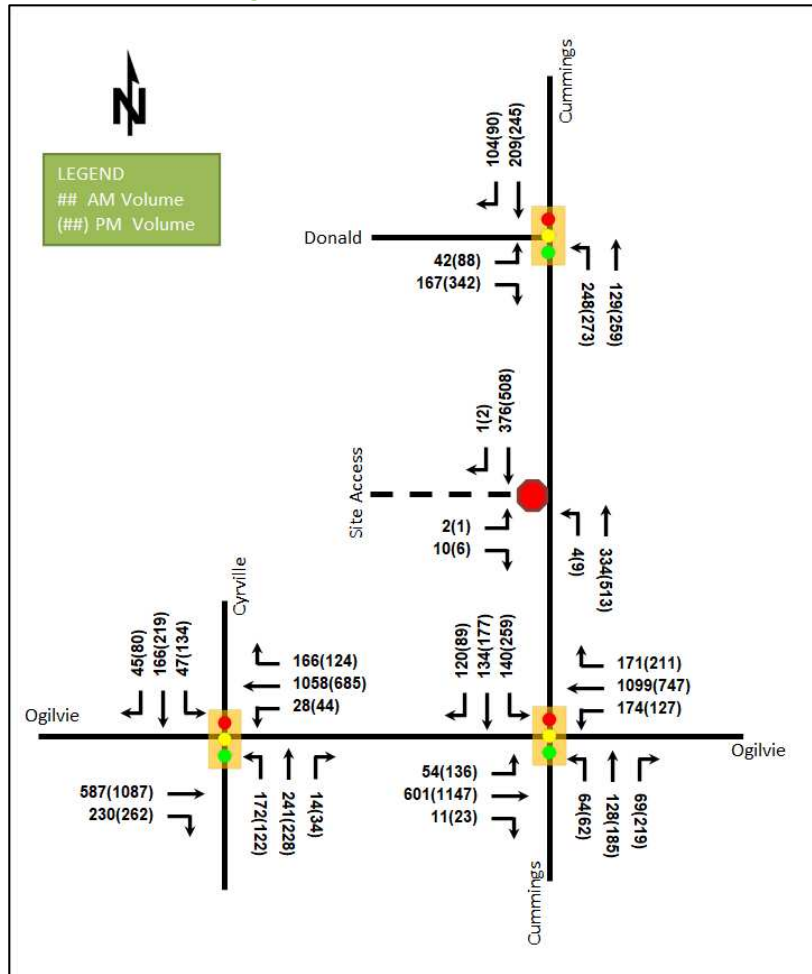


Table 19: 2026 Future Total Intersection Operations

| Intersection  | Lane           | AM Peak Hour |             |             |                       | PM Peak Hour |             |              |                       |
|---|----------------|--------------|-------------|-------------|-----------------------|--------------|-------------|--------------|-----------------------|
|   |                | LOS          | V/C         | Delay (s)   | Q (95 <sup>th</sup> ) | LOS          | V/C         | Delay (s)    | Q (95 <sup>th</sup> ) |
| Ogilvie Road at Cyrville Road<br><i>Signalized</i>    | EBT            | A            | 0.27        | 10.1        | 48.9                  | A            | 0.50        | 12.5         | 104.8                 |
|   | EBR            | A            | 0.24        | 2.2         | 10.8                  | A            | 0.27        | 2.1          | 11.4                  |
|   | WBL            | A            | 0.06        | 4.5         | m1.2                  | A            | 0.17        | 20.6         | m8.8                  |
|   | WBT            | A            | 0.49        | 4.7         | 20.2                  | A            | 0.31        | 16.6         | m66.1                 |
|   | WBR            | A            | 0.18        | 0.4         | m0.2                  | A            | 0.14        | 8.7          | m11.3                 |
|   | NBL            | D            | 0.90        | <b>85.9</b> | 59.6                  | E            | 0.95        | <b>113.5</b> | <b>#52.3</b>          |
|   | NBT            | B            | 0.64        | 47.1        | 70.3                  | B            | 0.66        | 48.1         | 71.5                  |
|   | SBL            | A            | 0.28        | 38.6        | 17.7                  | D            | 0.84        | <b>81.1</b>  | 48.1                  |
|   | SBT            | A            | 0.56        | 42.2        | 57.1                  | C            | 0.77        | 53.5         | 81.7                  |
| <b>Overall</b>  | <b>A</b>       | <b>0.59</b>  | <b>17.9</b> | -           | <b>B</b>              | <b>0.61</b>  | <b>26.8</b> | -            |                       |
| Donald Street at Cummings Avenue<br><i>Signalized</i> | EBL            | A            | 0.11        | 14.8        | 10.1                  | A            | 0.22        | 16.7         | 17.8                  |
|   | EBR            | A            | 0.35        | 5.9         | 12.0                  | A            | 0.57        | 6.8          | 17.0                  |
|   | NBL            | A            | 0.58        | 15.7        | 33.1                  | B            | 0.67        | 18.6         | 37.9                  |
|   | NBT            | A            | 0.17        | 8.2         | 13.8                  | A            | 0.35        | 9.4          | 26.4                  |
|   | SBT/R          | A            | 0.42        | 8.6         | 27.9                  | A            | 0.47        | 9.8          | 32.5                  |
|   | <b>Overall</b> | <b>A</b>     | <b>0.40</b> | <b>10.3</b> | -                     | <b>A</b>     | <b>0.50</b> | <b>11.3</b>  | -                     |

| Intersection  | Lane           | AM Peak Hour |             |             |                       | PM Peak Hour |             |             |                       |
|---|----------------|--------------|-------------|-------------|-----------------------|--------------|-------------|-------------|-----------------------|
|   |                | LOS          | V/C         | Delay (s)   | Q (95 <sup>th</sup> ) | LOS          | V/C         | Delay (s)   | Q (95 <sup>th</sup> ) |
| <b>Ogilvie Road at Cummings Avenue<br/>Signalized</b> | EBL            | A            | 0.30        | 22.9        | 17.9                  | B            | 0.64        | 36.3        | #32.5                 |
|   | EBT            | A            | 0.38        | 18.1        | 48.6                  | E            | 1.00        | 57.7        | #205.6                |
|   | WBL            | A            | 0.45        | 17.3        | 31.1                  | B            | 0.68        | 41.6        | #39.9                 |
|   | WBT            | C            | 0.78        | 29.7        | 166.8                 | D            | 0.84        | 43.1        | #148.1                |
|   | NBL            | A            | 0.28        | 40.2        | 24.5                  | A            | 0.24        | 36.8        | 23.2                  |
|   | NBT            | A            | 0.56        | 42.4        | 58.7                  | E            | 0.92        | 64.5        | #133.6                |
|   | SBL            | A            | 0.47        | 33.9        | 38.2                  | D            | 0.84        | 46.5        | #75.8                 |
|   | SBT            | A            | 0.48        | 29.8        | 61.9                  | A            | 0.38        | 22.4        | 56.8                  |
|   | <b>Overall</b> | <b>B</b>     | <b>0.69</b> | <b>27.6</b> | -                     | <b>E</b>     | <b>0.92</b> | <b>48.9</b> | -                     |
| <b>Site Access at Cummings Avenue<br/>Signalized</b>  | EB             | B            | 0.02        | 11.1        | 0.8                   | B            | 0.02        | 12.6        | 0.0                   |
|   | NB             | A            | 0.00        | 8.1         | 0.0                   | A            | 0.01        | 8.4         | 0.0                   |
|   | SB             | -            | -           | -           | -                     | -            | -           | -           | -                     |
|   | <b>Overall</b> | <b>A</b>     | -           | <b>0.2</b>  | -                     | <b>A</b>     | -           | <b>0.1</b>  | -                     |

Notes: Saturation flow rate of 1800 veh/h/lane  
 Queue is measured in metres  
 Peak Hour Factor = 1.00  
 Delay = average vehicle delay in seconds  
 m = metered queue  
 # = volume for the 95th %ile cycle exceeds capacity

During both peak hours, the study area intersection operates similar to the 2026 future background condition except for the eastbound left-turn movement during the PM peak hour at the intersection of Ogilvie Road at Cummings Avenue, which may be subject to extended queues, and it is similar to the existing condition.

### 7.4 2031 Future Total Operations

Figure 20 illustrates the 2031 total volumes and Table 20 summarizes the 2031 total intersection operations. The level of service for signalized intersections is based on v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection, and average delay for unsignalized intersections. The synchro worksheets for the 2031 future total horizon are provided in Appendix J.

Figure 20: 2031 Future Total Volumes

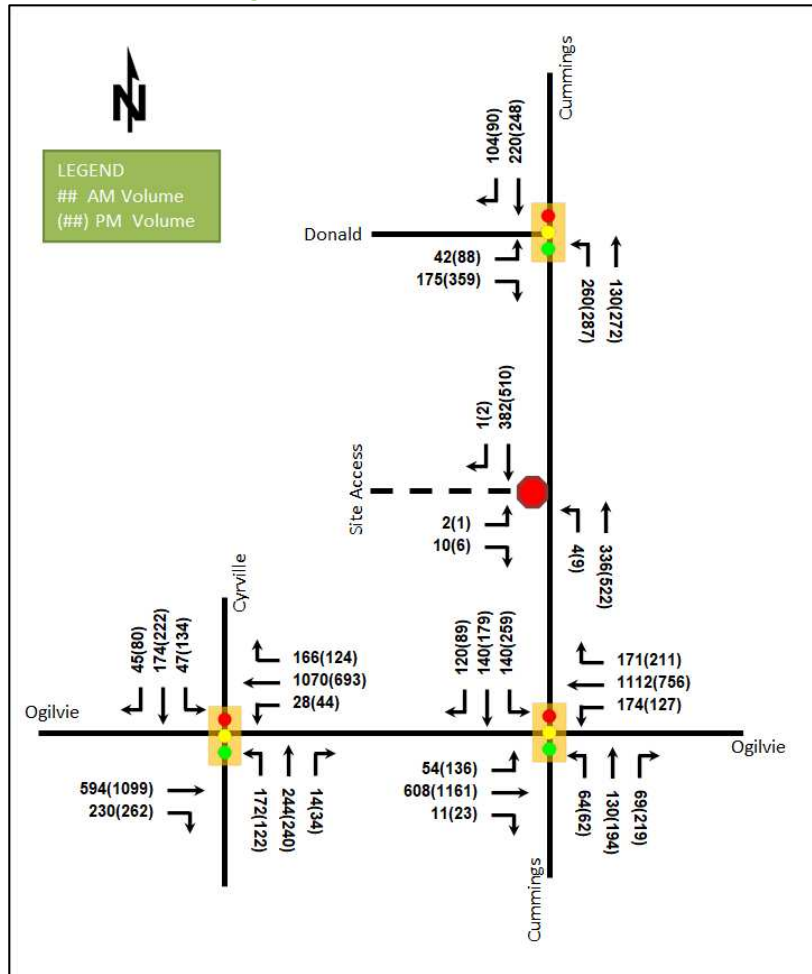


Table 20: 2031 Future Total Intersection Operations

| Intersection   | Lane           | AM Peak Hour |             |             |                       | PM Peak Hour |             |              |                       |
|--|----------------|--------------|-------------|-------------|-----------------------|--------------|-------------|--------------|-----------------------|
|  |                | LOS          | V/C         | Delay (s)   | Q (95 <sup>th</sup> ) | LOS          | V/C         | Delay (s)    | Q (95 <sup>th</sup> ) |
| <b>Ogilvie Road at Cyrville Road</b><br><i>Signalized</i>    | EBT            | A            | 0.28        | 10.3        | 49.6                  | A            | 0.50        | 12.6         | 106.5                 |
|  | EBR            | A            | 0.24        | 2.2         | 10.8                  | A            | 0.27        | 2.1          | 11.4                  |
|  | WBL            | A            | 0.06        | 4.5         | m1.2                  | A            | 0.18        | 21.0         | m8.6                  |
|  | WBT            | A            | 0.49        | 4.8         | 20.3                  | A            | 0.32        | 17.1         | m65.6                 |
|  | WBR            | A            | 0.18        | 0.4         | m0.2                  | A            | 0.14        | 8.9          | m11.1                 |
|  | NBL            | E            | 0.91        | <b>88.8</b> | 60.3                  | E            | 0.96        | <b>114.7</b> | <b>#52.7</b>          |
|  | NBT            | B            | 0.64        | 46.9        | 71.3                  | B            | 0.69        | 49.3         | 75.1                  |
|  | SBL            | A            | 0.28        | 38.3        | 17.7                  | D            | 0.88        | <b>88.9</b>  | 49.2                  |
|  | SBT            | A            | 0.57        | 42.5        | 59.2                  | C            | 0.78        | 53.7         | 82.4                  |
| <b>Overall</b>   | <b>A</b>       | <b>0.60</b>  | <b>18.1</b> | -           | <b>B</b>              | <b>0.62</b>  | <b>27.5</b> | -            |                       |
| <b>Donald Street at Cummings Avenue</b><br><i>Signalized</i> | EBL            | A            | 0.11        | 15.0        | 10.1                  | A            | 0.23        | 17.3         | 18.1                  |
|  | EBR            | A            | 0.36        | 5.9         | 12.3                  | A            | 0.59        | 7.1          | 17.9                  |
|  | NBL            | B            | 0.61        | 16.5        | 35.5                  | B            | 0.69        | 19.2         | 40.6                  |
|  | NBT            | A            | 0.17        | 8.1         | 14.0                  | A            | 0.36        | 9.4          | 27.7                  |
|  | SBT/R          | A            | 0.43        | 8.8         | 29.4                  | A            | 0.46        | 9.6          | 32.7                  |
|  | <b>Overall</b> | <b>A</b>     | <b>0.42</b> | <b>10.6</b> | -                     | <b>A</b>     | <b>0.52</b> | <b>11.4</b>  | -                     |



| Intersection  | Lane           | AM Peak Hour |             |            |                       | PM Peak Hour |             |            |                       |
|---|----------------|--------------|-------------|------------|-----------------------|--------------|-------------|------------|-----------------------|
|   |                | LOS          | V/C         | Delay (s)  | Q (95 <sup>th</sup> ) | LOS          | V/C         | Delay (s)  | Q (95 <sup>th</sup> ) |
| <b>Ogilvie Road at Cummings Avenue<br/>Signalized</b> | EBL            | A            | 0.31        | 23.7       | 18.2                  | B            | 0.65        | 38.6       | #35.3                 |
|   | EBT            | A            | 0.39        | 18.3       | 49.5                  | F            | 1.02        | 63.7       | #209.6                |
|   | WBL            | A            | 0.45        | 17.4       | 31.1                  | B            | 0.68        | 41.5       | #39.6                 |
|   | WBT            | C            | 0.78        | 30.1       | 169.7                 | D            | 0.86        | 44.6       | #150.5                |
|   | NBL            | A            | 0.28        | 40.3       | 24.5                  | A            | 0.24        | 36.6       | 23.2                  |
|   | NBT            | A            | 0.57        | 42.9       | 59.5                  | E            | 0.93        | 66.1       | #138.7                |
|   | SBL            | A            | 0.48        | 34.0       | 38.2                  | D            | 0.84        | 47.3       | #77.3                 |
|   | SBT            | A            | 0.49        | 30.4       | 64.0                  | A            | 0.38        | 22.2       | 57.1                  |
| <b>Overall</b>  | <b>B</b>       | <b>0.70</b>  | <b>27.9</b> | -          | <b>E</b>              | <b>0.93</b>  | <b>51.8</b> | -          |                       |
| <b>Site Access at Cummings Avenue<br/>Signalized</b>  | EB             | B            | 0.02        | 11.2       | 0.8                   | B            | 0.02        | 12.7       | 0.0                   |
|   | NB             | A            | 0.00        | 8.1        | 0.0                   | A            | 0.01        | 8.4        | 0.0                   |
|   | SB             | -            | -           | -          | -                     | -            | -           | -          | -                     |
|   | <b>Overall</b> | <b>A</b>     | -           | <b>0.2</b> | -                     | <b>A</b>     | -           | <b>0.1</b> | -                     |

Notes: Saturation flow rate of 1800 veh/h/lane  
 Queue is measured in metres  
 Peak Hour Factor = 1.00  
 Delay = average vehicle delay in seconds  
 m = metered queue  
 # = volume for the 95th %ile cycle exceeds capacity

During both peak hours, the study area intersection operates similar to the 2031 future background conditions except for the eastbound left-turn movement during the PM peak hour at the intersection of Ogilvie Road at Cummings Avenue may be subject to extended queues, which is similar to the existing condition. No additional capacity issues are noted.

### 7.5 Modal Share Sensitivity and Demand Rationalization Conclusions

The study area notes some minor capacity constraints along Ogilvie Road during the existing and forecasted horizons. These constraints are a result of the east-west traffic volumes and signal progression for the peak hours. It is also noted that the continued construction along Highway 417 and onto Highway 174 has likely inflated these volumes as drivers shift to alternate routes bypass delays only the highway system. These constraints should be monitored by the City as the construction activities wrap up and traffic may normalize back to the highway system. No further regional rationalization or trip demand is required.

The development is expected to generate less than 20 two-way vehicle trips, and the impact on the study area intersections is negligible. No site rationalization for adjusted mode shares or demand is required for this TIA.

## 8 Development Design

### 8.1 Design for Sustainable Modes

The proposed development includes a mid-rise building with a new two-way access on Cummings Avenue. There are a total of 90 underground bicycle parking spaces and a total of 94 surface bicycle parking spaces. Hard surface connections are provided between building entrances and the surrounding pedestrian facilities on Cummings Avenue. The closest bus stop is located less than 100 metres walking distance from the site, Cyrville LRT Station is located approximately 1.0-kilometre walking distance from the site access, and St-Laurent LRT Station is located approximately 1.3-kilometre walking distance from the site access.

### 8.2 Circulation and Access

The proposed development will remove the existing site accesses on Cummings Avenue and propose a new access on at the south end of the site. The site access is 6.7 metres wide, and the vehicle parking is proposed as accessing

the parking garage ramp with a 7.5% slope. The garbage collection vehicles were reviewed to confirm movements will be permitted on site, and the emergency services can access the site via the Cummings Avenue frontage.

## 9 Parking

### 9.1 Parking Supply

The site provides 37 residential parking spaces, 19 surface visitor parking spaces, 90 underground bicycle spaces, and 94 surface bicycle spaces. Within 600 metres of a rapid transit station, the maximum parking provision is 329 spaces, the minimum visitor parking provision is 19 spaces, and the minimum bicycle parking provision is 94 spaces. The vehicle and bicycle parking requirements are satisfied.

## 10 Boundary Street Design

Table 21 summarizes the MMLOS analysis for the boundary street of Cummings Avenue. The MMLOS for Cummings Avenue are only assessed for the existing conditions, as the future conditions will be subject to the City's improvements to the cycling infrastructure. The boundary street analysis is based on the policy area of "Within 600 m of a rapid transit station" and the land-use designation of "Mixed Use Centre". The MMLOS worksheets has been provided in Appendix K.

Table 21: Boundary Street MMLOS Analysis

| Segment         | Pedestrian LOS |        | Bicycle LOS |        | Transit LOS |        | Truck LOS |        |
|-----------------|----------------|--------|-------------|--------|-------------|--------|-----------|--------|
|                 | PLOS           | Target | BLOS        | Target | TLOS        | Target | TrLOS     | Target |
| Cummings Avenue | E              | A      | D           | B      | N/A         | N/A    | C         | D      |

The pedestrian LOS will not be met along the segment of Cummings Avenue. To meet the theoretical pedestrian LOS targets, the boulevards would need to be at least 0.5 metres along boundary streets and the operating speed would need to be lower than 30 km/h.

The bicycle LOS will not be met along the segment of Cummings Avenue. To meet the theoretical bicycle LOS targets, operating speeds would need to be decreased to less than 50 km/h. The City may look at reducing the speed limit to help improve the BLOS results (e.g. 40 km/h would become PLOS B).

No mitigation for the boundary street design is required as part of this application and require higher level City adjustments to the road operations, such as speed limits.

## 11 Access Intersections Design

### 11.1 Location and Design of Access

The proposed access width is approximately 6.7 metres, meeting the private approach width requirements, and the throat length meets the 15.0 metre minimum requirement. Access is provided via a depressed curb through the existing sidewalk at the roadway edge, and it will comply with the City standard SC7.1.

The access is located within the southbound auxiliary left-turn lane for the Ogilvie Road at Cummins Avenue intersection. While this is not an ideal location for an access, given the entire length of Cummings Avenue has back-to-back left-turn lanes for northbound left-turns at Donald Street and southbound left-turns at Ogilvie Road, this cannot be avoided. Access should still be permitted within this section of roadway.

The site access is 1.5 metres from the adjacent property line, which is closer to the required 3.0-metre offset from the private approach by-law, and the adjacent gas station access is approximately 8.5 metres from the property

line, therefore meeting the 9.0 metres offset between accesses. The access location is considered acceptable, and the City can approve through an exemption to the private approach bylaw.

## 11.2 Intersection Control

Based upon the projected volumes, the site access will have stop-control on the minor approaches.

## 11.3 Access Intersection Design

### 11.3.1 Future Access Intersection Operations

The operations are noted in Section 7.4 and no mitigation is required for the development.

### 11.3.2 Access Intersection MMLoS

Based upon the projected volumes, the site access will have stop-control on the minor approaches and don't require MMLoS.

### 11.3.3 Recommended Design Elements

The proposed access is provided via a depressed curb through the existing sidewalk at the roadway edge, and it will comply with the City standard SC7.1.

## 12 Transportation Demand Management

### 12.1 Context for TDM

The subject site is within the Cyville TOD area, the mode shares used within the TIA represent a shift from auto mode to transit mode. Overall, the modal shares are likely to be achieved and supporting TDM measures should be provided.

Total bedrooms within the development are 211 bedrooms across both buildings with 165 studio/one-bedroom units and 23 two-bedroom units.

### 12.2 Need and Opportunity

The subject site has been assumed to rely predominantly on transit due to the proximity to the Cyville LRT Station. The convenience of the transit station should provide the opportunity to reach the forecast transit mode share.

### 12.3 TDM Program

The "suite of post occupancy TDM measures" has been summarized in the TDM checklists for the residential land uses. The checklist is provided in Appendix L. The key TDM measures recommended include:

- Display local area maps with walking and cycling routes, and transit route information and schedules at major entrances
- Provide a multimodal travel option information package to new residents
- Inclusion of a 1-year Presto card for first time apartment rental, with a set time frame for this offer (e.g. 6-months) from the initial opening of the site
- Unbundle parking cost from rental costs

## 13 Transit

### 13.1 Route Capacity

In Section 5.1 the trip generation by mode was estimated, including an estimate of the number of transit trips that will be generated by the proposed development. Table 22 summarizes the transit trip generation.

Table 22: Trip Generation by Transit Mode

| Travel Mode | Mode Share | AM Peak Hour |     |       | PM Peak Hour |     |       |
|-------------|------------|--------------|-----|-------|--------------|-----|-------|
|             |            | In           | Out | Total | In           | Out | Total |
| Transit     | 55% (45%)  | 14           | 31  | 45    | 21           | 15  | 36    |

The proposed development is anticipated to generate an additional 45 AM and 36 PM peak hour two-way transit trips. From the trip distribution found in section 5.3, these values can be further broken down. Table 23 summarizes forecasted site-generated transit ridership trips by direction and the equivalent bus loads.

Table 23: Forecasted Site-Generated Transit Ridership

| Direction | AM Peak Hour |     | PM Peak Hour |     | Service Type | Approximate Equivalent Peak Hour/Direction Bus Loads |
|-----------|--------------|-----|--------------|-----|--------------|--|
|           | In           | Out | In           | Out |              |  |
| North     | 2            | 5   | 3            | 2   | Bus          | Negligible   |
| South     | 3            | 6   | 4            | 3   | Bus          | Negligible   |
| East      | 2            | 5   | 3            | 2   | Bus, LRT     | Negligible   |
| West      | 7            | 15  | 11           | 8   | Bus, LRT     | One-thirds of a standard bus                         |

### 13.2 Transit Priority

Examining the study area intersection delays, negligible impacts are noted on the transit movements and no decrease in transit LOS at the study area intersections are noted as a result of forecasted site-generated traffic.

## 14 Network Intersection Design

### 14.1 Network Intersection Control

No change to the existing signalized control is recommended for the network intersections.

### 14.2 Network Intersection Design

#### 14.2.1 2026 & 2031 Future Total Network Intersection Operations

The operations are noted in Section 7.4 and no mitigation of conditions is required for the subject site traffic.

#### 14.2.2 Network Intersection MMLoS

Table 24 summarizes the MMLoS analysis for the network intersections of Ogilvie Road at Cyrville Road, Donald Street at Cummings Avenue, and Ogilvie Road at Cummings Avenue. The existing and future conditions for both intersections will be the same and are considered in one row. The intersection analysis is based on the policy area of “Within 600 m of a rapid transit station” and the land-use designation of “Mixed Use Centre”. The MMLoS worksheets has been provided in Appendix K.

Table 24: Study Area Intersection MMLoS Analysis

| Intersection                     | Pedestrian LOS |        | Bicycle LOS |        | Transit LOS |        | Truck LOS |        | Auto LOS |        |
|----------------------------------|----------------|--------|-------------|--------|-------------|--------|-----------|--------|----------|--------|
|                                  | PLOS           | Target | BLOS        | Target | TLOS        | Target | TrLOS     | Target | ALOS     | Target |
| Ogilvie Road at Cyrville Road    | F              | A      | F           | B      | C           | C      | C         | D      | B        | D      |
| Donald Street at Cummings Avenue | F              | A      | E           | B      | N/A         | N/A    | C         | D      | A        | D      |
| Ogilvie Road at Cummings Avenue  | F              | A      | F           | B      | F           | C      | C         | D      | E        | D      |

The pedestrian LOS targets will not be met at the study area intersections. As typical for arterial roads, the crossing distance does not permit the targets to be met. To meet pedestrian LOS targets, the maximum crossing distance on all pedestrian crossings would need to be reduced to two lane-widths.

Pedestrian delay LOS is not considered in the PLOS calculation as it is not a suitable metric for the assessment of pedestrian LOS as formulated. This exclusion is consistent with City direction since 2015, and no alternative methodology has been provided for its assessment.

The bicycle LOS targets will not be met at the study area intersections. To meet bicycle LOS targets, the left-turn configurations would need to be two-stage or include turn boxes.

The transit LOS will not be met at Ogilvie Road at Cummings Avenue intersection and the delay would need to be zero to meet the target of LOS A.

The development is expected to have negligible impact to the study area intersections, and the City will be responsible for exploring options to address the area PLOS, BLOS, TLOS, and ALOS deficiencies. An additional MMLOS analysis is suggested during the City's redesign and upgrades at the Ogilvie Road at Cummings Road intersection.

#### 14.2.3 Recommended Design Elements

No study area intersection design elements are proposed as part of this study.

## 15 Summary of Improvements Indicated and Modifications Options

The following summarizes the analysis and results presented in this TIA report:

### Proposed Site and Screening

- The proposed site includes an apartment building totalling 188 units with 37 residential parking spaces, 19 visitor parking spaces, and 184 bicycle parking spaces
- The proposed development will remove the existing site accesses on Cummings Avenue and propose a new access on at the south end of the site
- The development is proposed to be completed as a single phase by 2026
- The development site is within the Cyrville TOD area and Inner East Lines 1 and 3 Stations secondary plan area
- The trip generation and safety triggers were met for the TIA Screening

### Existing Conditions

- Cummings Avenue south of Ogilvie Road, Ogilvie Road, Cyrville Road south of Cummings Avenue/Labelle Street are arterial roads
- Cummings Avenue between Ogilvie Road and Donald Street, and Donald Street are major collector roads, and Cummings Avenue north of Donald Street, Cyrville Road north of Cummings Avenue/Labelle Street are collector roads in the study area
- Sidewalks are provided along the east side of Cummings Avenue south of Ogilvie Road and both sides of Cyrville Road, Ogilvie Road, Donald Street, and Cummings Avenue north of Ogilvie Road
- Bike lanes are provided along Cyrville Road south of Ogilvie Road, Ogilvie Road, and Donald Street
- Ogilvie Road and Cyrville Road are spine routes and Donald Street and Cummings Avenue are local routes. Cyrville Road south of Ogilvie Road and Ogilvie Road west of Cyrville Road form part of a crosstown bikeway
- During the PM peak hour, the study area intersections experience capacity issues on the northbound left at the intersections of Ogilvie Road at Cyrville Road and on the eastbound through at Ogilvie Road at Cummings Avenue

- Within the study area, the intersection of Cummings Avenue at Ogilvie Road is noted to have experienced higher collisions than other locations
- The Ogilvie Road at Cummings Avenue intersection had a total of 57 collisions during the 2016-2020 time period, and collision types are most represented by rear end with 23 collisions
- The City's Cycling Safety Review of High-Volume Intersections (March 2020) completed a review of Ogilvie Road at Cummings Avenue intersection, and the report suggests improvements that help address a variety of collisions noted at this intersection
- This report does not recommend any changes to those planned for implementation by the City based upon the Cycling Safety Review, and no further examination is required as part of this study

#### **Development Generated Travel Demand**

- The proposed development is forecasted produce 79 two-way people trips during the AM and PM peak hours
- Of the forecasted people trips, 17 two-way trips will be vehicle trips during the AM and PM peak hours based on a 23% modal share target
- Of the forecasted trips, 15% are anticipated to travel north and east, 20% to the south, and 50% to the west

#### **Background Conditions**

- The background developments were explicitly included in the background conditions, along with background growths along the mainline volumes along Ogilvie Road, Donald Street, Cummings Avenue, and Cyrville Road
- The study area intersections at future background conditions will operate similar to the existing conditions
- No additional capacity issues are noted in the future conditions

#### **Development Design**

- There are a total of 90 underground bicycle parking spaces and a total of 94 surface bicycle parking spaces
- Hard surface connections are provided between building entrances and the surrounding pedestrian facilities on Cummings Avenue
- The closest bus stop is located less than 100 metres walking distance from the site, Cyrville LRT Station is located approximately 1.0-kilometre walking distance from the site access, and St-Laurent LRT Station is located approximately 1.3-kilometre walking distance from the site access
- The site access is 6.7 metres wide, and the vehicle parking is proposed as accessing the parking garage ramp with a 7.5% slope
- The garbage collection vehicles were reviewed to confirm movements will be permitted on site, and the emergency services can access the site via the Cummings Avenue frontage

#### **Parking**

- The site provides 37 residential parking spaces, 19 surface visitor parking spaces, 90 underground bicycle spaces, and 94 surface bicycle spaces
- The vehicle and bicycle parking requirements are satisfied

#### **Boundary Street Design**

- Cummings Avenue does not meet the pedestrian MMLOS targets, and at least 0.5 metres boulevards and lower than 30 km/h operating speed would need to meet the targets

- The bicycle LOS will not be met along the segment of Cummings Avenue, and lower than 50 km/h operating speed would need to meet the targets
- No mitigation for the boundary street design is required as part of this application and require higher level City adjustments to the road operations, such as speed limits

#### **Access Intersections Design**

- The proposed access width is approximately 6.7 metres, meeting the private approach width requirements, and the throat length meets the 15.0 metre minimum requirement
- Access is provided via a depressed curb through the existing sidewalk at the roadway edge, and it will comply with the City standard SC7.1
- The site access is 1.5 metres from the adjacent property line, which is closer to the required 3.0-metre offset from the private approach by-law, and the adjacent gas station access is approximately 8.5 metres from the property line, therefore meeting the 9.0 metres offset between accesses
- The access location is considered acceptable and the City can approve through an exemption to the private approach bylaw

#### **TDM**

- Supportive TDM measures to be included within the proposed development should include:
  - Display local area maps with walking and cycling routes, and transit route information and schedules at major entrances
  - Provide a multimodal travel option information package to new residents
  - Inclusion of a 1-year Presto card for first time apartment rental, with a set time frame for this offer (e.g. 6-months) from the initial opening of the site
  - Unbundle parking cost from rental costs

#### **Transit**

- The proposed development is anticipated to generate an additional 45 AM and 36 PM peak hour two-way transit trips
- Peak hour increases in transit ridership resulting from the site equate to one-thirds of a standard bus load westerly of the site, and negligible impact northerly, southerly, and easterly of the site
- Negligible impacts are noted on the transit movements

#### **Network Intersection Design**

- No change to the existing signalized control is recommended for the network intersections
- Generally, the network intersections will operate similarly to the existing condition, and no mitigation of conditions is required for the subject site traffic
- The pedestrian LOS targets will not be met at the study area intersections, and two lane-widths crossing distance on all pedestrian crossings would need
- Pedestrian delay LOS is not considered in the PLOS calculation
- The bicycle LOS targets will not be met at the study area intersections, and left-turn configurations would need to be two-stage or include turn boxes on all approaches
- The transit LOS will not be met at Ogilvie Road at Cummings Avenue intersection and the delay would need to be zero to meet the target of LOS A
- The development is expected to have negligible impact to the study area intersections, and the City of Ottawa will be responsible for exploring options to address the area PLOS, BLOS, TLOS, and ALOS deficiencies

- An additional MMLoS analysis is suggested during the City's redesign and upgrades at the Ogilvie Road at Cummings Road intersection

## 16 Conclusion

It is recommended that, from a transportation perspective, the proposed development applications proceed.

Prepared By:



Yu-Chu Chen, EIT  
Transportation Engineering-Intern

Reviewed By:



Andrew Harte, P.Eng.  
Senior Transportation Engineer



# Appendix A

TIA Screening Form and PM Certification Form

City of Ottawa 2017 TIA Guidelines  
Step 1 - Screening Form

Date: 21-Dec-22  
Project Number: 2022-168  
Project Reference: TCU 1184-96 Cummings

| 1.1 Description of Proposed Development |  |
|---|--|
| Municipal Address                       | 1184, 1188, 1196 Cummings Avenue   |
| Description of Location                 | Three existing residential lots north of the Ogilvie-Cummings intersection |
| Land Use Classification                 | Residential Third Density (R3Y [708] )                                     |
| Development Size                        | 188 residential units, approximately 56 parking stalls                     |
| Accesses                                | Single access  |
| Phase of Development                    | Single   |
| Buildout Year                           | 2025   |
| TIA Requirement                         | Full TIA Required  |

| 1.2 Trip Generation Trigger |                         |
|-----------------------------|-------------------------|
| Land Use Type               | Townhomes or apartments |
| Development Size            | 188 Units               |
| Trip Generation Trigger     | Yes                     |

| 1.3 Location Triggers  |    |
|--|----|
| Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks? | No |
| Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?   | No |
| Location Trigger   | No |

| 1.4. Safety Triggers  |     |   |
|---|-----|---|
| Are posted speed limits on a boundary street 80 km/hr or greater?   | No  |   |
| Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?  | No  |   |
| Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions)? | Yes | Site frontage is 32m north of Ogilvie to 108m north of Ogilvie  |
| Is the proposed driveway within auxiliary lanes of an intersection?   | Yes | Southbound left-turn on Cummings extends Donald, all accesses along Cummings are within an auxiliary lane |
| Does the proposed driveway make use of an existing median break that serves an existing site?   | No  |   |
| Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?  | Yes | High collisions at Ogilvie and Cyrville   |
| Does the development include a drive-thru facility?   | No  |   |
| Safety Trigger  | Yes |   |



## **TIA Plan Reports**

On 14 June 2017, the Council of the City of Ottawa adopted new Transportation Impact Assessment (TIA) Guidelines. In adopting the guidelines, Council established a requirement for those preparing and delivering transportation impact assessments and reports to sign a letter of certification.

Individuals submitting TIA reports will be responsible for all aspects of development-related transportation assessment and reporting, and undertaking such work, in accordance and compliance with the City of Ottawa's Official Plan, the Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines.

By submitting the attached TIA report (and any associated documents) and signing this document, the individual acknowledges that s/he meets the four criteria listed below.

### **CERTIFICATION**

1. I have reviewed and have a sound understanding of the objectives, needs and requirements of the City of Ottawa's Official Plan, Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines;
2. I have a sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;
3. I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and
4. I am either a licensed<sup>1</sup> or registered<sup>2</sup> professional in good standing, whose field of expertise [check  appropriate field(s)] is either transportation engineering  or transportation planning .

**1,2 License of registration body that oversees the profession is required to have a code of conduct and ethics guidelines that will ensure appropriate conduct and representation for transportation planning and/or transportation engineering works.**


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Tél. : 613-580-2424  
Télécopieur: 613-560-6006

Dated at Ottawa this 20 day of September, 2018.  
(City)

Name: Andrew Harte  
(Please Print)

Professional Title: Professional Engineer

  
Signature of Individual certifier that s/he meets the above four criteria

|  |
|--|
| <b>Office Contact Information (Please Print)</b>   |
| Address: 6 Plaza Court                             |
| City / Postal Code: Ottawa / K2H 7W1               |
| Telephone / Extension: (613) 697-3797              |
| E-Mail Address: Andrew.Harte@CGHTransportation.com |



# Appendix B

Turning Movement Counts



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### CYRVILLE RD @ OGILVIE RD

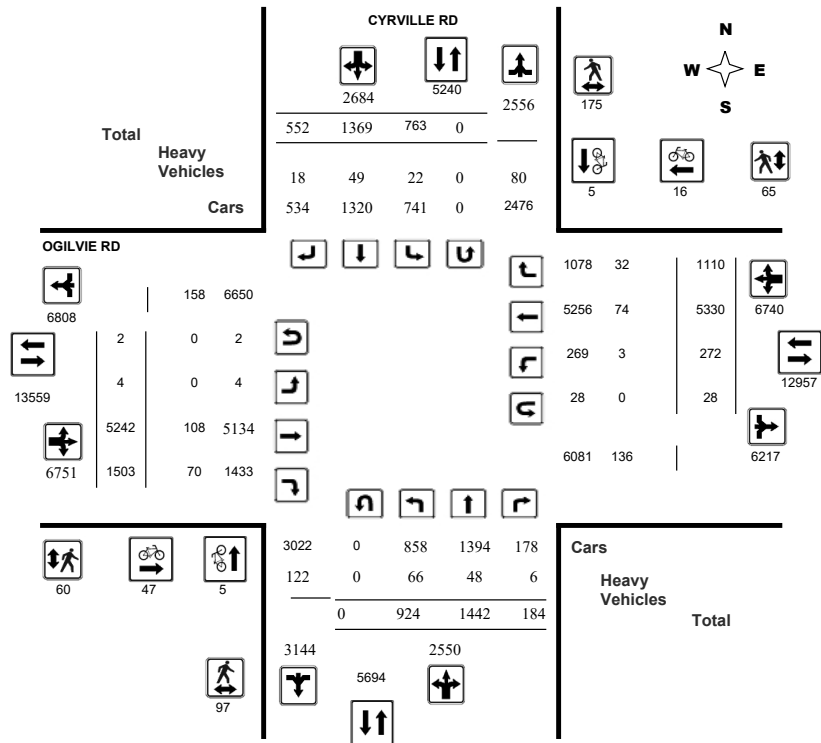
Survey Date: Wednesday, April 11, 2018

WO No: 37723

Start Time: 07:00

Device: Miovision

#### Full Study Diagram



# Transportation Services - Traffic Services

## Turning Movement Count - Study Results

### CYRVILLE RD @ OGILVIE RD

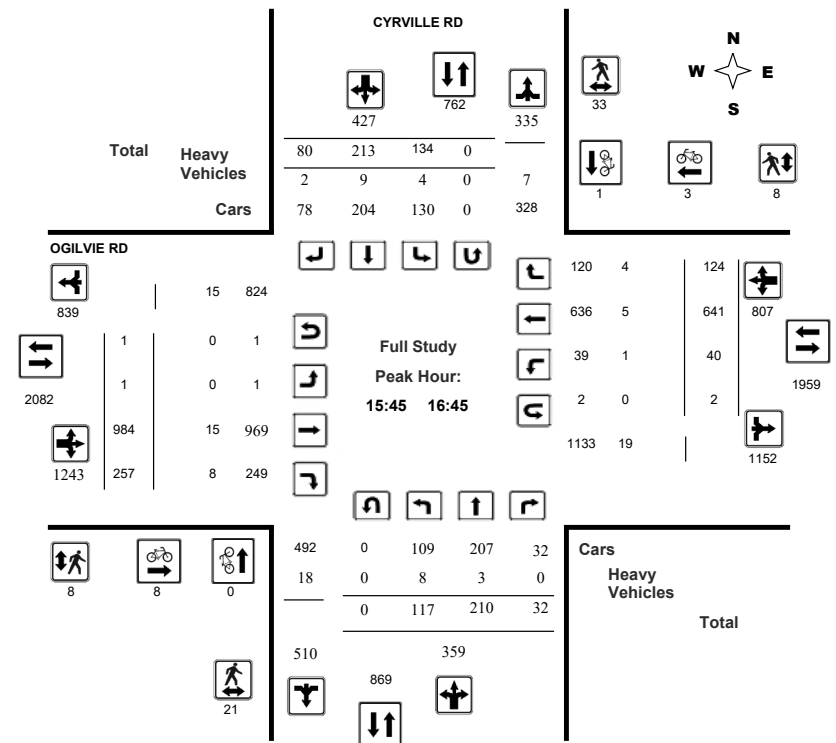
Survey Date: Wednesday, April 11, 2018

WO No: 37723

Start Time: 07:00

Device: Miovision

#### Full Study Peak Hour Diagram





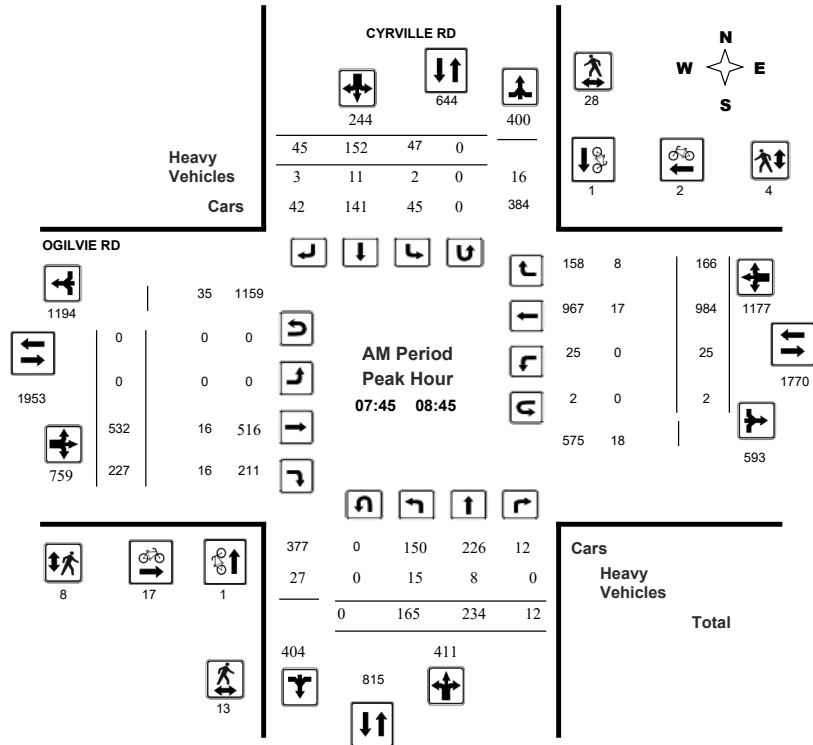
# Transportation Services - Traffic Services

## Turning Movement Count - Peak Hour Diagram

### CYRVILLE RD @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018  
Start Time: 07:00

WO No: 37723  
Device: Miovision



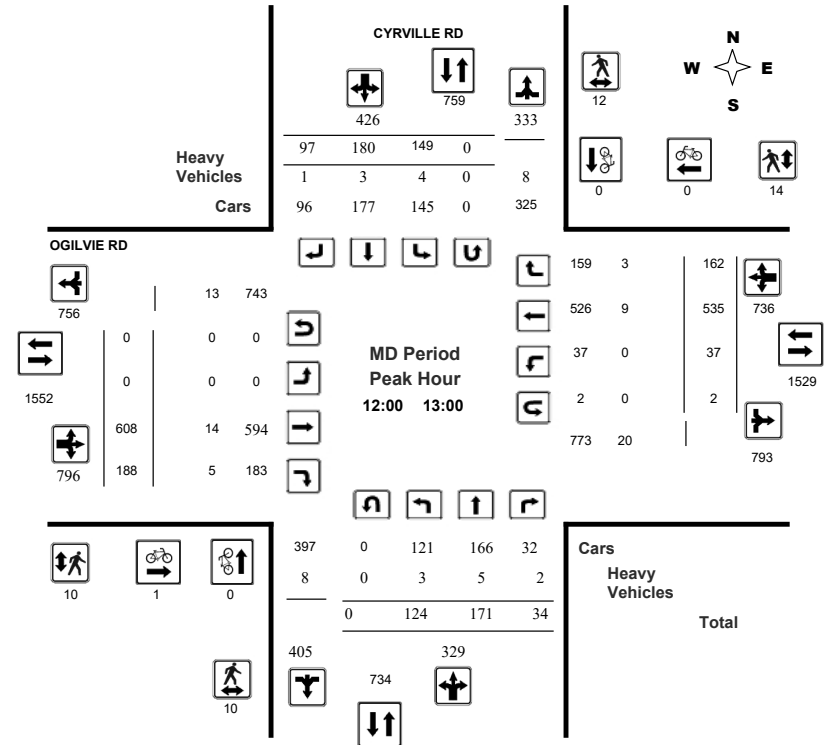
# Transportation Services - Traffic Services

## Turning Movement Count - Peak Hour Diagram

### CYRVILLE RD @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018  
Start Time: 07:00

WO No: 37723  
Device: Miovision

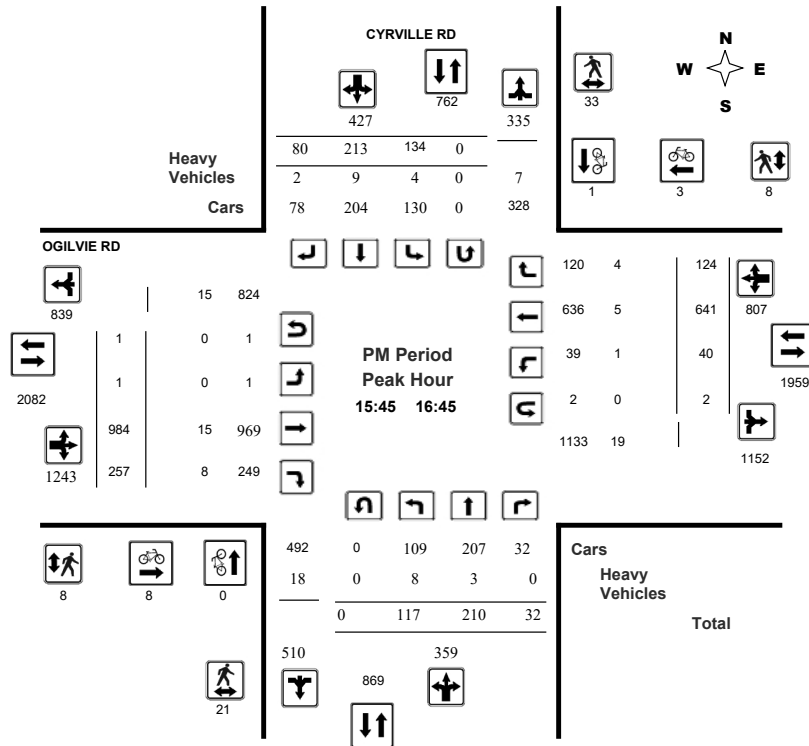




**Transportation Services - Traffic Services**  
**Turning Movement Count - Peak Hour Diagram**  
**CYRVILLE RD @ OGILVIE RD**

Survey Date: Wednesday, April 11, 2018  
 Start Time: 07:00

WO No: 37723  
 Device: Miovision



Comments



**Transportation Services - Traffic Services**  
**Turning Movement Count - Study Results**  
**CYRVILLE RD @ OGILVIE RD**

Survey Date: Wednesday, April 11, 2018  
 Start Time: 07:00

WO No: 37723  
 Device: Miovision

**Full Study Summary (8 HR Standard)**

Survey Date: Wednesday, April 11, 2018

Total Observed U-Turns  
 Northbound: 0 Southbound: 0  
 Eastbound: 2 Westbound: 28

AADT Factor .90

| Period  | CYRVILLE RD |             |            |             |             |             |             |            |             |             | OGILVIE RD |             |             |              |             |            |             |             |              |              | Grand Total  |
|---|-------------|-------------|------------|-------------|-------------|-------------|-------------|------------|-------------|-------------|------------|-------------|-------------|--------------|-------------|------------|-------------|-------------|--------------|--------------|--------------|
|   | Northbound  |             |            |             |             | Southbound  |             |            |             |             | Eastbound  |             |             |              |             | Westbound  |             |             |              |              |              |
|   | LT          | ST          | RT         | NB TOT      | STR TOT     | LT          | ST          | RT         | SB TOT      | STR TOT     | LT         | ST          | RT          | EB TOT       | STR TOT     | LT         | ST          | RT          | WB TOT       | STR TOT      |              |
| 07:00-08:00   | 144         | 156         | 10         | 310         | 544         | 27          | 172         | 35         | 234         | 544         | 0          | 556         | 185         | 741          | 501         | 24         | 838         | 146         | 1008         | 1749         | 2293         |
| 08:00-09:00   | 157         | 230         | 13         | 400         | 657         | 64          | 144         | 49         | 257         | 657         | 0          | 545         | 201         | 746          | 501         | 31         | 921         | 172         | 1124         | 1870         | 2527         |
| 09:00-10:00   | 86          | 133         | 12         | 231         | 501         | 74          | 144         | 52         | 270         | 501         | 1          | 475         | 145         | 621          | 501         | 38         | 576         | 126         | 740          | 1361         | 1862         |
| 11:30-12:30   | 113         | 173         | 36         | 322         | 675         | 92          | 156         | 105        | 353         | 675         | 0          | 654         | 174         | 828          | 675         | 27         | 523         | 152         | 702          | 1530         | 2205         |
| 12:30-13:30   | 113         | 151         | 35         | 299         | 714         | 146         | 179         | 90         | 415         | 714         | 0          | 563         | 188         | 751          | 714         | 44         | 535         | 138         | 717          | 1468         | 2182         |
| 15:00-16:00   | 109         | 178         | 29         | 316         | 729         | 122         | 227         | 64         | 413         | 729         | 2          | 828         | 205         | 1035         | 729         | 33         | 632         | 143         | 808          | 1843         | 2572         |
| 16:00-17:00   | 124         | 215         | 16         | 355         | 759         | 129         | 189         | 86         | 404         | 759         | 1          | 736         | 256         | 993          | 759         | 34         | 656         | 117         | 807          | 1800         | 2559         |
| 17:00-18:00   | 78          | 206         | 33         | 317         | 655         | 109         | 158         | 71         | 338         | 655         | 0          | 885         | 149         | 1034         | 655         | 41         | 649         | 116         | 806          | 1840         | 2495         |
| <b>Sub Total</b>  | <b>924</b>  | <b>1442</b> | <b>184</b> | <b>2550</b> | <b>5234</b> | <b>763</b>  | <b>1369</b> | <b>552</b> | <b>2684</b> | <b>5234</b> | <b>4</b>   | <b>5242</b> | <b>1503</b> | <b>6749</b>  | <b>5234</b> | <b>272</b> | <b>5330</b> | <b>1110</b> | <b>6712</b>  | <b>13461</b> | <b>18695</b> |
| <b>U Turns</b>  | <b>0</b>    |             |            |             |             |             |             |            |             |             | <b>0</b>   |             |             |              |             | <b>2</b>   |             |             |              |              | <b>30</b>    |
| <b>Total</b>  | <b>924</b>  | <b>1442</b> | <b>184</b> | <b>2550</b> | <b>5234</b> | <b>763</b>  | <b>1369</b> | <b>552</b> | <b>2684</b> | <b>5234</b> | <b>4</b>   | <b>5242</b> | <b>1503</b> | <b>6751</b>  | <b>5234</b> | <b>272</b> | <b>5330</b> | <b>1110</b> | <b>6740</b>  | <b>13491</b> | <b>18725</b> |
| <b>EQ 12Hr</b>  | <b>1284</b> | <b>2004</b> | <b>256</b> | <b>3544</b> | <b>7275</b> | <b>1061</b> | <b>1903</b> | <b>767</b> | <b>3731</b> | <b>7275</b> | <b>6</b>   | <b>7286</b> | <b>2089</b> | <b>9384</b>  | <b>7275</b> | <b>378</b> | <b>7409</b> | <b>1543</b> | <b>9369</b>  | <b>18752</b> | <b>26028</b> |
| Note: These values are calculated by multiplying the totals by the appropriate expansion factor.                |             |             |            |             |             |             |             |            |             |             |            |             |             |              | <b>1.39</b> |            |             |             |              |              |              |
| <b>AVG 12Hr</b>   | <b>1089</b> | <b>1700</b> | <b>217</b> | <b>3006</b> | <b>6548</b> | <b>900</b>  | <b>1614</b> | <b>651</b> | <b>3164</b> | <b>6548</b> | <b>5</b>   | <b>6180</b> | <b>1772</b> | <b>7959</b>  | <b>6548</b> | <b>321</b> | <b>6284</b> | <b>1309</b> | <b>7946</b>  | <b>16877</b> | <b>23425</b> |
| Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.              |             |             |            |             |             |             |             |            |             |             |            |             |             |              | <b>0.9</b>  |            |             |             |              |              |              |
| <b>AVG 24Hr</b>   | <b>1427</b> | <b>2227</b> | <b>284</b> | <b>3938</b> | <b>8083</b> | <b>1178</b> | <b>2114</b> | <b>853</b> | <b>4145</b> | <b>8083</b> | <b>6</b>   | <b>8096</b> | <b>2321</b> | <b>10427</b> | <b>8083</b> | <b>420</b> | <b>8232</b> | <b>1714</b> | <b>10410</b> | <b>20837</b> | <b>28920</b> |
| Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor. |             |             |            |             |             |             |             |            |             |             |            |             |             |              | <b>1.31</b> |            |             |             |              |              |              |
| Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.                    |             |             |            |             |             |             |             |            |             |             |            |             |             |              |             |            |             |             |              |              |              |





### Transportation Services - Traffic Services

#### Turning Movement Count - Study Results

##### CYRVILLE RD @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018

WO No: 37723

Start Time: 07:00

Device: Miovision

#### Full Study 15 Minute Increments

| CYRVILLE RD |       |     |            |       |      |     |           |       |         |     | OGILVIE RD |      |       |      |            |      |       |            |             |        |  | Grand Total |           |  |  |  |           |  |  |
|-------------|-------|-----|------------|-------|------|-----|-----------|-------|---------|-----|------------|------|-------|------|------------|------|-------|------------|-------------|--------|--|-------------|-----------|--|--|--|-----------|--|--|
| Northbound  |       |     | Southbound |       |      |     | Eastbound |       |         |     | Westbound  |      |       |      | Northbound |      |       | Southbound |             |        |  |             | Eastbound |  |  |  | Westbound |  |  |
| Time Period | LT    | ST  | RT         | N TOT | LT   | ST  | RT        | S TOT | STR TOT | LT  | ST         | RT   | E TOT | LT   | ST         | RT   | W TOT | STR TOT    | Grand Total |        |  |             |           |  |  |  |           |  |  |
| 07:00       | 07:15 | 26  | 39         | 1     | 66   | 4   | 36        | 9     | 49      | 5   | 0          | 128  | 42    | 170  | 6          | 162  | 37    | 206        | 5           | 491    |  |             |           |  |  |  |           |  |  |
| 07:15       | 07:30 | 44  | 28         | 3     | 75   | 6   | 36        | 10    | 52      | 8   | 0          | 146  | 40    | 186  | 3          | 188  | 39    | 230        | 8           | 543    |  |             |           |  |  |  |           |  |  |
| 07:30       | 07:45 | 31  | 37         | 3     | 71   | 7   | 53        | 6     | 66      | 9   | 0          | 148  | 39    | 187  | 12         | 236  | 31    | 279        | 9           | 603    |  |             |           |  |  |  |           |  |  |
| 07:45       | 08:00 | 43  | 52         | 3     | 98   | 10  | 47        | 10    | 67      | 10  | 0          | 134  | 64    | 198  | 3          | 252  | 39    | 294        | 10          | 657    |  |             |           |  |  |  |           |  |  |
| 08:00       | 08:15 | 32  | 50         | 3     | 85   | 12  | 28        | 7     | 47      | 10  | 0          | 131  | 52    | 183  | 6          | 270  | 38    | 314        | 10          | 629    |  |             |           |  |  |  |           |  |  |
| 08:15       | 08:30 | 44  | 73         | 3     | 120  | 10  | 31        | 13    | 54      | 8   | 0          | 140  | 58    | 198  | 8          | 252  | 33    | 295        | 8           | 667    |  |             |           |  |  |  |           |  |  |
| 08:30       | 08:45 | 46  | 59         | 3     | 108  | 15  | 46        | 15    | 76      | 11  | 0          | 127  | 53    | 180  | 8          | 210  | 56    | 274        | 11          | 638    |  |             |           |  |  |  |           |  |  |
| 08:45       | 09:00 | 35  | 48         | 4     | 87   | 27  | 39        | 14    | 80      | 11  | 0          | 147  | 38    | 185  | 9          | 189  | 45    | 243        | 11          | 595    |  |             |           |  |  |  |           |  |  |
| 09:00       | 09:15 | 21  | 31         | 3     | 55   | 16  | 48        | 10    | 74      | 7   | 0          | 126  | 40    | 166  | 12         | 163  | 52    | 227        | 7           | 522    |  |             |           |  |  |  |           |  |  |
| 09:15       | 09:30 | 26  | 35         | 1     | 62   | 15  | 27        | 15    | 57      | 4   | 0          | 130  | 32    | 162  | 9          | 140  | 26    | 175        | 4           | 456    |  |             |           |  |  |  |           |  |  |
| 09:30       | 09:45 | 16  | 35         | 5     | 56   | 27  | 46        | 19    | 92      | 10  | 1          | 126  | 39    | 166  | 14         | 150  | 24    | 188        | 10          | 502    |  |             |           |  |  |  |           |  |  |
| 09:45       | 10:00 | 23  | 32         | 3     | 58   | 16  | 23        | 8     | 47      | 9   | 0          | 93   | 34    | 127  | 3          | 123  | 24    | 153        | 9           | 385    |  |             |           |  |  |  |           |  |  |
| 11:30       | 11:45 | 30  | 40         | 9     | 79   | 31  | 33        | 25    | 89      | 3   | 0          | 166  | 41    | 207  | 7          | 128  | 28    | 163        | 3           | 538    |  |             |           |  |  |  |           |  |  |
| 11:45       | 12:00 | 23  | 45         | 8     | 76   | 16  | 37        | 22    | 75      | 12  | 0          | 160  | 44    | 204  | 7          | 126  | 35    | 179        | 12          | 534    |  |             |           |  |  |  |           |  |  |
| 12:00       | 12:15 | 32  | 46         | 11    | 89   | 24  | 38        | 30    | 92      | 2   | 0          | 150  | 33    | 183  | 7          | 144  | 37    | 189        | 2           | 553    |  |             |           |  |  |  |           |  |  |
| 12:15       | 12:30 | 28  | 42         | 8     | 78   | 21  | 48        | 28    | 97      | 3   | 0          | 178  | 56    | 234  | 6          | 125  | 52    | 184        | 3           | 593    |  |             |           |  |  |  |           |  |  |
| 12:30       | 12:45 | 30  | 40         | 7     | 77   | 73  | 36        | 15    | 124     | 8   | 0          | 130  | 44    | 174  | 11         | 143  | 34    | 188        | 8           | 563    |  |             |           |  |  |  |           |  |  |
| 12:45       | 13:00 | 34  | 43         | 8     | 85   | 31  | 58        | 24    | 113     | 5   | 0          | 150  | 55    | 205  | 13         | 123  | 39    | 175        | 5           | 578    |  |             |           |  |  |  |           |  |  |
| 13:00       | 13:15 | 29  | 39         | 12    | 80   | 27  | 42        | 28    | 97      | 10  | 0          | 139  | 49    | 188  | 10         | 126  | 29    | 165        | 10          | 530    |  |             |           |  |  |  |           |  |  |
| 13:15       | 13:30 | 20  | 29         | 8     | 57   | 15  | 43        | 23    | 81      | 5   | 0          | 144  | 40    | 184  | 10         | 143  | 36    | 190        | 5           | 512    |  |             |           |  |  |  |           |  |  |
| 15:00       | 15:15 | 34  | 40         | 5     | 79   | 35  | 55        | 23    | 113     | 5   | 0          | 195  | 47    | 243  | 12         | 158  | 28    | 198        | 5           | 633    |  |             |           |  |  |  |           |  |  |
| 15:15       | 15:30 | 23  | 49         | 3     | 75   | 30  | 53        | 14    | 97      | 4   | 2          | 206  | 36    | 244  | 6          | 143  | 38    | 187        | 4           | 603    |  |             |           |  |  |  |           |  |  |
| 15:30       | 15:45 | 25  | 48         | 5     | 78   | 26  | 46        | 16    | 88      | 3   | 0          | 179  | 46    | 225  | 9          | 184  | 38    | 232        | 3           | 623    |  |             |           |  |  |  |           |  |  |
| 15:45       | 16:00 | 27  | 41         | 16    | 84   | 31  | 73        | 11    | 115     | 9   | 0          | 248  | 76    | 324  | 6          | 147  | 39    | 192        | 9           | 715    |  |             |           |  |  |  |           |  |  |
| 16:00       | 16:15 | 31  | 70         | 3     | 104  | 40  | 45        | 15    | 100     | 6   | 0          | 259  | 55    | 315  | 13         | 171  | 23    | 207        | 6           | 726    |  |             |           |  |  |  |           |  |  |
| 16:15       | 16:30 | 22  | 48         | 4     | 74   | 30  | 47        | 28    | 105     | 5   | 0          | 233  | 78    | 311  | 14         | 154  | 32    | 201        | 5           | 691    |  |             |           |  |  |  |           |  |  |
| 16:30       | 16:45 | 37  | 51         | 9     | 97   | 33  | 48        | 26    | 107     | 6   | 1          | 244  | 48    | 293  | 7          | 169  | 30    | 207        | 6           | 704    |  |             |           |  |  |  |           |  |  |
| 16:45       | 17:00 | 34  | 46         | 0     | 80   | 26  | 49        | 17    | 92      | 5   | 0          | 0    | 75    | 75   | 0          | 162  | 32    | 194        | 5           | 441    |  |             |           |  |  |  |           |  |  |
| 17:00       | 17:15 | 17  | 63         | 9     | 89   | 28  | 49        | 12    | 89      | 5   | 0          | 283  | 44    | 327  | 11         | 167  | 26    | 205        | 5           | 710    |  |             |           |  |  |  |           |  |  |
| 17:15       | 17:30 | 19  | 47         | 7     | 73   | 34  | 43        | 17    | 94      | 4   | 0          | 245  | 38    | 283  | 16         | 182  | 31    | 231        | 4           | 681    |  |             |           |  |  |  |           |  |  |
| 17:30       | 17:45 | 22  | 55         | 8     | 85   | 31  | 38        | 20    | 89      | 2   | 0          | 197  | 29    | 226  | 5          | 145  | 27    | 177        | 2           | 577    |  |             |           |  |  |  |           |  |  |
| 17:45       | 18:00 | 20  | 41         | 9     | 70   | 16  | 28        | 22    | 66      | 5   | 0          | 160  | 38    | 198  | 9          | 155  | 32    | 198        | 5           | 532    |  |             |           |  |  |  |           |  |  |
| Total:      |       | 924 | 1442       | 184   | 2550 | 763 | 1369      | 552   | 2684    | 209 | 4          | 5242 | 1503  | 6751 | 272        | 5330 | 1110  | 6740       | 209         | 18,725 |  |             |           |  |  |  |           |  |  |

Note: U-Turns are included in Totals.



### Transportation Services - Traffic Services

#### Turning Movement Count - Study Results

##### CYRVILLE RD @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018

WO No: 37723

Start Time: 07:00

Device: Miovision

#### Full Study Cyclist Volume

| CYRVILLE RD |            |            | OGILVIE RD   |           |           | Grand Total |              |
|-------------|------------|------------|--------------|-----------|-----------|-------------|--------------|
| Time Period | Northbound | Southbound | Street Total | Eastbound | Westbound |             | Street Total |
| 07:00       | 07:15      | 0          | 0            | 0         | 1         | 0           | 1            |
| 07:15       | 07:30      | 1          | 0            | 1         | 1         | 2           | 3            |
| 07:30       | 07:45      | 0          | 1            | 1         | 1         | 2           | 4            |
| 07:45       | 08:00      | 1          | 0            | 1         | 3         | 1           | 5            |
| 08:00       | 08:15      | 0          | 0            | 0         | 8         | 0           | 8            |
| 08:15       | 08:30      | 0          | 1            | 1         | 4         | 1           | 6            |
| 08:30       | 08:45      | 0          | 0            | 0         | 2         | 0           | 2            |
| 08:45       | 09:00      | 0          | 1            | 1         | 3         | 0           | 4            |
| 09:00       | 09:15      | 1          | 0            | 1         | 1         | 0           | 2            |
| 09:15       | 09:30      | 0          | 0            | 0         | 2         | 0           | 2            |
| 09:30       | 09:45      | 0          | 0            | 0         | 1         | 1           | 2            |
| 09:45       | 10:00      | 0          | 0            | 0         | 1         | 0           | 1            |
| 11:30       | 11:45      | 1          | 0            | 1         | 0         | 0           | 1            |
| 11:45       | 12:00      | 0          | 0            | 0         | 0         | 0           | 0            |
| 12:00       | 12:15      | 0          | 0            | 0         | 0         | 0           | 0            |
| 12:15       | 12:30      | 0          | 0            | 0         | 0         | 0           | 0            |
| 12:30       | 12:45      | 0          | 0            | 0         | 1         | 0           | 1            |
| 12:45       | 13:00      | 0          | 0            | 0         | 0         | 0           | 0            |
| 13:00       | 13:15      | 0          | 0            | 0         | 0         | 0           | 0            |
| 13:15       | 13:30      | 0          | 0            | 0         | 0         | 0           | 0            |
| 15:00       | 15:15      | 0          | 0            | 0         | 1         | 1           | 2            |
| 15:15       | 15:30      | 0          | 0            | 0         | 0         | 0           | 0            |
| 15:30       | 15:45      | 0          | 0            | 0         | 2         | 0           | 2            |
| 15:45       | 16:00      | 0          | 0            | 0         | 2         | 0           | 2            |
| 16:00       | 16:15      | 0          | 0            | 0         | 0         | 0           | 0            |
| 16:15       | 16:30      | 0          | 1            | 1         | 2         | 1           | 4            |
| 16:30       | 16:45      | 0          | 0            | 0         | 4         | 2           | 6            |
| 16:45       | 17:00      | 0          | 0            | 0         | 0         | 1           | 1            |
| 17:00       | 17:15      | 0          | 0            | 0         | 4         | 2           | 6            |
| 17:15       | 17:30      | 0          | 1            | 1         | 1         | 1           | 3            |
| 17:30       | 17:45      | 1          | 0            | 1         | 1         | 2           | 4            |
| 17:45       | 18:00      | 0          | 0            | 0         | 1         | 0           | 1            |
| Total       |            | 5          | 5            | 10        | 47        | 16          | 63           |



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CYRVILLE RD @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018

WO No: 37723

Start Time: 07:00

Device: Miovision

Full Study Pedestrian Volume

CYRVILLE RD

OGILVIE RD

Table with 8 columns: Time Period, NB Approach, SB Approach, Total, EB Approach, WB Approach, Total, Grand Total. Rows show pedestrian counts for various time intervals from 07:00 to 18:00.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CYRVILLE RD @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018

WO No: 37723

Start Time: 07:00

Device: Miovision

Full Study Heavy Vehicles

CYRVILLE RD

OGILVIE RD

Table with 22 columns: Time Period, Northbound (LT, ST, RT, N TOT, STR TOT), Southbound (LT, ST, RT, S TOT, STR TOT), Eastbound (LT, ST, RT, E TOT, W TOT), Westbound (LT, ST, RT, W TOT, STR TOT), Grand Total. Rows show heavy vehicle counts for various time intervals from 07:00 to 18:00.



**Transportation Services - Traffic Services**

**Turning Movement Count - Study Results**

**CYRVILLE RD @ OGILVIE RD**

Survey Date: Wednesday, April 11, 2018

WO No: 37723

Start Time: 07:00

Device: Miovision

**Full Study 15 Minute U-Turn Total**

**CYRVILLE RD OGILVIE RD**

| Time Period  | Northbound U-Turn Total | Southbound U-Turn Total | Eastbound U-Turn Total | Westbound U-Turn Total | Total     |
|--------------|-------------------------|-------------------------|------------------------|------------------------|-----------|
| 07:00 07:15  | 0                       | 0                       | 0                      | 1                      | 1         |
| 07:15 07:30  | 0                       | 0                       | 0                      | 0                      | 0         |
| 07:30 07:45  | 0                       | 0                       | 0                      | 0                      | 0         |
| 07:45 08:00  | 0                       | 0                       | 0                      | 0                      | 0         |
| 08:00 08:15  | 0                       | 0                       | 0                      | 0                      | 0         |
| 08:15 08:30  | 0                       | 0                       | 0                      | 2                      | 2         |
| 08:30 08:45  | 0                       | 0                       | 0                      | 0                      | 0         |
| 08:45 09:00  | 0                       | 0                       | 0                      | 0                      | 0         |
| 09:00 09:15  | 0                       | 0                       | 0                      | 0                      | 0         |
| 09:15 09:30  | 0                       | 0                       | 0                      | 0                      | 0         |
| 09:30 09:45  | 0                       | 0                       | 0                      | 0                      | 0         |
| 09:45 10:00  | 0                       | 0                       | 0                      | 3                      | 3         |
| 11:30 11:45  | 0                       | 0                       | 0                      | 0                      | 0         |
| 11:45 12:00  | 0                       | 0                       | 0                      | 11                     | 11        |
| 12:00 12:15  | 0                       | 0                       | 0                      | 1                      | 1         |
| 12:15 12:30  | 0                       | 0                       | 0                      | 1                      | 1         |
| 12:30 12:45  | 0                       | 0                       | 0                      | 0                      | 0         |
| 12:45 13:00  | 0                       | 0                       | 0                      | 0                      | 0         |
| 13:00 13:15  | 0                       | 0                       | 0                      | 0                      | 0         |
| 13:15 13:30  | 0                       | 0                       | 0                      | 1                      | 1         |
| 15:00 15:15  | 0                       | 0                       | 1                      | 0                      | 1         |
| 15:15 15:30  | 0                       | 0                       | 0                      | 0                      | 0         |
| 15:30 15:45  | 0                       | 0                       | 0                      | 1                      | 1         |
| 15:45 16:00  | 0                       | 0                       | 0                      | 0                      | 0         |
| 16:00 16:15  | 0                       | 0                       | 1                      | 0                      | 1         |
| 16:15 16:30  | 0                       | 0                       | 0                      | 1                      | 1         |
| 16:30 16:45  | 0                       | 0                       | 0                      | 1                      | 1         |
| 16:45 17:00  | 0                       | 0                       | 0                      | 0                      | 0         |
| 17:00 17:15  | 0                       | 0                       | 0                      | 1                      | 1         |
| 17:15 17:30  | 0                       | 0                       | 0                      | 2                      | 2         |
| 17:30 17:45  | 0                       | 0                       | 0                      | 0                      | 0         |
| 17:45 18:00  | 0                       | 0                       | 0                      | 2                      | 2         |
| <b>Total</b> | <b>0</b>                | <b>0</b>                | <b>2</b>               | <b>28</b>              | <b>30</b> |



**Transportation Services - Traffic Services W.O. 37738**

**Turning Movement Count - 15 Minute Summary Report**

**CUMMINGS AVE @ OGILVIE RD**

Survey Date: Wednesday, April 11, 2018

Total Observed U-Turns

Northbound: 2 Southbound: 0  
Eastbound: 76 Westbound: 20

| Time Period   | CUMMINGS AVE |             |             |             | OGILVIE RD  |             |            |             | Grand Total |            |             |            |             |            |             |             |             |              |              |
|---------------|--------------|-------------|-------------|-------------|-------------|-------------|------------|-------------|-------------|------------|-------------|------------|-------------|------------|-------------|-------------|-------------|--------------|--------------|
|               | Northbound   |             | Southbound  |             | Eastbound   |             | Westbound  |             |             |            |             |            |             |            |             |             |             |              |              |
|               | LT           | ST          | RT          | N TOT       | LT          | ST          | RT         | S TOT       | STR TOT     | LT         | ST          | RT         | E TOT       | LT         | ST          | RT          | W TOT       | STR TOT      |              |
| 07:00 07:15   | 1            | 24          | 9           | 34          | 19          | 23          | 22         | 64          | 98          | 7          | 105         | 3          | 115         | 22         | 165         | 30          | 217         | 332          | 430          |
| 07:15 07:30   | 5            | 21          | 17          | 43          | 25          | 23          | 23         | 71          | 114         | 11         | 138         | 1          | 151         | 45         | 194         | 26          | 265         | 416          | 530          |
| 07:30 07:45   | 4            | 23          | 16          | 43          | 43          | 30          | 36         | 109         | 152         | 14         | 142         | 0          | 158         | 25         | 226         | 30          | 281         | 439          | 591          |
| 07:45 08:00   | 2            | 25          | 13          | 40          | 32          | 33          | 23         | 88          | 128         | 14         | 145         | 2          | 161         | 42         | 280         | 40          | 363         | 524          | 652          |
| 08:00 08:15   | 4            | 33          | 11          | 48          | 41          | 33          | 35         | 109         | 157         | 15         | 122         | 2          | 139         | 38         | 289         | 35          | 363         | 502          | 659          |
| 08:15 08:30   | 6            | 25          | 21          | 52          | 34          | 23          | 29         | 86          | 138         | 11         | 142         | 3          | 156         | 47         | 256         | 54          | 358         | 514          | 652          |
| 08:30 08:45   | 6            | 28          | 18          | 52          | 31          | 27          | 25         | 83          | 135         | 8          | 147         | 4          | 162         | 36         | 251         | 41          | 329         | 491          | 626          |
| 08:45 09:00   | 6            | 20          | 17          | 43          | 41          | 24          | 23         | 88          | 131         | 9          | 161         | 5          | 177         | 37         | 225         | 41          | 303         | 480          | 611          |
| 09:00 09:15   | 4            | 40          | 14          | 58          | 57          | 31          | 18         | 106         | 164         | 9          | 119         | 5          | 133         | 21         | 182         | 27          | 230         | 363          | 527          |
| 09:15 09:30   | 6            | 27          | 21          | 54          | 38          | 26          | 22         | 86          | 140         | 13         | 147         | 7          | 168         | 24         | 168         | 42          | 235         | 403          | 543          |
| 09:30 09:45   | 5            | 32          | 29          | 66          | 36          | 28          | 22         | 86          | 152         | 9          | 132         | 3          | 144         | 24         | 161         | 26          | 211         | 355          | 507          |
| 09:45 10:00   | 2            | 32          | 26          | 60          | 25          | 33          | 33         | 91          | 151         | 14         | 117         | 2          | 135         | 27         | 115         | 35          | 177         | 312          | 463          |
| 11:30 11:45   | 5            | 28          | 33          | 66          | 40          | 40          | 21         | 101         | 167         | 17         | 158         | 8          | 184         | 31         | 152         | 37          | 220         | 404          | 571          |
| 11:45 12:00   | 7            | 41          | 42          | 90          | 44          | 36          | 18         | 98          | 188         | 21         | 156         | 10         | 190         | 35         | 164         | 37          | 236         | 426          | 614          |
| 12:00 12:15   | 5            | 38          | 46          | 89          | 56          | 37          | 17         | 110         | 199         | 15         | 157         | 5          | 180         | 32         | 173         | 51          | 258         | 438          | 637          |
| 12:15 12:30   | 10           | 33          | 50          | 93          | 54          | 42          | 16         | 112         | 205         | 22         | 168         | 9          | 201         | 31         | 168         | 47          | 246         | 447          | 652          |
| 12:30 12:45   | 7            | 42          | 31          | 80          | 48          | 46          | 26         | 120         | 200         | 13         | 185         | 8          | 209         | 26         | 157         | 25          | 208         | 417          | 617          |
| 12:45 13:00   | 9            | 39          | 36          | 84          | 55          | 45          | 16         | 116         | 200         | 17         | 177         | 8          | 206         | 30         | 152         | 36          | 219         | 425          | 625          |
| 13:00 13:15   | 10           | 32          | 32          | 74          | 48          | 59          | 11         | 118         | 192         | 22         | 163         | 5          | 193         | 35         | 146         | 37          | 218         | 411          | 603          |
| 13:15 13:30   | 7            | 35          | 39          | 81          | 60          | 22          | 21         | 103         | 184         | 14         | 135         | 10         | 168         | 37         | 148         | 45          | 230         | 398          | 582          |
| 15:00 15:15   | 7            | 35          | 53          | 95          | 52          | 30          | 13         | 95          | 190         | 24         | 173         | 6          | 208         | 24         | 163         | 54          | 242         | 450          | 640          |
| 15:15 15:30   | 10           | 43          | 46          | 99          | 48          | 43          | 17         | 108         | 207         | 25         | 199         | 7          | 233         | 23         | 144         | 46          | 213         | 446          | 653          |
| 15:30 15:45   | 5            | 40          | 49          | 94          | 77          | 51          | 27         | 155         | 249         | 21         | 207         | 5          | 235         | 28         | 199         | 68          | 296         | 531          | 780          |
| 15:45 16:00   | 5            | 45          | 48          | 98          | 63          | 44          | 24         | 131         | 229         | 25         | 193         | 3          | 223         | 32         | 160         | 53          | 246         | 469          | 698          |
| 16:00 16:15   | 3            | 47          | 59          | 110         | 62          | 40          | 29         | 131         | 241         | 23         | 292         | 9          | 327         | 21         | 173         | 50          | 244         | 571          | 812          |
| 16:15 16:30   | 6            | 45          | 40          | 92          | 76          | 44          | 17         | 137         | 229         | 21         | 267         | 0          | 289         | 20         | 163         | 39          | 224         | 513          | 742          |
| 16:30 16:45   | 8            | 35          | 73          | 116         | 61          | 39          | 22         | 122         | 238         | 21         | 283         | 5          | 313         | 24         | 196         | 43          | 264         | 577          | 815          |
| 16:45 17:00   | 4            | 49          | 45          | 98          | 71          | 44          | 20         | 135         | 233         | 28         | 246         | 4          | 279         | 27         | 161         | 42          | 233         | 512          | 745          |
| 17:00 17:15   | 13           | 36          | 48          | 97          | 61          | 28          | 23         | 112         | 209         | 33         | 300         | 6          | 343         | 32         | 182         | 69          | 283         | 626          | 835          |
| 17:15 17:30   | 11           | 42          | 50          | 103         | 65          | 52          | 19         | 136         | 239         | 28         | 253         | 8          | 299         | 26         | 190         | 55          | 274         | 573          | 812          |
| 17:30 17:45   | 9            | 37          | 31          | 77          | 58          | 27          | 15         | 100         | 177         | 25         | 220         | 7          | 254         | 18         | 174         | 33          | 225         | 479          | 656          |
| 17:45 18:00   | 6            | 30          | 35          | 71          | 56          | 23          | 29         | 108         | 179         | 25         | 168         | 4          | 198         | 18         | 154         | 39          | 211         | 409          | 588          |
| <b>TOTAL:</b> | <b>198</b>   | <b>1102</b> | <b>1098</b> | <b>2400</b> | <b>1577</b> | <b>1126</b> | <b>712</b> | <b>3415</b> | <b>5815</b> | <b>574</b> | <b>5717</b> | <b>164</b> | <b>6531</b> | <b>938</b> | <b>5831</b> | <b>1333</b> | <b>8122</b> | <b>14653</b> | <b>20468</b> |

Note: U-Turns are included in Totals.

Comment:



**Transportation Services - Traffic Services**  
**Turning Movement Count - Cyclist Volume Report**

Work Order  
**37738**

**CUMMINGS AVE @ OGILVIE RD**

Count Date: Wednesday, April 11, 2018

Start Time: 07:00

| Time Period  | CUMMINGS AVE |            |              | OGILVIE RD |           |              | Grand Total |
|--------------|--------------|------------|--------------|------------|-----------|--------------|-------------|
|              | Northbound   | Southbound | Street Total | Eastbound  | Westbound | Street Total |             |
| 07:00 08:00  | 0            | 1          | 1            | 8          | 6         | 14           | 15          |
| 08:00 09:00  | 3            | 1          | 4            | 13         | 1         | 14           | 18          |
| 09:00 10:00  | 0            | 0          | 0            | 5          | 1         | 6            | 6           |
| 11:30 12:30  | 0            | 1          | 1            | 0          | 2         | 2            | 3           |
| 12:30 13:30  | 0            | 0          | 0            | 1          | 2         | 3            | 3           |
| 15:00 16:00  | 3            | 4          | 7            | 5          | 8         | 13           | 20          |
| 16:00 17:00  | 1            | 5          | 6            | 6          | 7         | 13           | 19          |
| 17:00 18:00  | 3            | 2          | 5            | 7          | 8         | 15           | 20          |
| <b>Total</b> | <b>10</b>    | <b>14</b>  | <b>24</b>    | <b>45</b>  | <b>35</b> | <b>80</b>    | <b>104</b>  |

Comment:

Note: These volumes consists of bicycles only (no mopeds or motorcycles) and ARE NOT included in the Turning Movement Count Summary.

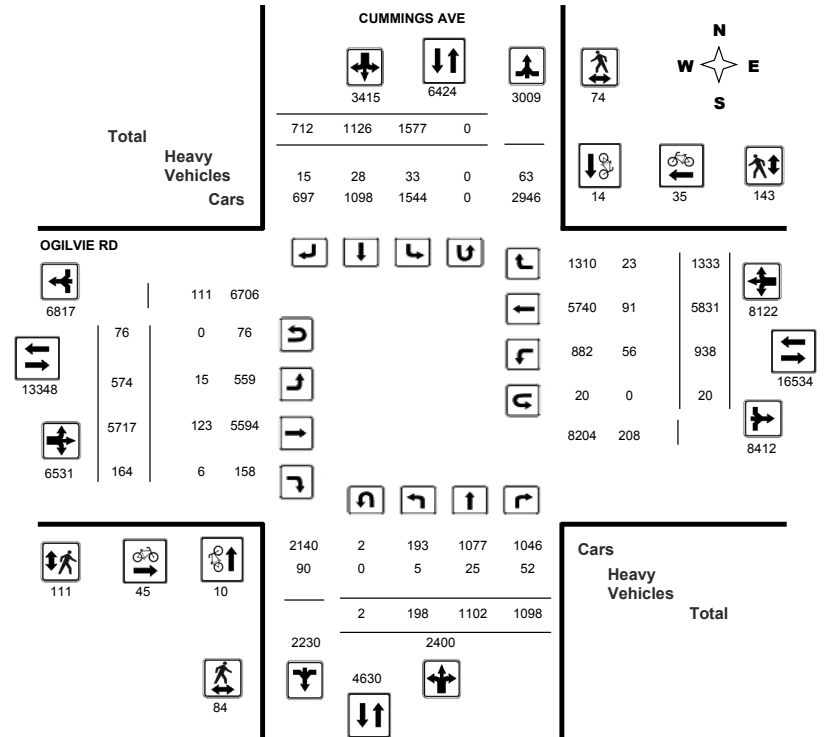


**Transportation Services - Traffic Services**  
**Turning Movement Count - Full Study Diagram**

**CUMMINGS AVE @ OGILVIE RD**

Survey Date: Wednesday, April 11, 2018

WO#: 37738  
 Device: Miovision



Comments



# Transportation Services - Traffic Services

W.O.  
37738

## Turning Movement Count - Heavy Vehicle Report

### CUMMINGS AVE @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018

| CUMMINGS AVE                    |          |           |           |           |            |           |           |           |            | OGILVIE RD |            |          |            |           |           |           |            |            |            | W<br>TOT | STR<br>TOT | Grand<br>Total |
|---------------------------------|----------|-----------|-----------|-----------|------------|-----------|-----------|-----------|------------|------------|------------|----------|------------|-----------|-----------|-----------|------------|------------|------------|----------|------------|----------------|
| Northbound                      |          |           |           |           | Southbound |           |           |           |            | Eastbound  |            |          |            |           | Westbound |           |            |            |            |          |            |                |
| Time Period                     | LT       | ST        | RT        | N<br>TOT  | LT         | ST        | RT        | S<br>TOT  | STR<br>TOT | LT         | ST         | RT       | E<br>TOT   | LT        | ST        | RT        | W<br>TOT   | STR<br>TOT |            |          |            |                |
| 07:00 08:00                     | 2        | 7         | 6         | 15        | 5          | 2         | 0         | 7         | 22         | 1          | 25         | 0        | 26         | 5         | 14        | 4         | 23         | 49         | 71         |          |            |                |
| 08:00 09:00                     | 0        | 5         | 12        | 17        | 9          | 1         | 0         | 10        | 27         | 3          | 11         | 1        | 15         | 9         | 26        | 5         | 40         | 55         | 82         |          |            |                |
| 09:00 10:00                     | 0        | 6         | 6         | 12        | 7          | 7         | 3         | 17        | 29         | 2          | 14         | 1        | 17         | 10        | 12        | 1         | 23         | 40         | 69         |          |            |                |
| 11:30 12:30                     | 0        | 2         | 8         | 10        | 1          | 1         | 3         | 5         | 15         | 5          | 11         | 1        | 17         | 8         | 9         | 0         | 17         | 34         | 49         |          |            |                |
| 12:30 13:30                     | 1        | 1         | 5         | 7         | 3          | 3         | 3         | 9         | 16         | 1          | 17         | 0        | 18         | 4         | 15        | 3         | 22         | 40         | 56         |          |            |                |
| 15:00 16:00                     | 0        | 2         | 8         | 10        | 5          | 8         | 4         | 17        | 27         | 0          | 25         | 0        | 25         | 10        | 8         | 6         | 24         | 49         | 76         |          |            |                |
| 16:00 17:00                     | 1        | 2         | 3         | 6         | 3          | 5         | 1         | 9         | 15         | 2          | 13         | 3        | 18         | 6         | 4         | 3         | 13         | 31         | 46         |          |            |                |
| 17:00 18:00                     | 1        | 0         | 4         | 5         | 0          | 1         | 1         | 2         | 7          | 1          | 7          | 0        | 8          | 4         | 3         | 1         | 8          | 16         | 23         |          |            |                |
| <b>Sub Total</b>                | <b>5</b> | <b>25</b> | <b>52</b> | <b>82</b> | <b>33</b>  | <b>28</b> | <b>15</b> | <b>76</b> | <b>158</b> | <b>15</b>  | <b>123</b> | <b>6</b> | <b>144</b> | <b>56</b> | <b>91</b> | <b>23</b> | <b>170</b> | <b>314</b> | <b>472</b> |          |            |                |
| <b>U-Turns (Heavy Vehicles)</b> | <b>0</b> | <b>0</b>  | <b>0</b>  | <b>0</b>  | <b>0</b>   | <b>0</b>  | <b>0</b>  | <b>0</b>  | <b>0</b>   | <b>0</b>   | <b>0</b>   | <b>0</b> | <b>0</b>   | <b>0</b>  | <b>0</b>  | <b>0</b>  | <b>0</b>   | <b>0</b>   | <b>0</b>   |          |            |                |
| <b>Total</b>                    | <b>5</b> | <b>25</b> | <b>52</b> | <b>82</b> | <b>33</b>  | <b>28</b> | <b>15</b> | <b>76</b> | <b>158</b> | <b>15</b>  | <b>123</b> | <b>6</b> | <b>144</b> | <b>56</b> | <b>91</b> | <b>23</b> | <b>170</b> | <b>314</b> | <b>472</b> |          |            |                |

Heavy Vehicles include Buses, Single-Unit Trucks and Articulated Trucks. Further, they ARE included in the Turning Movement Count Summary.



# Transportation Services - Traffic Services

Work Order  
37738

## Turning Movement Count - Pedestrian Volume Report

### CUMMINGS AVE @ OGILVIE RD

Count Date: Wednesday, April 11, 2018

Start Time: 07:00

| Time Period  | NB Approach<br>(E or W Crossing) | SB Approach<br>(E or W Crossing) | Total      | EB Approach<br>(N or S Crossing) | WB Approach<br>(N or S Crossing) | Total      | Grand Total |
|--------------|----------------------------------|----------------------------------|------------|----------------------------------|----------------------------------|------------|-------------|
| 07:00 07:15  | 1                                | 0                                | 1          | 2                                | 1                                | 3          | 4           |
| 07:15 07:30  | 3                                | 4                                | 7          | 0                                | 7                                | 7          | 14          |
| 07:30 07:45  | 2                                | 3                                | 5          | 3                                | 2                                | 5          | 10          |
| 07:45 08:00  | 2                                | 3                                | 5          | 0                                | 9                                | 9          | 14          |
| 07:00 08:00  | 8                                | 10                               | 18         | 5                                | 19                               | 24         | 42          |
| 08:00 08:15  | 4                                | 6                                | 10         | 2                                | 12                               | 14         | 24          |
| 08:15 08:30  | 4                                | 5                                | 9          | 1                                | 17                               | 18         | 27          |
| 08:30 08:45  | 5                                | 11                               | 16         | 2                                | 14                               | 16         | 32          |
| 08:45 09:00  | 5                                | 2                                | 7          | 4                                | 17                               | 21         | 28          |
| 08:00 09:00  | 18                               | 24                               | 42         | 9                                | 60                               | 69         | 111         |
| 09:00 09:15  | 4                                | 1                                | 5          | 0                                | 5                                | 5          | 10          |
| 09:15 09:30  | 1                                | 1                                | 2          | 0                                | 0                                | 0          | 2           |
| 09:30 09:45  | 0                                | 2                                | 2          | 0                                | 1                                | 1          | 3           |
| 09:45 10:00  | 0                                | 1                                | 1          | 0                                | 4                                | 4          | 5           |
| 09:00 10:00  | 5                                | 5                                | 10         | 0                                | 10                               | 10         | 20          |
| 11:30 11:45  | 4                                | 1                                | 5          | 1                                | 2                                | 3          | 8           |
| 11:45 12:00  | 1                                | 1                                | 2          | 1                                | 0                                | 1          | 3           |
| 12:00 12:15  | 3                                | 3                                | 6          | 1                                | 6                                | 7          | 13          |
| 12:15 12:30  | 0                                | 1                                | 1          | 2                                | 5                                | 7          | 8           |
| 11:30 12:30  | 8                                | 6                                | 14         | 5                                | 13                               | 18         | 32          |
| 12:30 12:45  | 1                                | 1                                | 2          | 2                                | 1                                | 3          | 5           |
| 12:45 13:00  | 2                                | 1                                | 3          | 2                                | 3                                | 5          | 8           |
| 13:00 13:15  | 3                                | 4                                | 7          | 1                                | 7                                | 8          | 15          |
| 13:15 13:30  | 0                                | 2                                | 2          | 1                                | 0                                | 1          | 3           |
| 12:30 13:30  | 6                                | 8                                | 14         | 6                                | 11                               | 17         | 31          |
| 15:00 15:15  | 3                                | 1                                | 4          | 0                                | 6                                | 6          | 10          |
| 15:15 15:30  | 5                                | 1                                | 6          | 20                               | 2                                | 22         | 28          |
| 15:30 15:45  | 0                                | 2                                | 2          | 5                                | 2                                | 7          | 9           |
| 15:45 16:00  | 1                                | 2                                | 3          | 28                               | 0                                | 28         | 31          |
| 15:00 16:00  | 9                                | 6                                | 15         | 53                               | 10                               | 63         | 78          |
| 16:00 16:15  | 5                                | 2                                | 7          | 5                                | 1                                | 6          | 13          |
| 16:15 16:30  | 1                                | 1                                | 2          | 1                                | 0                                | 1          | 3           |
| 16:30 16:45  | 7                                | 1                                | 8          | 5                                | 4                                | 9          | 17          |
| 16:45 17:00  | 3                                | 5                                | 8          | 8                                | 2                                | 10         | 18          |
| 16:00 17:00  | 16                               | 9                                | 25         | 19                               | 7                                | 26         | 51          |
| 17:00 17:15  | 8                                | 3                                | 11         | 7                                | 1                                | 8          | 19          |
| 17:15 17:30  | 3                                | 1                                | 4          | 5                                | 9                                | 14         | 18          |
| 17:30 17:45  | 2                                | 0                                | 2          | 0                                | 0                                | 0          | 2           |
| 17:45 18:00  | 1                                | 2                                | 3          | 2                                | 3                                | 5          | 8           |
| 17:00 18:00  | 14                               | 6                                | 20         | 14                               | 13                               | 27         | 47          |
| <b>Total</b> | <b>84</b>                        | <b>74</b>                        | <b>158</b> | <b>111</b>                       | <b>143</b>                       | <b>254</b> | <b>412</b>  |

Comment:



# Transportation Services - Traffic Services

Work Order  
37738

## Turning Movement Count - Full Study Summary Report

### CUMMINGS AVE @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018

|                        |               |                    |
|------------------------|---------------|--------------------|
| Total Observed U-Turns |               | AADT Factor<br>.90 |
| Northbound: 2          | Southbound: 0 |                    |
| Eastbound: 76          | Westbound: 20 |                    |

#### Full Study

| Period  | CUMMINGS AVE |      |      |        |            |      |      |        | OGILVIE RD |      |      |     |           |      |      |      | WB TOT | STR TOT | Grand Total |  |  |
|---|--------------|------|------|--------|------------|------|------|--------|------------|------|------|-----|-----------|------|------|------|--------|---------|-------------|--|--|
|   | Northbound   |      |      |        | Southbound |      |      |        | Eastbound  |      |      |     | Westbound |      |      |      |        |         |             |  |  |
|   | LT           | ST   | RT   | NB TOT | LT         | ST   | RT   | SB TOT | STR TOT    | LT   | ST   | RT  | EB TOT    | LT   | ST   | RT   |        |         |             |  |  |
| 07:00 08:00   | 12           | 93   | 55   | 160    | 119        | 109  | 104  | 332    | 492        | 46   | 530  | 6   | 582       | 134  | 865  | 126  | 1125   | 1707    | 2199        |  |  |
| 08:00 09:00   | 22           | 106  | 67   | 195    | 147        | 107  | 112  | 366    | 561        | 43   | 572  | 14  | 629       | 158  | 1021 | 171  | 1350   | 1979    | 2540        |  |  |
| 09:00 10:00   | 17           | 131  | 90   | 238    | 156        | 118  | 95   | 369    | 607        | 45   | 515  | 17  | 577       | 96   | 626  | 130  | 852    | 1429    | 2036        |  |  |
| 11:30 12:30   | 27           | 140  | 171  | 338    | 194        | 155  | 72   | 421    | 759        | 75   | 639  | 32  | 746       | 129  | 657  | 172  | 958    | 1704    | 2463        |  |  |
| 12:30 13:30   | 33           | 148  | 138  | 319    | 211        | 172  | 74   | 457    | 776        | 66   | 660  | 31  | 757       | 128  | 603  | 143  | 874    | 1631    | 2407        |  |  |
| 15:00 16:00   | 27           | 163  | 196  | 386    | 240        | 168  | 81   | 489    | 875        | 95   | 772  | 21  | 888       | 107  | 666  | 221  | 994    | 1882    | 2757        |  |  |
| 16:00 17:00   | 21           | 176  | 217  | 414    | 270        | 167  | 88   | 525    | 939        | 93   | 1088 | 18  | 1199      | 92   | 693  | 174  | 959    | 2158    | 3097        |  |  |
| 17:00 18:00   | 39           | 145  | 164  | 348    | 240        | 130  | 86   | 456    | 804        | 111  | 941  | 25  | 1077      | 94   | 700  | 196  | 990    | 2067    | 2871        |  |  |
| <b>Sub Total</b>  | 198          | 1102 | 1098 | 2398   | 1577       | 1126 | 712  | 3415   | 5813       | 574  | 5717 | 164 | 6455      | 938  | 5831 | 1333 | 8102   | 14557   | 20370       |  |  |
| <b>U Turns</b>  |              |      |      | 2      |            |      |      | 0      | 2          |      |      |     | 76        |      |      |      | 20     | 96      | 98          |  |  |
| <b>Total</b>  | 198          | 1102 | 1098 | 2400   | 1577       | 1126 | 712  | 3415   | 5815       | 574  | 5717 | 164 | 6531      | 938  | 5831 | 1333 | 8122   | 14653   | 20468       |  |  |
| <b>EQ 12Hr</b>  | 275          | 1532 | 1526 | 3336   | 2192       | 1565 | 990  | 4747   | 8083       | 798  | 7947 | 228 | 9078      | 1304 | 8105 | 1853 | 11290  | 20368   | 28451       |  |  |
| Note: These values are calculated by multiplying the totals by the appropriate expansion factor.                |              |      |      |        |            |      |      |        |            | 1.39 |      |     |           |      |      |      |        |         |             |  |  |
| <b>AVG 12Hr</b>   | 248          | 1379 | 1374 | 3002   | 1973       | 1409 | 891  | 4272   | 7274       | 718  | 7152 | 205 | 8170      | 1173 | 7295 | 1668 | 10161  | 18331   | 25605       |  |  |
| Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.              |              |      |      |        |            |      |      |        |            | .90  |      |     |           |      |      |      |        |         |             |  |  |
| <b>AVG 24Hr</b>   | 324          | 1806 | 1799 | 3933   | 2584       | 1845 | 1167 | 5597   | 9530       | 941  | 9369 | 269 | 10703     | 1537 | 9556 | 2185 | 13310  | 24013   | 33543       |  |  |
| Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor. |              |      |      |        |            |      |      |        |            | 1.31 |      |     |           |      |      |      |        |         |             |  |  |

#### Comments:

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.



# Transportation Services - Traffic Services

## Turning Movement Count - Full Study Peak Hour Diagram

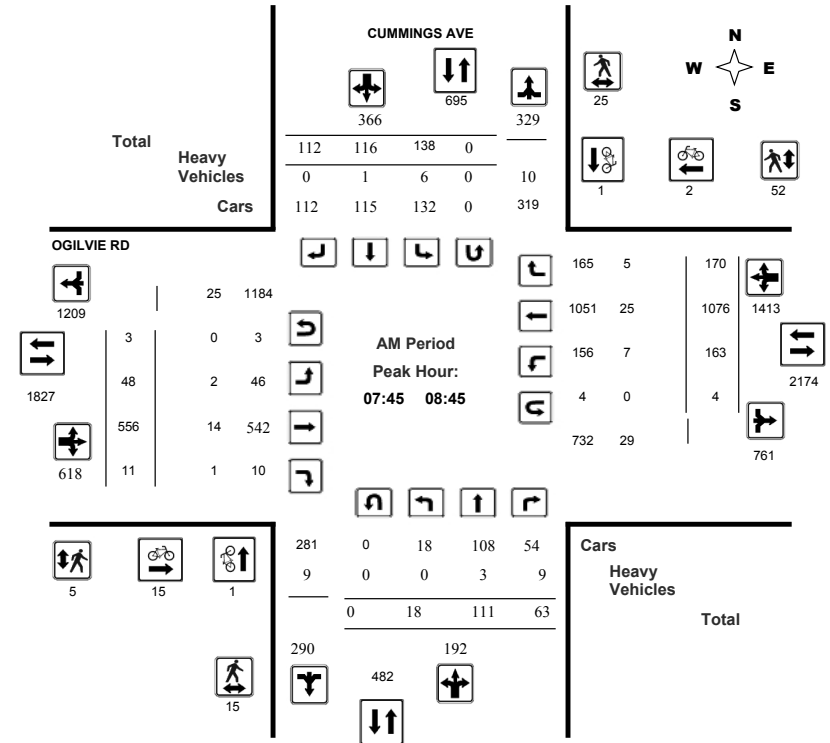
### CUMMINGS AVE @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018

Start Time: 07:00

WO No: 37738

Device: Miovision



#### Comments



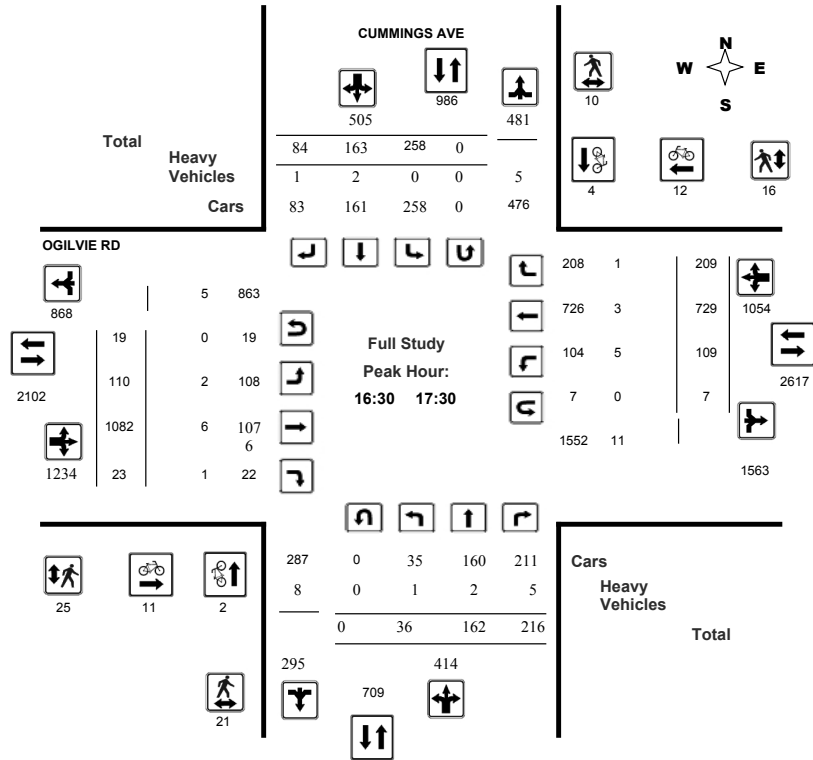
### Transportation Services - Traffic Services

#### Turning Movement Count - Full Study Peak Hour Diagram

##### CUMMINGS AVE @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018  
Start Time: 07:00

WO No: 37738  
Device: Miovision



Comments



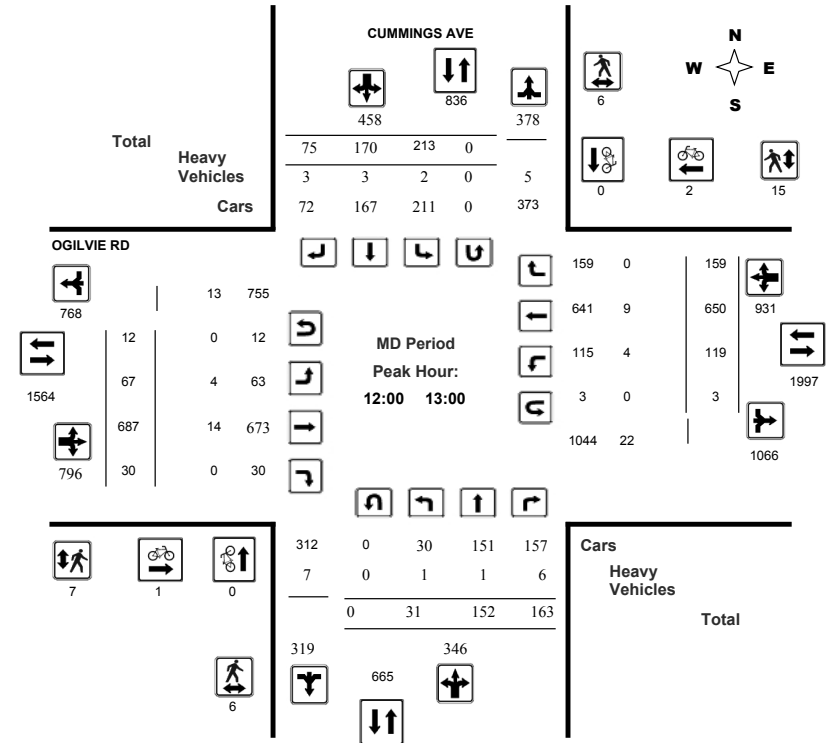
### Transportation Services - Traffic Services

#### Turning Movement Count - Full Study Peak Hour Diagram

##### CUMMINGS AVE @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018  
Start Time: 07:00

WO No: 37738  
Device: Miovision



Comments



# Transportation Services - Traffic Services

## Turning Movement Count - Full Study Peak Hour Diagram

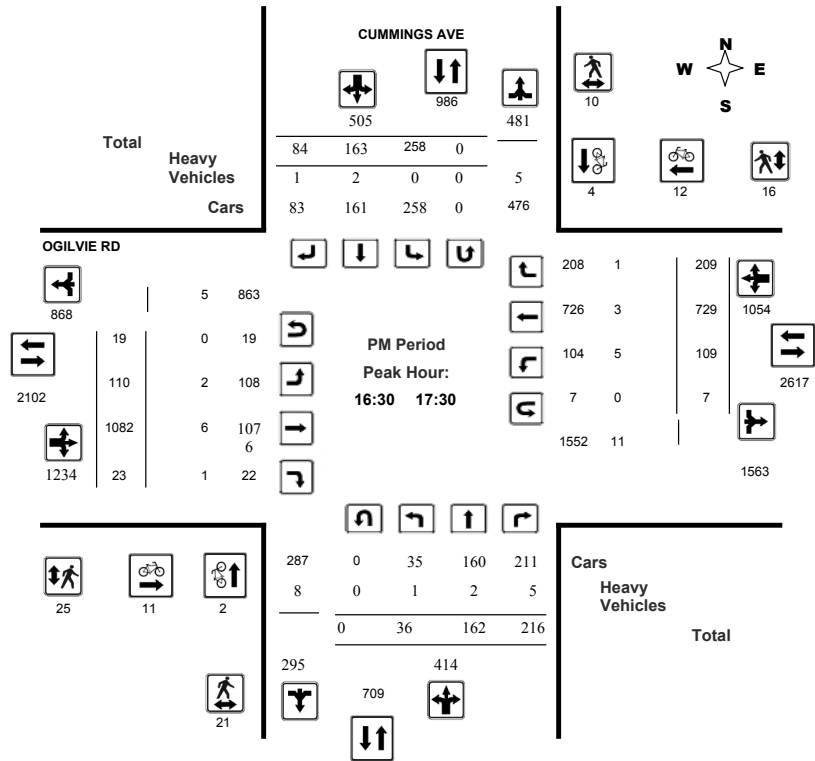
### CUMMINGS AVE @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018

Start Time: 07:00

WO No: 37738

Device: Miovision



Comments



# Transportation Services - Traffic Services

Work Order  
37738

## Turning Movement Count - 15 Min U-Turn Total Report

### CUMMINGS AVE @ OGILVIE RD

Survey Date: Wednesday, April 11, 2018

| Time Period  | Northbound U-Turn Total | Southbound U-Turn Total | Eastbound U-Turn Total | Westbound U-Turn Total | Total     |
|--------------|-------------------------|-------------------------|------------------------|------------------------|-----------|
| 07:00 07:15  | 0                       | 0                       | 0                      | 0                      | 0         |
| 07:15 07:30  | 0                       | 0                       | 1                      | 0                      | 1         |
| 07:30 07:45  | 0                       | 0                       | 2                      | 0                      | 2         |
| 07:45 08:00  | 0                       | 0                       | 0                      | 1                      | 1         |
| 08:00 08:15  | 0                       | 0                       | 0                      | 1                      | 1         |
| 08:15 08:30  | 0                       | 0                       | 0                      | 1                      | 1         |
| 08:30 08:45  | 0                       | 0                       | 3                      | 1                      | 4         |
| 08:45 09:00  | 0                       | 0                       | 2                      | 0                      | 2         |
| 09:00 09:15  | 0                       | 0                       | 0                      | 0                      | 0         |
| 09:15 09:30  | 0                       | 0                       | 1                      | 1                      | 2         |
| 09:30 09:45  | 0                       | 0                       | 0                      | 0                      | 0         |
| 09:45 10:00  | 0                       | 0                       | 2                      | 0                      | 2         |
| 11:30 11:45  | 0                       | 0                       | 1                      | 0                      | 1         |
| 11:45 12:00  | 0                       | 0                       | 3                      | 0                      | 3         |
| 12:00 12:15  | 0                       | 0                       | 3                      | 2                      | 5         |
| 12:15 12:30  | 0                       | 0                       | 2                      | 0                      | 2         |
| 12:30 12:45  | 0                       | 0                       | 3                      | 0                      | 3         |
| 12:45 13:00  | 0                       | 0                       | 4                      | 1                      | 5         |
| 13:00 13:15  | 0                       | 0                       | 3                      | 0                      | 3         |
| 13:15 13:30  | 0                       | 0                       | 9                      | 0                      | 9         |
| 15:00 15:15  | 0                       | 0                       | 5                      | 1                      | 6         |
| 15:15 15:30  | 0                       | 0                       | 2                      | 0                      | 2         |
| 15:30 15:45  | 0                       | 0                       | 2                      | 1                      | 3         |
| 15:45 16:00  | 0                       | 0                       | 2                      | 1                      | 3         |
| 16:00 16:15  | 1                       | 0                       | 3                      | 0                      | 4         |
| 16:15 16:30  | 1                       | 0                       | 1                      | 2                      | 4         |
| 16:30 16:45  | 0                       | 0                       | 4                      | 1                      | 5         |
| 16:45 17:00  | 0                       | 0                       | 1                      | 3                      | 4         |
| 17:00 17:15  | 0                       | 0                       | 4                      | 0                      | 4         |
| 17:15 17:30  | 0                       | 0                       | 10                     | 3                      | 13        |
| 17:30 17:45  | 0                       | 0                       | 2                      | 0                      | 2         |
| 17:45 18:00  | 0                       | 0                       | 1                      | 0                      | 1         |
| <b>Total</b> | <b>2</b>                | <b>0</b>                | <b>76</b>              | <b>20</b>              | <b>98</b> |





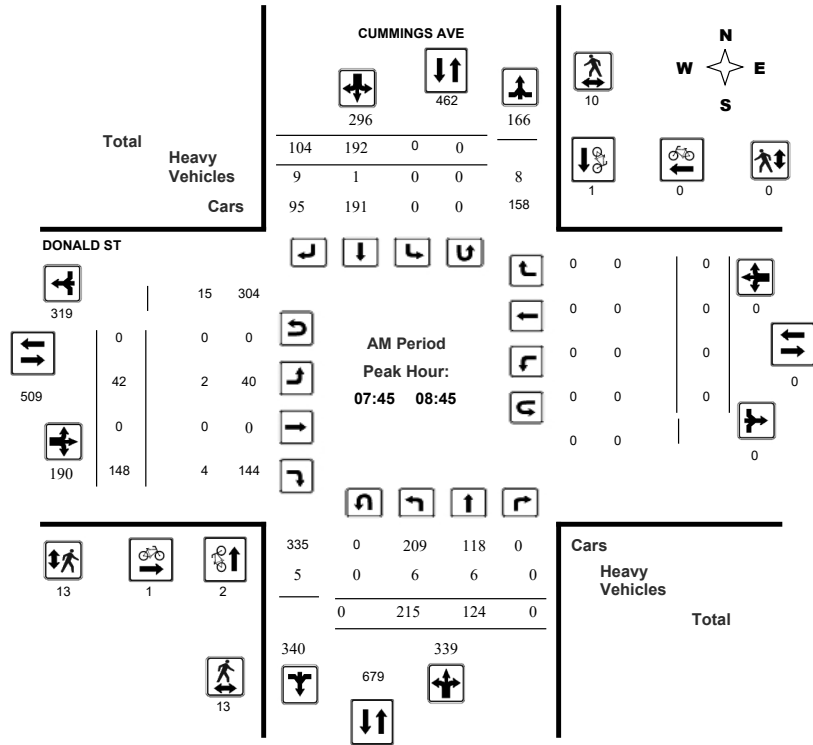
### Transportation Services - Traffic Services

#### Turning Movement Count - Full Study Peak Hour Diagram

#### CUMMINGS AVE @ DONALD ST

Survey Date: Wednesday, April 11, 2018  
Start Time: 07:00

WO No: 37720  
Device: Miovision



Comments



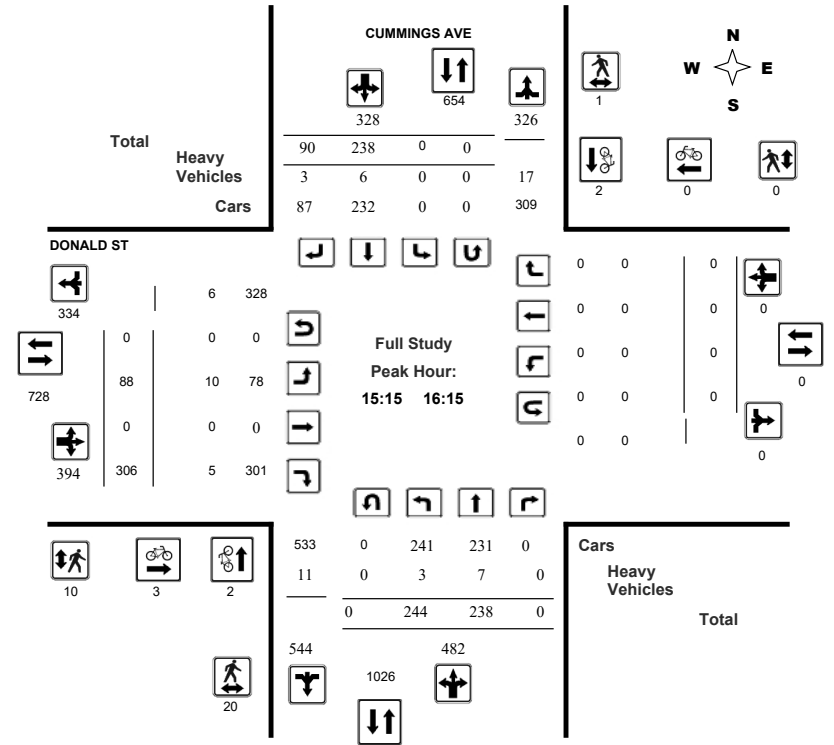
### Transportation Services - Traffic Services

#### Turning Movement Count - Full Study Peak Hour Diagram

#### CUMMINGS AVE @ DONALD ST

Survey Date: Wednesday, April 11, 2018  
Start Time: 07:00

WO No: 37720  
Device: Miovision



Comments



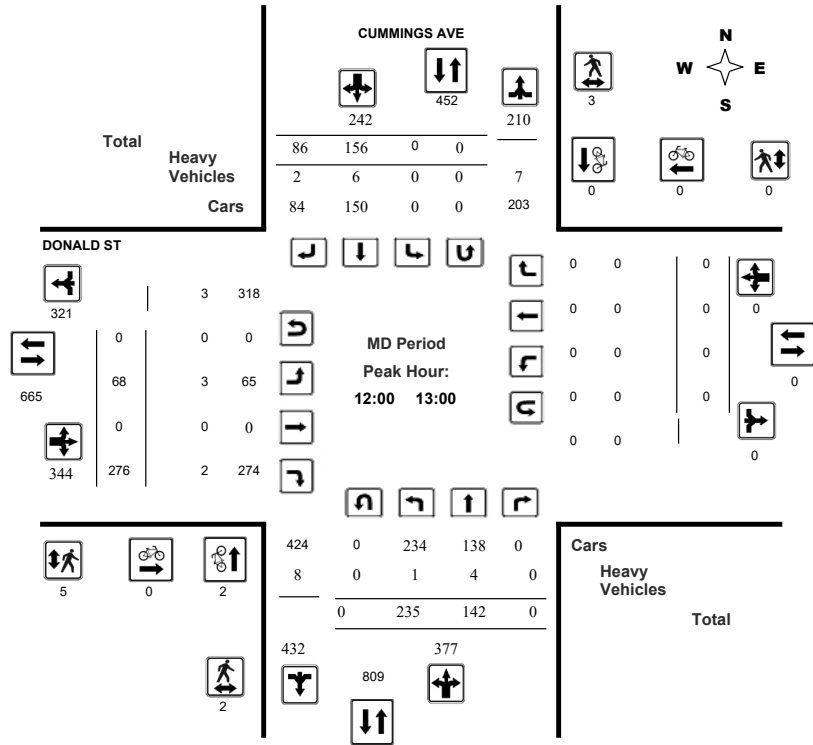
### Transportation Services - Traffic Services

#### Turning Movement Count - Full Study Peak Hour Diagram

#### CUMMINGS AVE @ DONALD ST

Survey Date: Wednesday, April 11, 2018  
Start Time: 07:00

WO No: 37720  
Device: Miovision



Comments



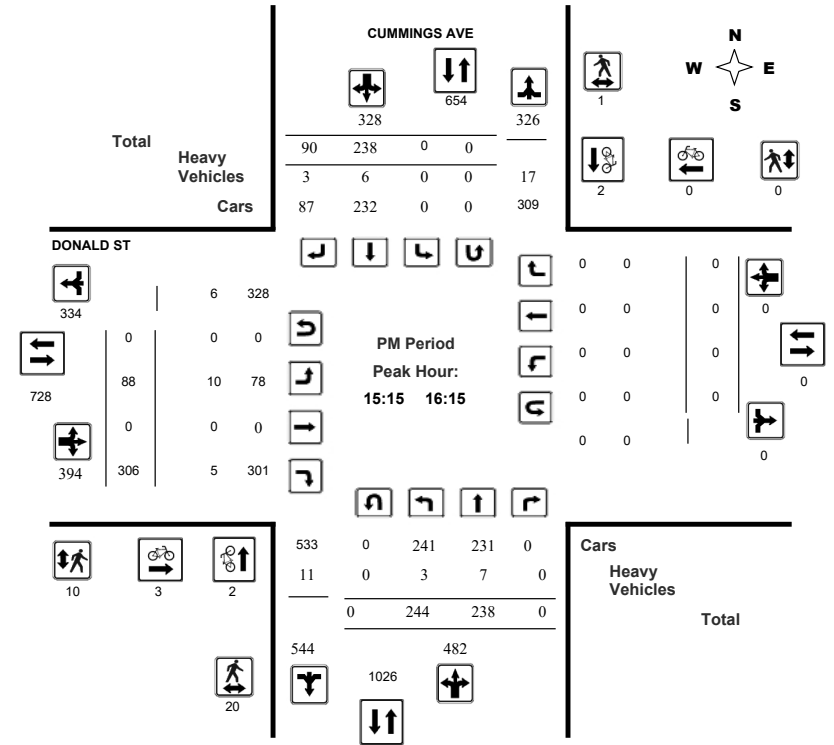
### Transportation Services - Traffic Services

#### Turning Movement Count - Full Study Peak Hour Diagram

#### CUMMINGS AVE @ DONALD ST

Survey Date: Wednesday, April 11, 2018  
Start Time: 07:00

WO No: 37720  
Device: Miovision



Comments

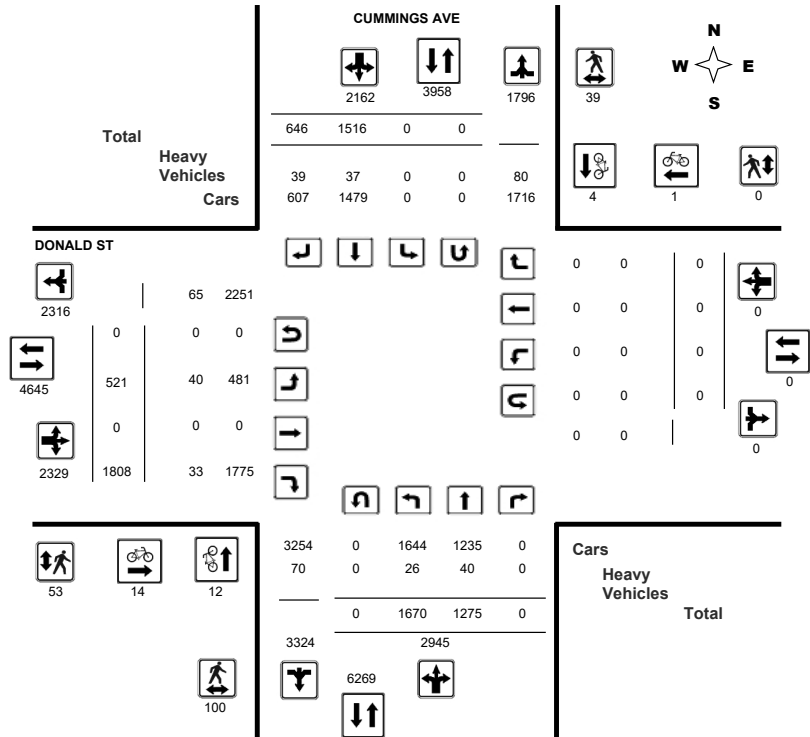


**Transportation Services - Traffic Services**  
Turning Movement Count - Full Study Diagram

**CUMMINGS AVE @ DONALD ST**

Survey Date: Wednesday, April 11, 2018

WO#: 37720  
Device: Miovision



Comments



**Transportation Services - Traffic Services**

Work Order  
37720

**Turning Movement Count - Full Study Summary Report**

**CUMMINGS AVE @ DONALD ST**

Survey Date: Wednesday, April 11, 2018

Total Observed U-Turns  
Northbound: 0 Southbound: 0  
Eastbound: 0 Westbound: 0  
AADT Factor: .90

| Period  | CUMMINGS AVE |      |    |        |            |      |      |        | DONALD ST |     |    |      |           |    |    |    | Grand Total |        |         |  |
|---|--------------|------|----|--------|------------|------|------|--------|-----------|-----|----|------|-----------|----|----|----|-------------|--------|---------|--|
|   | Northbound   |      |    |        | Southbound |      |      |        | Eastbound |     |    |      | Westbound |    |    |    |             |        |         |  |
|   | LT           | ST   | RT | NB TOT | LT         | ST   | RT   | SB TOT | STR TOT   | LT  | ST | RT   | EB TOT    | LT | ST | RT |             | WB TOT | STR TOT |  |
| 07:00 08:00   | 156          | 106  | 0  | 262    | 0          | 189  | 56   | 245    | 507       | 39  | 0  | 128  | 167       | 0  | 0  | 0  | 0           | 167    | 674     |  |
| 08:00 09:00   | 204          | 126  | 0  | 330    | 0          | 189  | 101  | 290    | 620       | 38  | 0  | 150  | 188       | 0  | 0  | 0  | 0           | 188    | 808     |  |
| 09:00 10:00   | 185          | 121  | 0  | 306    | 0          | 177  | 74   | 251    | 557       | 45  | 0  | 182  | 227       | 0  | 0  | 0  | 0           | 227    | 784     |  |
| 11:30 12:30   | 226          | 129  | 0  | 355    | 0          | 171  | 75   | 246    | 601       | 61  | 0  | 244  | 305       | 0  | 0  | 0  | 0           | 305    | 906     |  |
| 12:30 13:30   | 218          | 142  | 0  | 360    | 0          | 151  | 75   | 226    | 586       | 67  | 0  | 272  | 339       | 0  | 0  | 0  | 0           | 339    | 925     |  |
| 15:00 16:00   | 243          | 229  | 0  | 472    | 0          | 207  | 95   | 302    | 774       | 81  | 0  | 286  | 367       | 0  | 0  | 0  | 0           | 367    | 1141    |  |
| 16:00 17:00   | 222          | 205  | 0  | 427    | 0          | 231  | 94   | 325    | 752       | 95  | 0  | 289  | 384       | 0  | 0  | 0  | 0           | 384    | 1136    |  |
| 17:00 18:00   | 216          | 217  | 0  | 433    | 0          | 201  | 76   | 277    | 710       | 95  | 0  | 257  | 352       | 0  | 0  | 0  | 0           | 352    | 1062    |  |
| <b>Sub Total</b>  | 1670         | 1275 | 0  | 2945   | 0          | 1516 | 646  | 2162   | 5107      | 521 | 0  | 1808 | 2329      | 0  | 0  | 0  | 0           | 2329   | 7436    |  |
| <b>U Turns</b>  | 0            |      |    |        | 0          |      |      |        | 0         |     |    |      | 0         |    |    |    | 0           |        | 0       |  |
| <b>Total</b>  | 1670         | 1275 | 0  | 2945   | 0          | 1516 | 646  | 2162   | 5107      | 521 | 0  | 1808 | 2329      | 0  | 0  | 0  | 0           | 2329   | 7436    |  |
| <b>EQ 12Hr</b>  | 2321         | 1772 | 0  | 4094   | 0          | 2107 | 898  | 3005   | 7099      | 724 | 0  | 2513 | 3237      | 0  | 0  | 0  | 0           | 3237   | 10336   |  |
| Note: These values are calculated by multiplying the totals by the appropriate expansion factor.                |              |      |    |        |            |      |      |        |           |     |    |      | 1.39      |    |    |    |             |        |         |  |
| <b>AVG 12Hr</b>   | 2089         | 1595 | 0  | 3684   | 0          | 1897 | 808  | 2705   | 6389      | 652 | 0  | 2262 | 2914      | 0  | 0  | 0  | 0           | 2914   | 9303    |  |
| Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.              |              |      |    |        |            |      |      |        |           |     |    |      | .90       |    |    |    |             |        |         |  |
| <b>AVG 24Hr</b>   | 2737         | 2089 | 0  | 4826   | 0          | 2484 | 1059 | 3543   | 8369      | 854 | 0  | 2963 | 3817      | 0  | 0  | 0  | 0           | 3817   | 12186   |  |
| Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor. |              |      |    |        |            |      |      |        |           |     |    |      | 1.31      |    |    |    |             |        |         |  |

Comments:

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.



**Transportation Services - Traffic Services** W.O. 37720  
**Turning Movement Count - 15 Minute Summary Report**

**CUMMINGS AVE @ DONALD ST**

Survey Date: Wednesday, April 11, 2018

Total Observed U-Turns

Northbound: 0 Southbound: 0  
 Eastbound: 0 Westbound: 0

| CUMMINGS AVE  |      |      |    |       |            |      |     |       |         | DONALD ST |    |      |       |    |           |    |       |         |      | Grand Total |
|---------------|------|------|----|-------|------------|------|-----|-------|---------|-----------|----|------|-------|----|-----------|----|-------|---------|------|-------------|
| Northbound    |      |      |    |       | Southbound |      |     |       |         | Eastbound |    |      |       |    | Westbound |    |       |         |      |             |
| Time Period   | LT   | ST   | RT | N TOT | LT         | ST   | RT  | S TOT | STR TOT | LT        | ST | RT   | E TOT | LT | ST        | RT | W TOT | STR TOT |      |             |
| 07:00 07:15   | 37   | 21   | 0  | 58    | 0          | 36   | 11  | 47    | 105     | 7         | 0  | 25   | 32    | 0  | 0         | 0  | 0     | 32      | 137  |             |
| 07:15 07:30   | 35   | 30   | 0  | 65    | 0          | 41   | 11  | 52    | 117     | 12        | 0  | 36   | 48    | 0  | 0         | 0  | 0     | 48      | 165  |             |
| 07:30 07:45   | 38   | 26   | 0  | 64    | 0          | 65   | 10  | 75    | 139     | 10        | 0  | 32   | 42    | 0  | 0         | 0  | 0     | 42      | 181  |             |
| 07:45 08:00   | 46   | 29   | 0  | 75    | 0          | 47   | 24  | 71    | 146     | 10        | 0  | 35   | 45    | 0  | 0         | 0  | 0     | 45      | 191  |             |
| 08:00 08:15   | 49   | 38   | 0  | 87    | 0          | 53   | 32  | 85    | 172     | 7         | 0  | 41   | 48    | 0  | 0         | 0  | 0     | 48      | 220  |             |
| 08:15 08:30   | 60   | 33   | 0  | 93    | 0          | 48   | 25  | 73    | 166     | 11        | 0  | 32   | 43    | 0  | 0         | 0  | 0     | 43      | 209  |             |
| 08:30 08:45   | 60   | 24   | 0  | 84    | 0          | 44   | 23  | 67    | 151     | 14        | 0  | 40   | 54    | 0  | 0         | 0  | 0     | 54      | 205  |             |
| 08:45 09:00   | 35   | 31   | 0  | 66    | 0          | 44   | 21  | 65    | 131     | 6         | 0  | 37   | 43    | 0  | 0         | 0  | 0     | 43      | 174  |             |
| 09:00 09:15   | 44   | 31   | 0  | 75    | 0          | 43   | 15  | 58    | 133     | 16        | 0  | 54   | 70    | 0  | 0         | 0  | 0     | 70      | 203  |             |
| 09:15 09:30   | 58   | 27   | 0  | 85    | 0          | 44   | 25  | 69    | 154     | 9         | 0  | 40   | 49    | 0  | 0         | 0  | 0     | 49      | 203  |             |
| 09:30 09:45   | 44   | 29   | 0  | 73    | 0          | 43   | 19  | 62    | 135     | 7         | 0  | 40   | 47    | 0  | 0         | 0  | 0     | 47      | 182  |             |
| 09:45 10:00   | 39   | 34   | 0  | 73    | 0          | 47   | 15  | 62    | 135     | 13        | 0  | 48   | 61    | 0  | 0         | 0  | 0     | 61      | 196  |             |
| 11:30 11:45   | 44   | 30   | 0  | 74    | 0          | 44   | 15  | 59    | 133     | 8         | 0  | 63   | 71    | 0  | 0         | 0  | 0     | 71      | 204  |             |
| 11:45 12:00   | 57   | 28   | 0  | 85    | 0          | 47   | 14  | 61    | 146     | 17        | 0  | 45   | 62    | 0  | 0         | 0  | 0     | 62      | 208  |             |
| 12:00 12:15   | 68   | 34   | 0  | 102   | 0          | 42   | 22  | 64    | 166     | 24        | 0  | 66   | 90    | 0  | 0         | 0  | 0     | 90      | 256  |             |
| 12:15 12:30   | 57   | 37   | 0  | 94    | 0          | 38   | 24  | 62    | 156     | 12        | 0  | 70   | 82    | 0  | 0         | 0  | 0     | 82      | 238  |             |
| 12:30 12:45   | 54   | 36   | 0  | 90    | 0          | 36   | 22  | 58    | 148     | 16        | 0  | 74   | 90    | 0  | 0         | 0  | 0     | 90      | 238  |             |
| 12:45 13:00   | 56   | 35   | 0  | 91    | 0          | 40   | 18  | 58    | 149     | 16        | 0  | 66   | 82    | 0  | 0         | 0  | 0     | 82      | 231  |             |
| 13:00 13:15   | 42   | 41   | 0  | 83    | 0          | 47   | 16  | 63    | 146     | 23        | 0  | 72   | 95    | 0  | 0         | 0  | 0     | 95      | 241  |             |
| 13:15 13:30   | 66   | 30   | 0  | 96    | 0          | 28   | 19  | 47    | 143     | 12        | 0  | 60   | 72    | 0  | 0         | 0  | 0     | 72      | 215  |             |
| 15:00 15:15   | 57   | 48   | 0  | 105   | 0          | 47   | 27  | 74    | 179     | 15        | 0  | 56   | 71    | 0  | 0         | 0  | 0     | 71      | 250  |             |
| 15:15 15:30   | 59   | 52   | 0  | 111   | 0          | 45   | 24  | 69    | 180     | 20        | 0  | 69   | 89    | 0  | 0         | 0  | 0     | 89      | 269  |             |
| 15:30 15:45   | 72   | 57   | 0  | 129   | 0          | 58   | 21  | 79    | 208     | 27        | 0  | 101  | 128   | 0  | 0         | 0  | 0     | 128     | 336  |             |
| 15:45 16:00   | 55   | 72   | 0  | 127   | 0          | 57   | 23  | 80    | 207     | 19        | 0  | 60   | 79    | 0  | 0         | 0  | 0     | 79      | 286  |             |
| 16:00 16:15   | 58   | 57   | 0  | 115   | 0          | 78   | 22  | 100   | 215     | 22        | 0  | 76   | 98    | 0  | 0         | 0  | 0     | 98      | 313  |             |
| 16:15 16:30   | 55   | 50   | 0  | 105   | 0          | 56   | 19  | 75    | 180     | 22        | 0  | 57   | 79    | 0  | 0         | 0  | 0     | 79      | 259  |             |
| 16:30 16:45   | 56   | 48   | 0  | 104   | 0          | 51   | 29  | 80    | 184     | 28        | 0  | 86   | 114   | 0  | 0         | 0  | 0     | 114     | 298  |             |
| 16:45 17:00   | 53   | 50   | 0  | 103   | 0          | 46   | 24  | 70    | 173     | 23        | 0  | 70   | 93    | 0  | 0         | 0  | 0     | 93      | 266  |             |
| 17:00 17:15   | 80   | 54   | 0  | 134   | 0          | 54   | 14  | 68    | 202     | 30        | 0  | 66   | 96    | 0  | 0         | 0  | 0     | 96      | 298  |             |
| 17:15 17:30   | 45   | 69   | 0  | 114   | 0          | 58   | 17  | 75    | 189     | 25        | 0  | 71   | 96    | 0  | 0         | 0  | 0     | 96      | 285  |             |
| 17:30 17:45   | 44   | 51   | 0  | 95    | 0          | 44   | 23  | 67    | 162     | 20        | 0  | 64   | 84    | 0  | 0         | 0  | 0     | 84      | 246  |             |
| 17:45 18:00   | 47   | 43   | 0  | 90    | 0          | 45   | 22  | 67    | 157     | 20        | 0  | 56   | 76    | 0  | 0         | 0  | 0     | 76      | 233  |             |
| <b>TOTAL:</b> | 1670 | 1275 | 0  | 2945  | 0          | 1516 | 646 | 2162  | 5107    | 521       | 0  | 1808 | 2329  | 0  | 0         | 0  | 0     | 2329    | 7436 |             |

Note: U-Turns are included in Totals.

Comment:



**Transportation Services - Traffic Services**  
**Turning Movement Count - Cyclist Volume Report**

Work Order  
37720

**CUMMINGS AVE @ DONALD ST**

Count Date: Wednesday, April 11, 2018

Start Time: 07:00

| Time Period  | CUMMINGS AVE |            |              | DONALD ST |           |              | Grand Total |
|--------------|--------------|------------|--------------|-----------|-----------|--------------|-------------|
|              | Northbound   | Southbound | Street Total | Eastbound | Westbound | Street Total |             |
| 07:00 08:00  | 0            | 0          | 0            | 4         | 1         | 5            | 5           |
| 08:00 09:00  | 2            | 1          | 3            | 0         | 0         | 0            | 3           |
| 09:00 10:00  | 0            | 0          | 0            | 0         | 0         | 0            | 0           |
| 11:30 12:30  | 2            | 1          | 3            | 0         | 0         | 0            | 3           |
| 12:30 13:30  | 3            | 0          | 3            | 0         | 0         | 0            | 3           |
| 15:00 16:00  | 1            | 1          | 2            | 3         | 0         | 3            | 5           |
| 16:00 17:00  | 3            | 1          | 4            | 5         | 0         | 5            | 9           |
| 17:00 18:00  | 1            | 0          | 1            | 2         | 0         | 2            | 3           |
| <b>Total</b> | 12           | 4          | 16           | 14        | 1         | 15           | 31          |

Comment:

Note: These volumes consists of bicycles only (no mopeds or motorcycles) and ARE NOT included in the Turning Movement Count Summary.



**Transportation Services - Traffic Services**  
**Turning Movement Count - Cyclist Volume Report**

Work Order  
37720

**CUMMINGS AVE @ DONALD ST**

Count Date: Wednesday, April 11, 2018

Start Time: 07:00

| Time Period        | CUMMINGS AVE |            |              | DONALD ST |           |              | Grand Total |
|--------------------|--------------|------------|--------------|-----------|-----------|--------------|-------------|
|                    | Northbound   | Southbound | Street Total | Eastbound | Westbound | Street Total |             |
| 07:00 08:00        | 0            | 0          | 0            | 4         | 1         | 5            | 5           |
| 08:00 09:00        | 2            | 1          | 3            | 0         | 0         | 0            | 3           |
| 09:00 10:00        | 0            | 0          | 0            | 0         | 0         | 0            | 0           |
| 11:30 12:30        | 2            | 1          | 3            | 0         | 0         | 0            | 3           |
| 12:30 13:30        | 3            | 0          | 3            | 0         | 0         | 0            | 3           |
| 15:00 16:00        | 1            | 1          | 2            | 3         | 0         | 3            | 5           |
| 16:00 17:00        | 3            | 1          | 4            | 5         | 0         | 5            | 9           |
| 17:00 18:00        | 1            | 0          | 1            | 2         | 0         | 2            | 3           |
| <b>Total</b> ..... | <b>12</b>    | <b>4</b>   | <b>16</b>    | <b>14</b> | <b>1</b>  | <b>15</b>    | <b>31</b>   |

Comment:



**Transportation Services - Traffic Services**  
**Turning Movement Count - Pedestrian Volume Report**

Work Order  
37720

**CUMMINGS AVE @ DONALD ST**

Count Date: Wednesday, April 11, 2018

Start Time: 07:00

| Time Period        | NB Approach       | SB Approach       | Total      | EB Approach       | WB Approach       | Total     | Grand Total |
|--------------------|-------------------|-------------------|------------|-------------------|-------------------|-----------|-------------|
|                    | (E or W Crossing) | (E or W Crossing) |            | (N or S Crossing) | (N or S Crossing) |           |             |
| 07:00 07:15        | 1                 | 0                 | 1          | 1                 | 0                 | 1         | 2           |
| 07:15 07:30        | 4                 | 4                 | 8          | 0                 | 0                 | 0         | 8           |
| 07:30 07:45        | 2                 | 2                 | 4          | 1                 | 0                 | 1         | 5           |
| 07:45 08:00        | 4                 | 1                 | 5          | 2                 | 0                 | 2         | 7           |
| 07:00 08:00        | 11                | 7                 | 18         | 4                 | 0                 | 4         | 22          |
| 08:00 08:15        | 5                 | 2                 | 7          | 6                 | 0                 | 6         | 13          |
| 08:15 08:30        | 1                 | 2                 | 3          | 3                 | 0                 | 3         | 6           |
| 08:30 08:45        | 3                 | 5                 | 8          | 2                 | 0                 | 2         | 10          |
| 08:45 09:00        | 12                | 1                 | 13         | 3                 | 0                 | 3         | 16          |
| 08:00 09:00        | 21                | 10                | 31         | 14                | 0                 | 14        | 45          |
| 09:00 09:15        | 7                 | 0                 | 7          | 1                 | 0                 | 1         | 8           |
| 09:15 09:30        | 1                 | 3                 | 4          | 1                 | 0                 | 1         | 5           |
| 09:30 09:45        | 3                 | 0                 | 3          | 1                 | 0                 | 1         | 4           |
| 09:45 10:00        | 1                 | 1                 | 2          | 1                 | 0                 | 1         | 3           |
| 09:00 10:00        | 12                | 4                 | 16         | 4                 | 0                 | 4         | 20          |
| 11:30 11:45        | 2                 | 1                 | 3          | 1                 | 0                 | 1         | 4           |
| 11:45 12:00        | 2                 | 0                 | 2          | 1                 | 0                 | 1         | 3           |
| 12:00 12:15        | 0                 | 0                 | 0          | 0                 | 0                 | 0         | 0           |
| 12:15 12:30        | 0                 | 1                 | 1          | 0                 | 0                 | 0         | 1           |
| 11:30 12:30        | 4                 | 2                 | 6          | 2                 | 0                 | 2         | 8           |
| 12:30 12:45        | 1                 | 0                 | 1          | 1                 | 0                 | 1         | 2           |
| 12:45 13:00        | 1                 | 2                 | 3          | 4                 | 0                 | 4         | 7           |
| 13:00 13:15        | 2                 | 0                 | 2          | 1                 | 0                 | 1         | 3           |
| 13:15 13:30        | 0                 | 1                 | 1          | 0                 | 0                 | 0         | 1           |
| 12:30 13:30        | 4                 | 3                 | 7          | 6                 | 0                 | 6         | 13          |
| 15:00 15:15        | 1                 | 1                 | 2          | 0                 | 0                 | 0         | 2           |
| 15:15 15:30        | 2                 | 0                 | 2          | 0                 | 0                 | 0         | 2           |
| 15:30 15:45        | 5                 | 0                 | 5          | 1                 | 0                 | 1         | 6           |
| 15:45 16:00        | 11                | 0                 | 11         | 7                 | 0                 | 7         | 18          |
| 15:00 16:00        | 19                | 1                 | 20         | 8                 | 0                 | 8         | 28          |
| 16:00 16:15        | 2                 | 1                 | 3          | 2                 | 0                 | 2         | 5           |
| 16:15 16:30        | 0                 | 3                 | 3          | 2                 | 0                 | 2         | 5           |
| 16:30 16:45        | 6                 | 1                 | 7          | 2                 | 0                 | 2         | 9           |
| 16:45 17:00        | 6                 | 0                 | 6          | 3                 | 0                 | 3         | 9           |
| 16:00 17:00        | 14                | 5                 | 19         | 9                 | 0                 | 9         | 28          |
| 17:00 17:15        | 6                 | 0                 | 6          | 1                 | 0                 | 1         | 7           |
| 17:15 17:30        | 1                 | 1                 | 2          | 2                 | 0                 | 2         | 4           |
| 17:30 17:45        | 2                 | 4                 | 6          | 2                 | 0                 | 2         | 8           |
| 17:45 18:00        | 6                 | 2                 | 8          | 1                 | 0                 | 1         | 9           |
| 17:00 18:00        | 15                | 7                 | 22         | 6                 | 0                 | 6         | 28          |
| <b>Total</b> ..... | <b>100</b>        | <b>39</b>         | <b>139</b> | <b>53</b>         | <b>0</b>          | <b>53</b> | <b>192</b>  |

Comment:

Note: These volumes consists of bicycles only (no mopeds or motorcycles) and ARE NOT included in the Turning Movement Count Summary.



# Transportation Services - Traffic Services

Work Order  
37720

## Turning Movement Count - 15 Min U-Turn Total Report

### CUMMINGS AVE @ DONALD ST

Survey Date: Wednesday, April 11, 2018

| Time Period | Northbound<br>U-Turn Total | Southbound<br>U-Turn Total | Eastbound<br>U-Turn Total | Westbound<br>U-Turn Total | Total |
|-------------|----------------------------|----------------------------|---------------------------|---------------------------|-------|
| 07:00 07:15 | 0                          | 0                          | 0                         | 0                         | 0     |
| 07:15 07:30 | 0                          | 0                          | 0                         | 0                         | 0     |
| 07:30 07:45 | 0                          | 0                          | 0                         | 0                         | 0     |
| 07:45 08:00 | 0                          | 0                          | 0                         | 0                         | 0     |
| 08:00 08:15 | 0                          | 0                          | 0                         | 0                         | 0     |
| 08:15 08:30 | 0                          | 0                          | 0                         | 0                         | 0     |
| 08:30 08:45 | 0                          | 0                          | 0                         | 0                         | 0     |
| 08:45 09:00 | 0                          | 0                          | 0                         | 0                         | 0     |
| 09:00 09:15 | 0                          | 0                          | 0                         | 0                         | 0     |
| 09:15 09:30 | 0                          | 0                          | 0                         | 0                         | 0     |
| 09:30 09:45 | 0                          | 0                          | 0                         | 0                         | 0     |
| 09:45 10:00 | 0                          | 0                          | 0                         | 0                         | 0     |
| 11:30 11:45 | 0                          | 0                          | 0                         | 0                         | 0     |
| 11:45 12:00 | 0                          | 0                          | 0                         | 0                         | 0     |
| 12:00 12:15 | 0                          | 0                          | 0                         | 0                         | 0     |
| 12:15 12:30 | 0                          | 0                          | 0                         | 0                         | 0     |
| 12:30 12:45 | 0                          | 0                          | 0                         | 0                         | 0     |
| 12:45 13:00 | 0                          | 0                          | 0                         | 0                         | 0     |
| 13:00 13:15 | 0                          | 0                          | 0                         | 0                         | 0     |
| 13:15 13:30 | 0                          | 0                          | 0                         | 0                         | 0     |
| 15:00 15:15 | 0                          | 0                          | 0                         | 0                         | 0     |
| 15:15 15:30 | 0                          | 0                          | 0                         | 0                         | 0     |
| 15:30 15:45 | 0                          | 0                          | 0                         | 0                         | 0     |
| 15:45 16:00 | 0                          | 0                          | 0                         | 0                         | 0     |
| 16:00 16:15 | 0                          | 0                          | 0                         | 0                         | 0     |
| 16:15 16:30 | 0                          | 0                          | 0                         | 0                         | 0     |
| 16:30 16:45 | 0                          | 0                          | 0                         | 0                         | 0     |
| 16:45 17:00 | 0                          | 0                          | 0                         | 0                         | 0     |
| 17:00 17:15 | 0                          | 0                          | 0                         | 0                         | 0     |
| 17:15 17:30 | 0                          | 0                          | 0                         | 0                         | 0     |
| 17:30 17:45 | 0                          | 0                          | 0                         | 0                         | 0     |
| 17:45 18:00 | 0                          | 0                          | 0                         | 0                         | 0     |
| Total       | 0                          | 0                          | 0                         | 0                         | 0     |

# Appendix C

Synchro Intersection Worksheets – Existing Conditions

Lanes, Volumes, Timings  
1: Cyrville Rd & Ogilvie Rd

Existing  
AM Peak Hour

| Lane Group             | EBL | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR | SBL   | SBT   | SBR |
|------------------------|-----|-------|-------|-------|-------|-------|-------|-------|-----|-------|-------|-----|
| Lane Configurations    |     | ↑↑    | ↑     | ↑     | ↑↑    | ↑     | ↑     | ↑     | ↑   | ↑     | ↑     | ↑   |
| Traffic Volume (vph)   | 0   | 532   | 227   | 27    | 984   | 166   | 165   | 234   | 12  | 47    | 152   | 45  |
| Future Volume (vph)    | 0   | 532   | 227   | 27    | 984   | 166   | 165   | 234   | 12  | 47    | 152   | 45  |
| Satd. Flow (prot)      | 0   | 3283  | 1414  | 1658  | 3316  | 1441  | 1551  | 1716  | 0   | 1626  | 1600  | 0   |
| Fit Permitted          |     |       |       | 0.414 |       |       | 0.505 |       |     | 0.406 |       |     |
| Satd. Flow (perm)      | 0   | 3283  | 1329  | 714   | 3316  | 1319  | 821   | 1716  | 0   | 693   | 1600  | 0   |
| Satd. Flow (RTOR)      |     |       | 252   |       |       | 184   |       | 2     |     |       | 13    |     |
| Lane Group Flow (vph)  | 0   | 591   | 252   | 30    | 1093  | 184   | 183   | 273   | 0   | 52    | 219   | 0   |
| Turn Type              |     | NA    | Perm  | Perm  | NA    | Perm  | Perm  | NA    |     | Perm  | NA    |     |
| Protected Phases       |     | 2     |       |       | 6     |       |       | 8     |     |       |       | 4   |
| Permitted Phases       |     |       | 2     | 6     |       | 6     | 8     |       |     | 4     |       |     |
| Detector Phase         |     | 2     | 2     | 6     | 6     | 6     | 8     | 8     |     | 4     | 4     |     |
| Switch Phase           |     |       |       |       |       |       |       |       |     |       |       |     |
| Minimum Initial (s)    |     | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  |     | 10.0  | 10.0  |     |
| Minimum Split (s)      |     | 32.2  | 32.2  | 32.2  | 32.2  | 32.2  | 47.1  | 47.1  |     | 47.1  | 47.1  |     |
| Total Split (s)        |     | 72.9  | 72.9  | 72.9  | 72.9  | 72.9  | 47.1  | 47.1  |     | 47.1  | 47.1  |     |
| Total Split (%)        |     | 60.8% | 60.8% | 60.8% | 60.8% | 60.8% | 39.3% | 39.3% |     | 39.3% | 39.3% |     |
| Yellow Time (s)        |     | 3.7   | 3.7   | 3.7   | 3.7   | 3.7   | 3.7   | 3.7   |     | 3.7   | 3.7   |     |
| All-Red Time (s)       |     | 2.5   | 2.5   | 2.5   | 2.5   | 2.5   | 3.4   | 3.4   |     | 3.4   | 3.4   |     |
| Lost Time Adjust (s)   |     | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     | 0.0   | 0.0   |     |
| Total Lost Time (s)    |     | 6.2   | 6.2   | 6.2   | 6.2   | 6.2   | 7.1   | 7.1   |     | 7.1   | 7.1   |     |
| Lead/Lag               |     |       |       |       |       |       |       |       |     |       |       |     |
| Lead-Lag Optimize?     |     |       |       |       |       |       |       |       |     |       |       |     |
| Recall Mode            |     | C-Max | C-Max | C-Max | C-Max | C-Max | None  | None  |     | None  | None  |     |
| Act Effct Green (s)    |     | 77.5  | 77.5  | 77.5  | 77.5  | 77.5  | 29.2  | 29.2  |     | 29.2  | 29.2  |     |
| Actuated g/C Ratio     |     | 0.65  | 0.65  | 0.65  | 0.65  | 0.65  | 0.24  | 0.24  |     | 0.24  | 0.24  |     |
| v/c Ratio              |     | 0.28  | 0.27  | 0.07  | 0.51  | 0.20  | 0.92  | 0.65  |     | 0.31  | 0.55  |     |
| Control Delay          |     | 10.7  | 2.2   | 3.3   | 3.5   | 0.3   | 88.3  | 46.8  |     | 38.9  | 40.9  |     |
| Queue Delay            |     | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     | 0.0   | 0.0   |     |
| Total Delay            |     | 10.7  | 2.2   | 3.3   | 3.5   | 0.3   | 88.3  | 46.8  |     | 38.9  | 40.9  |     |
| LOS                    |     | B     | A     | A     | A     | A     | F     | D     |     | D     | D     |     |
| Approach Delay         |     | 8.2   |       |       | 3.0   |       | 63.4  |       |     | 40.5  |       |     |
| Approach LOS           |     | A     |       |       | A     |       | E     |       |     | D     |       |     |
| Queue Length 50th (m)  |     | 29.6  | 0.0   | 0.5   | 11.0  | 0.1   | 41.9  | 57.3  |     | 10.0  | 42.3  |     |
| Queue Length 95th (m)  |     | 49.3  | 11.3  | m0.9  | 14.7  | m0.0  | #65.1 | 75.8  |     | 19.4  | 59.0  |     |
| Internal Link Dist (m) |     | 113.5 |       |       | 313.9 |       | 191.2 |       |     | 190.6 |       |     |
| Turn Bay Length (m)    |     |       |       | 62.0  |       | 71.0  | 33.5  |       |     | 82.0  |       |     |
| Base Capacity (vph)    |     | 2119  | 947   | 461   | 2140  | 916   | 273   | 573   |     | 231   | 542   |     |
| Starvation Cap Reductn |     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |     | 0     | 0     |     |
| Spillback Cap Reductn  |     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |     | 0     | 0     |     |
| Storage Cap Reductn    |     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |     | 0     | 0     |     |
| Reduced v/c Ratio      |     | 0.28  | 0.27  | 0.07  | 0.51  | 0.20  | 0.67  | 0.48  |     | 0.23  | 0.40  |     |

Intersection Summary

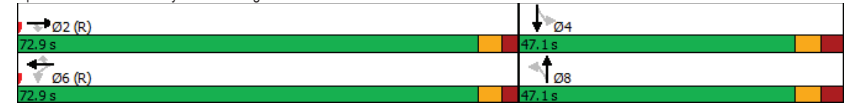
|   |
|---|
| Cycle Length: 120   |
| Actuated Cycle Length: 120  |
| Offset: 10 (8%), Referenced to phase 2:EBT and 6:WBTL, Start of Green |
| Natural Cycle: 80   |
| Control Type: Actuated-Coordinated                                    |

Lanes, Volumes, Timings  
1: Cyrville Rd & Ogilvie Rd

Existing  
AM Peak Hour

|   |                        |
|---|------------------------|
| Maximum v/c Ratio: 0.92   | Intersection LOS: B    |
| Intersection Signal Delay: 17.6                                   | ICU Level of Service C |
| Intersection Capacity Utilization 72.0%                           |                        |
| Analysis Period (min) 15  |                        |
| # 95th percentile volume exceeds capacity, queue may be longer.   |                        |
| Queue shown is maximum after two cycles.                          |                        |
| m Volume for 95th percentile queue is metered by upstream signal. |                        |

Splits and Phases: 1: Cyrville Rd & Ogilvie Rd





Lanes, Volumes, Timings  
2: Cummings Ave & Donald

Existing  
AM Peak Hour

| Lane Group             | EBL   | EBR   | NBL   | NBT   | SBT   | SBR |
|------------------------|-------|-------|-------|-------|-------|-----|
| Lane Configurations    |       |       |       |       |       |     |
| Traffic Volume (vph)   | 42    | 148   | 215   | 124   | 192   | 104 |
| Future Volume (vph)    | 42    | 148   | 215   | 124   | 192   | 104 |
| Satd. Flow (prot)      | 1610  | 1469  | 1642  | 1695  | 1597  | 0   |
| Fit Permitted          | 0.950 |       | 0.562 |       |       |     |
| Satd. Flow (perm)      | 1532  | 1382  | 957   | 1695  | 1597  | 0   |
| Satd. Flow (RTOR)      |       | 164   |       |       | 68    |     |
| Lane Group Flow (vph)  | 47    | 164   | 239   | 138   | 329   | 0   |
| Turn Type              | Perm  | Perm  | Perm  | NA    | NA    |     |
| Protected Phases       |       |       |       | 2     | 6     |     |
| Permitted Phases       | 4     | 4     | 2     |       |       |     |
| Detector Phase         | 4     | 4     | 2     | 2     | 6     |     |
| Switch Phase           |       |       |       |       |       |     |
| Minimum Initial (s)    | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  |     |
| Minimum Split (s)      | 22.0  | 22.0  | 39.9  | 39.9  | 39.9  |     |
| Total Split (s)        | 22.0  | 22.0  | 98.0  | 98.0  | 98.0  |     |
| Total Split (%)        | 18.3% | 18.3% | 81.7% | 81.7% | 81.7% |     |
| Yellow Time (s)        | 3.3   | 3.3   | 3.3   | 3.3   | 3.3   |     |
| All-Red Time (s)       | 2.7   | 2.7   | 3.6   | 3.6   | 3.6   |     |
| Lost Time Adjust (s)   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     |
| Total Lost Time (s)    | 6.0   | 6.0   | 6.9   | 6.9   | 6.9   |     |
| Lead/Lag               |       |       |       |       |       |     |
| Lead-Lag Optimize?     |       |       |       |       |       |     |
| Recall Mode            | None  | None  | Min   | Min   | Min   |     |
| Act Effct Green (s)    | 11.3  | 11.3  | 19.3  | 19.3  | 19.3  |     |
| Actuated g/C Ratio     | 0.26  | 0.26  | 0.44  | 0.44  | 0.44  |     |
| v/c Ratio              | 0.12  | 0.35  | 0.57  | 0.19  | 0.45  |     |
| Control Delay          | 14.8  | 5.8   | 15.5  | 8.3   | 8.9   |     |
| Queue Delay            | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     |
| Total Delay            | 14.8  | 5.8   | 15.5  | 8.3   | 8.9   |     |
| LOS                    | B     | A     | B     | A     | A     |     |
| Approach Delay         | 7.8   |       |       | 12.9  | 8.9   |     |
| Approach LOS           | A     |       |       | B     | A     |     |
| Queue Length 50th (m)  | 2.1   | 0.0   | 11.4  | 5.4   | 11.2  |     |
| Queue Length 95th (m)  | 11.0  | 12.0  | 31.8  | 14.6  | 29.3  |     |
| Internal Link Dist (m) | 296.9 |       |       | 237.9 | 259.3 |     |
| Turn Bay Length (m)    | 60.0  |       | 60.0  |       |       |     |
| Base Capacity (vph)    | 580   | 625   | 957   | 1695  | 1597  |     |
| Starvation Cap Reductn | 0     | 0     | 0     | 0     | 0     |     |
| Spillback Cap Reductn  | 0     | 0     | 0     | 0     | 0     |     |
| Storage Cap Reductn    | 0     | 0     | 0     | 0     | 0     |     |
| Reduced v/c Ratio      | 0.08  | 0.26  | 0.25  | 0.08  | 0.21  |     |

Intersection Summary

Cycle Length: 120  
Actuated Cycle Length: 44.1  
Natural Cycle: 65  
Control Type: Actuated-Uncoordinated  
Maximum v/c Ratio: 0.57

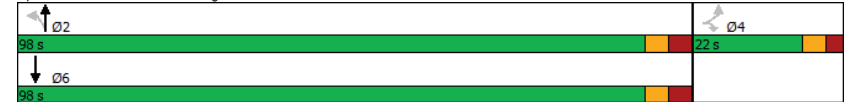
Lanes, Volumes, Timings  
2: Cummings Ave & Donald

Existing  
AM Peak Hour

Intersection Signal Delay: 10.3  
Intersection Capacity Utilization 60.0%  
Analysis Period (min) 15

Intersection LOS: B  
ICU Level of Service B

Splits and Phases: 2: Cummings Ave & Donald



Lanes, Volumes, Timings  
3: Cummings Ave & Ogilvie Rd

Existing  
AM Peak Hour

| Lane Group             | EBL   | EBT   | EBR | WBL   | WBT    | WBR | NBL   | NBT   | NBR | SBL   | SBT   | SBR |
|------------------------|-------|-------|-----|-------|--------|-----|-------|-------|-----|-------|-------|-----|
| Lane Configurations    | ↖     | ↖↗    | ↘   | ↖     | ↖↗     | ↘   | ↖     | ↖↗    | ↘   | ↖     | ↖↗    | ↘   |
| Traffic Volume (vph)   | 51    | 556   | 11  | 167   | 1076   | 170 | 18    | 111   | 63  | 138   | 116   | 112 |
| Future Volume (vph)    | 51    | 556   | 11  | 167   | 1076   | 170 | 18    | 111   | 63  | 138   | 116   | 112 |
| Satd. Flow (prot)      | 1626  | 3265  | 0   | 1626  | 3194   | 0   | 1658  | 1508  | 0   | 1626  | 1599  | 0   |
| Fit Permitted          | 0.084 |       |     | 0.347 |        |     | 0.602 |       |     | 0.449 |       |     |
| Satd. Flow (perm)      | 144   | 3265  | 0   | 585   | 3194   | 0   | 1046  | 1508  | 0   | 737   | 1599  | 0   |
| Satd. Flow (RTOR)      |       | 2     |     |       | 19     |     |       | 23    |     |       | 44    |     |
| Lane Group Flow (vph)  | 57    | 630   | 0   | 186   | 1385   | 0   | 20    | 193   | 0   | 153   | 253   | 0   |
| Turn Type              | pm+pt | NA    |     | pm+pt | NA     |     | Perm  | NA    |     | pm+pt | NA    |     |
| Protected Phases       | 5     | 2     |     | 1     | 6      |     |       | 8     |     | 7     | 4     |     |
| Permitted Phases       | 2     |       |     | 6     |        |     | 8     |       |     | 4     |       |     |
| Detector Phase         | 5     | 2     |     | 1     | 6      |     | 8     | 8     |     | 7     | 4     |     |
| Switch Phase           |       |       |     |       |        |     |       |       |     |       |       |     |
| Minimum Initial (s)    | 5.0   | 10.0  |     | 5.0   | 10.0   |     | 10.0  | 10.0  |     | 5.0   | 10.0  |     |
| Minimum Split (s)      | 9.7   | 24.7  |     | 9.7   | 24.7   |     | 36.6  | 36.6  |     | 9.3   | 36.6  |     |
| Total Split (s)        | 11.0  | 61.0  |     | 11.0  | 61.0   |     | 36.6  | 36.6  |     | 11.4  | 48.0  |     |
| Total Split (%)        | 9.2%  | 50.8% |     | 9.2%  | 50.8%  |     | 30.5% | 30.5% |     | 9.5%  | 40.0% |     |
| Yellow Time (s)        | 3.7   | 3.7   |     | 3.7   | 3.7    |     | 3.3   | 3.3   |     | 3.3   | 3.3   |     |
| All-Red Time (s)       | 1.0   | 2.0   |     | 1.0   | 2.0    |     | 3.3   | 3.3   |     | 1.0   | 3.3   |     |
| Lost Time Adjust (s)   | 0.0   | 0.0   |     | 0.0   | 0.0    |     | 0.0   | 0.0   |     | 0.0   | 0.0   |     |
| Total Lost Time (s)    | 4.7   | 5.7   |     | 4.7   | 5.7    |     | 6.6   | 6.6   |     | 4.3   | 6.6   |     |
| Lead/Lag               | Lead  | Lag   |     | Lead  | Lag    |     | Lag   | Lag   |     | Lead  |       |     |
| Lead-Lag Optimize?     | Yes   | Yes   |     | Yes   | Yes    |     | Yes   | Yes   |     | Yes   |       |     |
| Recall Mode            | None  | C-Max |     | None  | C-Max  |     | None  | None  |     | None  | None  |     |
| Act Effct Green (s)    | 66.0  | 58.8  |     | 67.3  | 61.3   |     | 26.2  | 26.2  |     | 39.9  | 37.6  |     |
| Actuated g/C Ratio     | 0.55  | 0.49  |     | 0.56  | 0.51   |     | 0.22  | 0.22  |     | 0.33  | 0.31  |     |
| v/c Ratio              | 0.37  | 0.39  |     | 0.48  | 0.84   |     | 0.09  | 0.56  |     | 0.52  | 0.48  |     |
| Control Delay          | 30.2  | 18.2  |     | 18.4  | 33.2   |     | 35.8  | 41.8  |     | 35.3  | 29.3  |     |
| Queue Delay            | 0.0   | 0.0   |     | 0.0   | 0.0    |     | 0.0   | 0.0   |     | 0.0   | 0.0   |     |
| Total Delay            | 30.2  | 18.2  |     | 18.4  | 33.2   |     | 35.8  | 41.8  |     | 35.3  | 29.3  |     |
| LOS                    | C     | B     |     | B     | C      |     | D     | D     |     | D     | C     |     |
| Approach Delay         |       | 19.2  |     |       | 31.5   |     |       | 41.3  |     |       | 31.6  |     |
| Approach LOS           |       | B     |     |       | C      |     |       | D     |     |       | C     |     |
| Queue Length 50th (m)  | 5.3   | 39.6  |     | 20.7  | 157.0  |     | 3.6   | 34.2  |     | 25.1  | 37.4  |     |
| Queue Length 95th (m)  | 20.5  | 50.6  |     | 33.1  | #207.0 |     | 10.1  | 57.2  |     | 41.4  | 60.8  |     |
| Internal Link Dist (m) |       | 313.9 |     |       | 184.8  |     |       | 136.9 |     |       | 237.9 |     |
| Turn Bay Length (m)    | 80.0  |       |     | 100.0 |        |     | 34.0  |       |     | 153.0 |       |     |
| Base Capacity (vph)    | 156   | 1601  |     | 384   | 1640   |     | 261   | 394   |     | 297   | 580   |     |
| Starvation Cap Reductn | 0     | 0     |     | 0     | 0      |     | 0     | 0     |     | 0     | 0     |     |
| Spillback Cap Reductn  | 0     | 0     |     | 0     | 0      |     | 0     | 0     |     | 0     | 0     |     |
| Storage Cap Reductn    | 0     | 0     |     | 0     | 0      |     | 0     | 0     |     | 0     | 0     |     |
| Reduced v/c Ratio      | 0.37  | 0.39  |     | 0.48  | 0.84   |     | 0.08  | 0.49  |     | 0.52  | 0.44  |     |

Intersection Summary

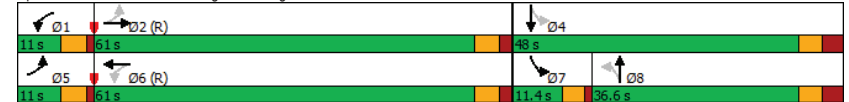
Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 110 (92%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green  
 Natural Cycle: 105  
 Control Type: Actuated-Coordinated

Lanes, Volumes, Timings  
3: Cummings Ave & Ogilvie Rd

Existing  
AM Peak Hour

|   |                        |
|---|------------------------|
| Maximum v/c Ratio: 0.84   | Intersection LOS: C    |
| Intersection Signal Delay: 29.3                                 | ICU Level of Service E |
| Intersection Capacity Utilization 90.1%                         |                        |
| Analysis Period (min) 15  |                        |
| # 95th percentile volume exceeds capacity, queue may be longer. |                        |
| Queue shown is maximum after two cycles.                        |                        |

Splits and Phases: 3: Cummings Ave & Ogilvie Rd



Lanes, Volumes, Timings  
1: Cyrville Rd & Ogilvie Rd

Existing  
PM Peak Hour

| Lane Group             | EBL | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR | SBL   | SBT   | SBR |
|------------------------|-----|-------|-------|-------|-------|-------|-------|-------|-----|-------|-------|-----|
| Lane Configurations    |     | ↑↑    | ↑     | ↑     | ↑↑    | ↑     | ↑     | ↑     | ↑   | ↑     | ↑     | ↑   |
| Traffic Volume (vph)   | 0   | 984   | 257   | 42    | 641   | 124   | 117   | 210   | 32  | 134   | 213   | 80  |
| Future Volume (vph)    | 0   | 984   | 257   | 42    | 641   | 124   | 117   | 210   | 32  | 134   | 213   | 80  |
| Satd. Flow (prot)      | 0   | 3316  | 1469  | 1658  | 3316  | 1469  | 1580  | 1705  | 0   | 1642  | 1635  | 0   |
| Fit Permitted          |     |       |       | 0.215 |       |       | 0.310 |       |     | 0.412 |       |     |
| Satd. Flow (perm)      | 0   | 3316  | 1353  | 373   | 3316  | 1303  | 514   | 1705  | 0   | 709   | 1635  | 0   |
| Satd. Flow (RTOR)      |     |       | 286   |       |       | 138   |       | 7     |     |       | 18    |     |
| Lane Group Flow (vph)  | 0   | 1093  | 286   | 47    | 712   | 138   | 130   | 269   | 0   | 149   | 326   | 0   |
| Turn Type              | NA  | Perm  | Perm  | NA    | Perm  | Perm  | NA    | Perm  | NA  | Perm  | NA    |     |
| Protected Phases       |     | 2     |       |       | 6     |       |       | 8     |     |       |       | 4   |
| Permitted Phases       |     |       | 2     | 6     |       | 6     | 8     |       |     | 4     |       |     |
| Detector Phase         |     | 2     | 2     | 6     | 6     | 6     | 8     | 8     |     | 4     | 4     |     |
| Switch Phase           |     |       |       |       |       |       |       |       |     |       |       |     |
| Minimum Initial (s)    |     | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  |     | 10.0  | 10.0  |     |
| Minimum Split (s)      |     | 32.2  | 32.2  | 32.2  | 32.2  | 32.2  | 47.1  | 47.1  |     | 47.1  | 47.1  |     |
| Total Split (s)        |     | 70.0  | 70.0  | 70.0  | 70.0  | 70.0  | 50.0  | 50.0  |     | 50.0  | 50.0  |     |
| Total Split (%)        |     | 58.3% | 58.3% | 58.3% | 58.3% | 58.3% | 41.7% | 41.7% |     | 41.7% | 41.7% |     |
| Yellow Time (s)        |     | 3.7   | 3.7   | 3.7   | 3.7   | 3.7   | 3.7   | 3.7   |     | 3.7   | 3.7   |     |
| All-Red Time (s)       |     | 2.5   | 2.5   | 2.5   | 2.5   | 2.5   | 3.4   | 3.4   |     | 3.4   | 3.4   |     |
| Lost Time Adjust (s)   |     | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     | 0.0   | 0.0   |     |
| Total Lost Time (s)    |     | 6.2   | 6.2   | 6.2   | 6.2   | 6.2   | 7.1   | 7.1   |     | 7.1   | 7.1   |     |
| Lead/Lag               |     |       |       |       |       |       |       |       |     |       |       |     |
| Lead-Lag Optimize?     |     |       |       |       |       |       |       |       |     |       |       |     |
| Recall Mode            |     | C-Max | C-Max | C-Max | C-Max | C-Max | None  | None  |     | None  | None  |     |
| Act Effct Green (s)    |     | 77.7  | 77.7  | 77.7  | 77.7  | 77.7  | 29.0  | 29.0  |     | 29.0  | 29.0  |     |
| Actuated g/C Ratio     |     | 0.65  | 0.65  | 0.65  | 0.65  | 0.65  | 0.24  | 0.24  |     | 0.24  | 0.24  |     |
| v/c Ratio              |     | 0.51  | 0.29  | 0.20  | 0.33  | 0.15  | 1.05  | 0.65  |     | 0.87  | 0.80  |     |
| Control Delay          |     | 13.3  | 2.2   | 22.6  | 18.8  | 9.7   | 138.2 | 46.0  |     | 84.5  | 54.1  |     |
| Queue Delay            |     | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     | 0.0   | 0.0   |     |
| Total Delay            |     | 13.3  | 2.2   | 22.6  | 18.8  | 9.7   | 138.2 | 46.0  |     | 84.5  | 54.1  |     |
| LOS                    |     | B     | A     | C     | B     | A     | F     | D     |     | F     | D     |     |
| Approach Delay         |     | 11.0  |       |       | 17.6  |       |       | 76.0  |     |       | 63.6  |     |
| Approach LOS           |     | B     |       |       | B     |       |       | E     |     |       | E     |     |
| Queue Length 50th (m)  |     | 65.1  | 0.0   | 6.3   | 53.5  | 8.5   | ~33.7 | 56.0  |     | 34.0  | 69.1  |     |
| Queue Length 95th (m)  |     | 105.7 | 11.7  | m8.5  | m61.7 | m11.3 | #60.9 | 73.6  |     | 54.2  | 89.9  |     |
| Internal Link Dist (m) |     | 113.8 |       |       | 313.9 |       |       | 191.2 |     |       | 190.4 |     |
| Turn Bay Length (m)    |     |       |       | 62.0  |       | 71.0  | 33.5  |       |     | 82.0  |       |     |
| Base Capacity (vph)    |     | 2146  | 976   | 241   | 2146  | 892   | 183   | 614   |     | 253   | 596   |     |
| Starvation Cap Reductn |     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |     | 0     | 0     |     |
| Spillback Cap Reductn  |     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |     | 0     | 0     |     |
| Storage Cap Reductn    |     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |     | 0     | 0     |     |
| Reduced v/c Ratio      |     | 0.51  | 0.29  | 0.20  | 0.33  | 0.15  | 0.71  | 0.44  |     | 0.59  | 0.55  |     |

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 20 (17%), Referenced to phase 2:EBT and 6:WBTL, Start of Green

Natural Cycle: 80

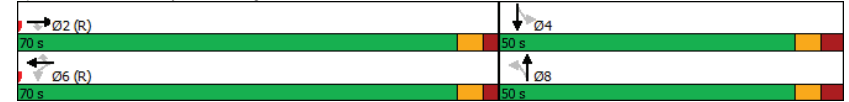
Control Type: Actuated-Coordinated

Lanes, Volumes, Timings  
1: Cyrville Rd & Ogilvie Rd

Existing  
PM Peak Hour

|   |                        |
|---|------------------------|
| Maximum v/c Ratio: 1.05   | Intersection LOS: C    |
| Intersection Signal Delay: 29.1                                   | ICU Level of Service E |
| Intersection Capacity Utilization 83.2%                           |                        |
| Analysis Period (min) 15  |                        |
| ~ Volume exceeds capacity, queue is theoretically infinite.       |                        |
| Queue shown is maximum after two cycles.                          |                        |
| # 95th percentile volume exceeds capacity, queue may be longer.   |                        |
| Queue shown is maximum after two cycles.                          |                        |
| m Volume for 95th percentile queue is metered by upstream signal. |                        |

Splits and Phases: 1: Cyrville Rd & Ogilvie Rd



Lanes, Volumes, Timings  
2: Cummings Ave & Donald

Existing  
PM Peak Hour

| Lane Group             | EBL   | EBR   | NBL   | NBT   | SBT   | SBR |
|------------------------|-------|-------|-------|-------|-------|-----|
| Lane Configurations    |       |       |       |       |       |     |
| Traffic Volume (vph)   | 88    | 306   | 244   | 238   | 238   | 90  |
| Future Volume (vph)    | 88    | 306   | 244   | 238   | 238   | 90  |
| Satd. Flow (prot)      | 1523  | 1483  | 1658  | 1728  | 1647  | 0   |
| Fit Permitted          | 0.950 |       | 0.544 |       |       |     |
| Satd. Flow (perm)      | 1518  | 1345  | 939   | 1728  | 1647  | 0   |
| Satd. Flow (RTOR)      |       | 340   |       |       | 36    |     |
| Lane Group Flow (vph)  | 98    | 340   | 271   | 264   | 364   | 0   |
| Turn Type              | Perm  | Perm  | Perm  | NA    | NA    |     |
| Protected Phases       |       |       |       | 2     | 6     |     |
| Permitted Phases       | 4     | 4     | 2     |       |       |     |
| Detector Phase         | 4     | 4     | 2     | 2     | 6     |     |
| Switch Phase           |       |       |       |       |       |     |
| Minimum Initial (s)    | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  |     |
| Minimum Split (s)      | 22.0  | 22.0  | 39.9  | 39.9  | 39.9  |     |
| Total Split (s)        | 31.0  | 31.0  | 89.0  | 89.0  | 89.0  |     |
| Total Split (%)        | 25.8% | 25.8% | 74.2% | 74.2% | 74.2% |     |
| Yellow Time (s)        | 3.3   | 3.3   | 3.3   | 3.3   | 3.3   |     |
| All-Red Time (s)       | 2.7   | 2.7   | 3.6   | 3.6   | 3.6   |     |
| Lost Time Adjust (s)   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     |
| Total Lost Time (s)    | 6.0   | 6.0   | 6.9   | 6.9   | 6.9   |     |
| Lead/Lag               |       |       |       |       |       |     |
| Lead-Lag Optimize?     |       |       |       |       |       |     |
| Recall Mode            | None  | None  | Min   | Min   | Min   |     |
| Act Effct Green (s)    | 11.3  | 11.3  | 18.7  | 18.7  | 18.7  |     |
| Actuated g/C Ratio     | 0.26  | 0.26  | 0.43  | 0.43  | 0.43  |     |
| v/c Ratio              | 0.25  | 0.57  | 0.67  | 0.36  | 0.50  |     |
| Control Delay          | 17.3  | 6.9   | 18.8  | 9.4   | 10.2  |     |
| Queue Delay            | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     |
| Total Delay            | 17.3  | 6.9   | 18.8  | 9.4   | 10.2  |     |
| LOS                    | B     | A     | B     | A     | B     |     |
| Approach Delay         | 9.2   |       |       | 14.1  | 10.2  |     |
| Approach LOS           | A     |       |       | B     | B     |     |
| Queue Length 50th (m)  | 5.3   | 0.0   | 13.6  | 11.1  | 14.7  |     |
| Queue Length 95th (m)  | 19.4  | 16.9  | 38.4  | 27.0  | 35.9  |     |
| Internal Link Dist (m) | 296.3 |       |       | 237.9 | 259.3 |     |
| Turn Bay Length (m)    | 60.0  |       | 60.0  |       |       |     |
| Base Capacity (vph)    | 912   | 943   | 939   | 1728  | 1647  |     |
| Starvation Cap Reductn | 0     | 0     | 0     | 0     | 0     |     |
| Spillback Cap Reductn  | 0     | 0     | 0     | 0     | 0     |     |
| Storage Cap Reductn    | 0     | 0     | 0     | 0     | 0     |     |
| Reduced v/c Ratio      | 0.11  | 0.36  | 0.29  | 0.15  | 0.22  |     |

Intersection Summary

Cycle Length: 120  
Actuated Cycle Length: 43.5  
Natural Cycle: 65  
Control Type: Semi Act-Uncoord  
Maximum v/c Ratio: 0.67

Lanes, Volumes, Timings  
2: Cummings Ave & Donald

Existing  
PM Peak Hour

Intersection Signal Delay: 11.5  
Intersection Capacity Utilization 63.2%  
Analysis Period (min) 15

Intersection LOS: B  
ICU Level of Service B

Splits and Phases: 2: Cummings Ave & Donald



Lanes, Volumes, Timings  
3: Cummings Ave & Ogilvie Rd

Existing  
PM Peak Hour

|                        | ↖     | →      | ↘   | ↙     | ←      | ↖   | ↙     | ↘      | ↙   | ↘     | ↙     | ↘   |
|------------------------|-------|--------|-----|-------|--------|-----|-------|--------|-----|-------|-------|-----|
| Lane Group             | EBL   | EBT    | EBR | WBL   | WBT    | WBR | NBL   | NBT    | NBR | SBL   | SBT   | SBR |
| Lane Configurations    | ↖     | ↕      | ↘   | ↖     | ↕      | ↘   | ↖     | ↕      | ↘   | ↖     | ↕     | ↘   |
| Traffic Volume (vph)   | 129   | 1082   | 23  | 116   | 729    | 209 | 36    | 162    | 216 | 258   | 163   | 84  |
| Future Volume (vph)    | 129   | 1082   | 23  | 116   | 729    | 209 | 36    | 162    | 216 | 258   | 163   | 84  |
| Satd. Flow (prot)      | 1658  | 3298   | 0   | 1626  | 3161   | 0   | 1642  | 1566   | 0   | 1658  | 1632  | 0   |
| Fit Permitted          | 0.095 |        |     | 0.096 |        |     | 0.591 |        |     | 0.160 |       |     |
| Satd. Flow (perm)      | 166   | 3298   | 0   | 164   | 3161   | 0   | 1000  | 1566   | 0   | 277   | 1632  | 0   |
| Satd. Flow (RTOR)      |       | 2      |     |       | 33     |     |       | 55     |     |       | 28    |     |
| Lane Group Flow (vph)  | 143   | 1228   | 0   | 129   | 1042   | 0   | 40    | 420    | 0   | 287   | 274   | 0   |
| Turn Type              | pm+pt | NA     |     | pm+pt | NA     |     | Perm  | NA     |     | pm+pt | NA    |     |
| Protected Phases       | 5     | 2      |     | 1     | 6      |     |       | 8      |     | 7     | 4     |     |
| Permitted Phases       | 2     |        |     | 6     |        |     | 8     |        |     | 4     |       |     |
| Detector Phase         | 5     | 2      |     | 1     | 6      |     | 8     | 8      |     | 7     | 4     |     |
| Switch Phase           |       |        |     |       |        |     |       |        |     |       |       |     |
| Minimum Initial (s)    | 5.0   | 10.0   |     | 5.0   | 10.0   |     | 10.0  | 10.0   |     | 5.0   | 10.0  |     |
| Minimum Split (s)      | 9.7   | 24.7   |     | 9.7   | 24.7   |     | 36.6  | 36.6   |     | 9.3   | 36.6  |     |
| Total Split (s)        | 15.0  | 45.0   |     | 15.0  | 45.0   |     | 40.0  | 40.0   |     | 20.0  | 60.0  |     |
| Total Split (%)        | 12.5% | 37.5%  |     | 12.5% | 37.5%  |     | 33.3% | 33.3%  |     | 16.7% | 50.0% |     |
| Yellow Time (s)        | 3.7   | 3.7    |     | 3.7   | 3.7    |     | 3.3   | 3.3    |     | 3.3   | 3.3   |     |
| All-Red Time (s)       | 1.0   | 2.0    |     | 1.0   | 2.0    |     | 3.3   | 3.3    |     | 1.0   | 3.3   |     |
| Lost Time Adjust (s)   | 0.0   | 0.0    |     | 0.0   | 0.0    |     | 0.0   | 0.0    |     | 0.0   | 0.0   |     |
| Total Lost Time (s)    | 4.7   | 5.7    |     | 4.7   | 5.7    |     | 6.6   | 6.6    |     | 4.3   | 6.6   |     |
| Lead/Lag               | Lead  | Lag    |     | Lead  | Lag    |     | Lag   | Lag    |     | Lead  |       |     |
| Lead-Lag Optimize?     | Yes   | Yes    |     | Yes   | Yes    |     | Yes   | Yes    |     | Yes   |       |     |
| Recall Mode            | None  | C-Max  |     | None  | C-Max  |     | None  | None   |     | None  | None  |     |
| Act Effct Green (s)    | 52.8  | 42.0   |     | 52.3  | 41.7   |     | 31.4  | 31.4   |     | 53.7  | 51.4  |     |
| Actuated g/C Ratio     | 0.44  | 0.35   |     | 0.44  | 0.35   |     | 0.26  | 0.26   |     | 0.45  | 0.43  |     |
| v/c Ratio              | 0.73  | 1.06   |     | 0.69  | 0.93   |     | 0.15  | 0.93   |     | 0.94  | 0.38  |     |
| Control Delay          | 49.5  | 76.8   |     | 42.3  | 52.2   |     | 34.7  | 66.1   |     | 65.4  | 22.2  |     |
| Queue Delay            | 0.0   | 0.0    |     | 0.0   | 0.0    |     | 0.0   | 0.0    |     | 0.0   | 0.0   |     |
| Total Delay            | 49.5  | 76.8   |     | 42.3  | 52.2   |     | 34.7  | 66.1   |     | 65.4  | 22.2  |     |
| LOS                    | D     | E      |     | D     | D      |     | C     | E      |     | E     | C     |     |
| Approach Delay         |       | 73.9   |     |       | 51.1   |     |       | 63.4   |     |       | 44.3  |     |
| Approach LOS           |       | E      |     |       | D      |     |       | E      |     |       | D     |     |
| Queue Length 50th (m)  | 12.7  | ~178.8 |     | 17.4  | 124.6  |     | 7.1   | 83.9   |     | 43.8  | 37.4  |     |
| Queue Length 95th (m)  | #46.2 | #221.4 |     | #40.4 | #170.7 |     | 16.2  | #141.1 |     | #95.6 | 58.4  |     |
| Internal Link Dist (m) |       | 313.9  |     |       | 184.8  |     |       | 136.9  |     |       | 237.9 |     |
| Turn Bay Length (m)    | 80.0  |        |     | 100.0 |        |     | 34.0  |        |     | 153.0 |       |     |
| Base Capacity (vph)    | 202   | 1155   |     | 197   | 1120   |     | 278   | 475    |     | 304   | 741   |     |
| Starvation Cap Reductn | 0     | 0      |     | 0     | 0      |     | 0     | 0      |     | 0     | 0     |     |
| Spillback Cap Reductn  | 0     | 0      |     | 0     | 0      |     | 0     | 0      |     | 0     | 0     |     |
| Storage Cap Reductn    | 0     | 0      |     | 0     | 0      |     | 0     | 0      |     | 0     | 0     |     |
| Reduced v/c Ratio      | 0.71  | 1.06   |     | 0.65  | 0.93   |     | 0.14  | 0.88   |     | 0.94  | 0.37  |     |

Intersection Summary

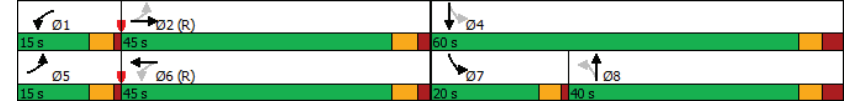
Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 46 (38%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green  
 Natural Cycle: 125  
 Control Type: Actuated-Coordinated

Lanes, Volumes, Timings  
3: Cummings Ave & Ogilvie Rd

Existing  
PM Peak Hour

|   |                        |
|---|------------------------|
| Maximum v/c Ratio: 1.06   | Intersection LOS: E    |
| Intersection Signal Delay: 60.4                                 | ICU Level of Service F |
| Intersection Capacity Utilization 96.3%                         |                        |
| Analysis Period (min) 15  |                        |
| ~ Volume exceeds capacity, queue is theoretically infinite.     |                        |
| Queue shown is maximum after two cycles.                        |                        |
| # 95th percentile volume exceeds capacity, queue may be longer. |                        |
| Queue shown is maximum after two cycles.                        |                        |

Splits and Phases: 3: Cummings Ave & Ogilvie Rd



# Appendix D

Collision Data



|           |      |       |  |            |               |                 |   |                       |                |          |   |   |   |   |
|-----------|------|-------|--|------------|---------------|-----------------|---|-----------------------|----------------|----------|---|---|---|---|
| 1/10/2020 | 2020 | 18:00 | OGILVIE RD btwn MURDOCK GT & CUMMINGS AVE ( _3ZBN9A) | 01 - Clear | 07 - Dark     | 10 - No control | 0 | 03 - P.D. only        | 04 - Sideswipe | 01 - Dry | 2 | 0 | 0 | 0 |
| 8/6/2020  | 2020 | 17:14 | OGILVIE RD btwn MURDOCK GT & CUMMINGS AVE ( _3ZBN9A) | 01 - Clear | 01 - Daylight | 10 - No control | 0 | 02 - Non-fatal injury | 02 - Angle     | 01 - Dry | 2 | 0 | 0 | 0 |



# Appendix E

TRANS Plot

# TRANS Regional Model

Version 2.15 - Assigned June 16, 2020

## AM Peak Hour Total Traffic Volume

### Cyrville - St. Laurent Area Growth

2011 Model - Basecase

N/A

User Initials: TIMW

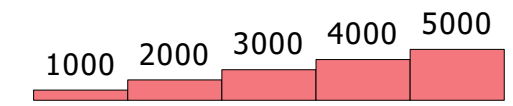
Plot Prepared: August 10, 2020

EMME Scenario: 21711

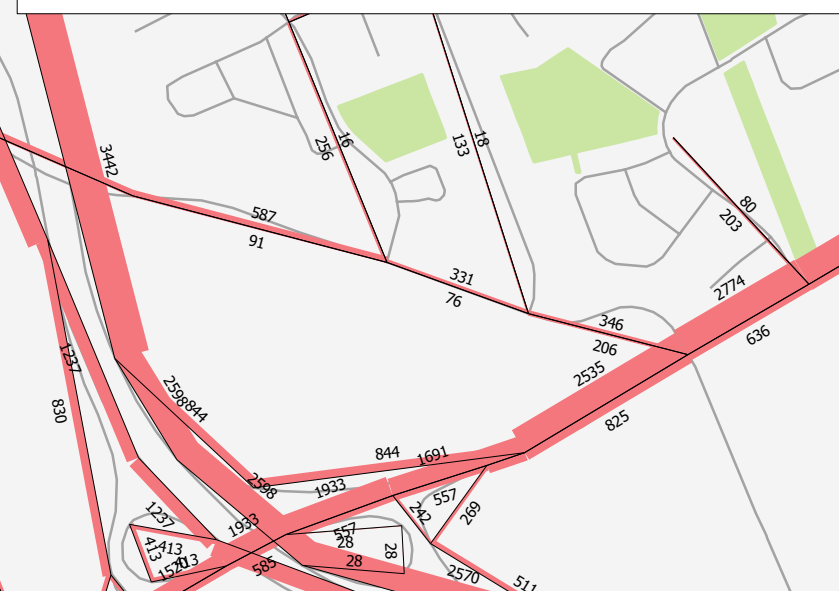
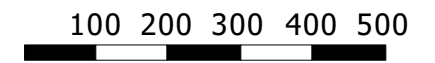


## Legend

AM Peak Hour Total Traffic Volume



Distance (m)



The TRANS model is continuously refined & maintained, and all information is provided in good faith. However, model outputs are provided "as is", and no warranty or guarantee is provided as to the accuracy, reliability or reasonableness of the results. In using this data, you agree to accept any and all risks arising from any incorrect, incomplete, or misleading information.

Recipients are required to use caution and professional judgement in using and interpreting model outputs. In particular, caution should be used when focusing on a geographically limited area (such as a single road or intersection), as the model is primarily designed to simulate regional-scale phenomena and has been calibrated at a regional level.

As general good practice, it is recommended that the user confirm the network coding within the area of interest, and compare base year forecasts against traffic count data to assess the extent to which the model may be over- or under-estimating the travel demand.

# TRANS Regional Model

Version 2.15 - Assigned June 16, 2020

## AM Peak Hour Total Traffic Volume

### Cyrville - St. Laurent Area Growth

2031 Model - Basecase

N/A

User Initials: TIMW

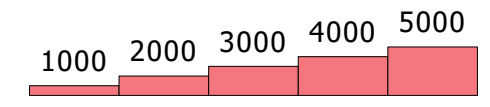
Plot Prepared: August 10, 2020

EMME Scenario: 21711

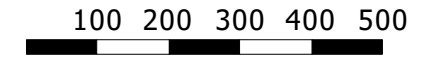


## Legend

AM Peak Hour Total Traffic Volume



Distance (m)



The TRANS model is continuously refined & maintained, and all information is provided in good faith. However, model outputs are provided "as is", and no warranty or guarantee is provided as to the accuracy, reliability or reasonableness of the results. In using this data, you agree to accept any and all risks arising from any incorrect, incomplete, or misleading information.

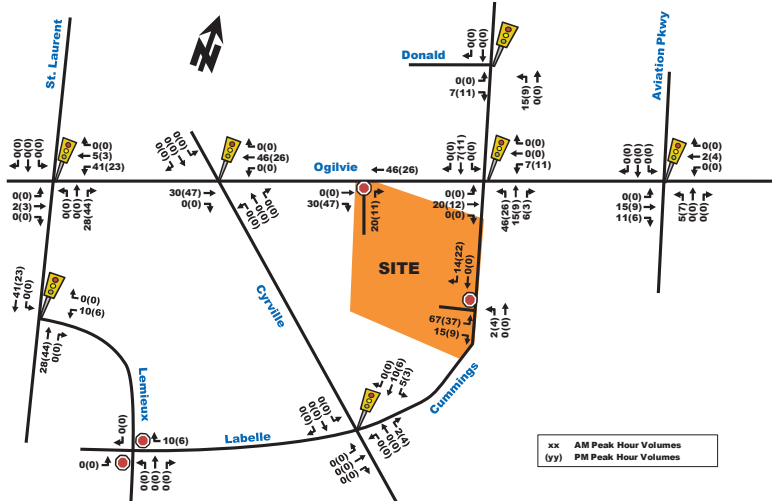
Recipients are required to use caution and professional judgement in using and interpreting model outputs. In particular, caution should be used when focusing on a geographically limited area (such as a single road or intersection), as the model is primarily designed to simulate regional-scale phenomena and has been calibrated at a regional level.

As a general good practice, it is recommended that the user confirm the network coding within the area of interest, and compare base year forecasts against traffic count data to assess the extent to which the model may be over- or under-estimating the travel demand.

# Appendix F

Background Volumes

Figure 7: Total Phase 1 and 2 Site Generated Traffic



1125-1149 CYRVILLE ROAD TRANSPORTATION IMPACT ASSESSMENT  
 Forecasting Report  
 13 October 2021

Figure 10 - Site Traffic Assignment

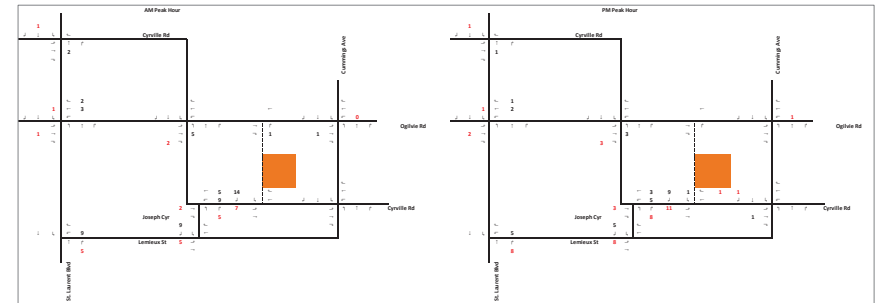


Figure 9: New Site Generation Auto Volumes

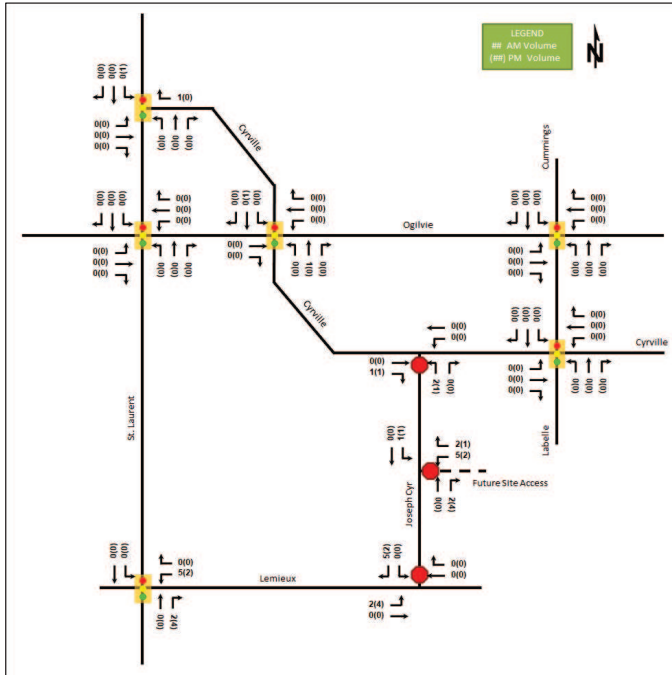
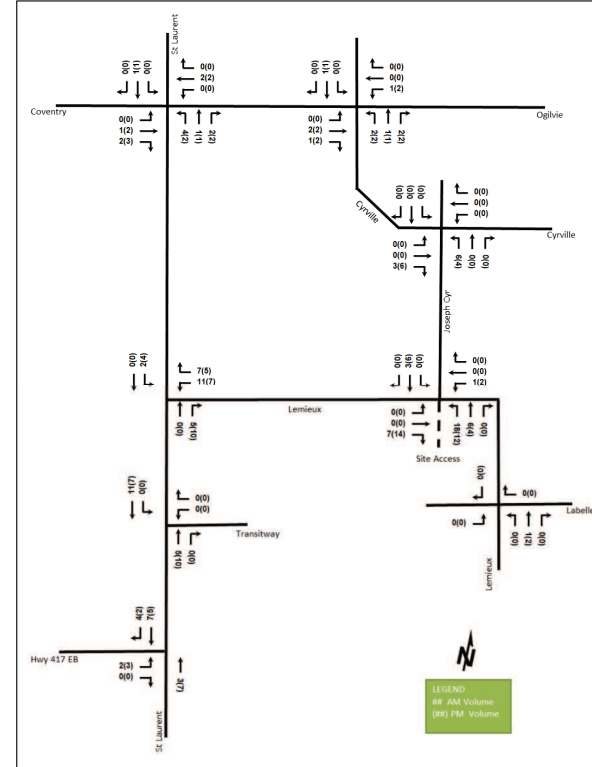


Figure 14: New Site Generation Auto Volumes



# PARSONS

As shown in Table 5, a total of 39 and 40 veh/h are projected to travel to/from the proposed development during the weekday morning and afternoon peak hours.

## 9.1.2. MODE SHARES

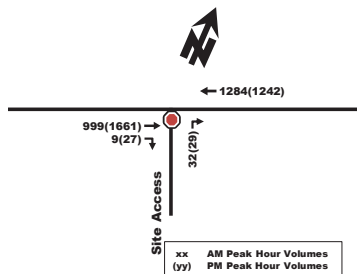
Using the TRANS Auto Trips projected in Table 5 and the modal share percentages from the 2011 NCR Household Origin – Destination Survey and Table 3.13 of the TRANS Trip Generation Study, the modal share for the proposed development are summarized in Table 6.

Table 6: Total Site Trip Generation

| Travel Mode                   | AM Mode Share | AM Peak (persons/h) |           |           | PM Mode Share | PM Peak (persons/h) |           |           |
|-------------------------------|---------------|---------------------|-----------|-----------|---------------|---------------------|-----------|-----------|
|                               |               | In                  | Out       | Total     |               | In                  | Out       | Total     |
| Auto Driver                   | 50%           | 8                   | 31        | 39        | 50%           | 24                  | 16        | 40        |
| Auto Passenger                | 10%           | 2                   | 6         | 8         | 15%           | 8                   | 4         | 12        |
| Transit                       | 25%           | 4                   | 16        | 20        | 20%           | 9                   | 7         | 16        |
| Non-motorized                 | 15%           | 2                   | 10        | 12        | 15%           | 7                   | 5         | 12        |
| Total People Trips            | 100%          | 16                  | 63        | 78        | 100%          | 48                  | 32        | 80        |
| <b>Total 'New' Auto Trips</b> |               | <b>8</b>            | <b>31</b> | <b>39</b> |               | <b>24</b>           | <b>16</b> | <b>40</b> |

As shown in Table 6, based on the TRANS Trip Generation method, the proposed site is projected to generate approximately 78 to 80 two-way person-trips per hour during the weekday peak hours. The increase in two-way transit trips is estimated to be 16 to 20 persons per hour, and the increase in bike/walk trips is approximately 12 persons per hour.

Figure 6: Projected Site Access Volumes (2018)



# Appendix G

Synchro Intersection Worksheets – 2026 Future Background Conditions



Lanes, Volumes, Timings  
1: Cyrville Rd & Ogilvie Rd

2026 Future Background  
AM Peak Hour

| Lane Group             | EBL | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR | SBL   | SBT   | SBR |
|------------------------|-----|-------|-------|-------|-------|-------|-------|-------|-----|-------|-------|-----|
| Lane Configurations    |     | ↑↑    | ↑     | ↑     | ↑↑    | ↑     | ↑     | ↑     | ↑   | ↑     | ↑     | ↑   |
| Traffic Volume (vph)   | 0   | 584   | 230   | 28    | 1050  | 166   | 172   | 241   | 14  | 47    | 166   | 45  |
| Future Volume (vph)    | 0   | 584   | 230   | 28    | 1050  | 166   | 172   | 241   | 14  | 47    | 166   | 45  |
| Satd. Flow (prot)      | 0   | 3283  | 1414  | 1658  | 3316  | 1441  | 1551  | 1714  | 0   | 1626  | 1604  | 0   |
| Fit Permitted          |     |       |       | 0.419 |       |       | 0.510 |       |     | 0.426 |       |     |
| Satd. Flow (perm)      | 0   | 3283  | 1329  | 722   | 3316  | 1319  | 829   | 1714  | 0   | 727   | 1604  | 0   |
| Satd. Flow (RTOR)      |     |       | 230   |       |       | 166   |       | 3     |     |       | 12    |     |
| Lane Group Flow (vph)  | 0   | 584   | 230   | 28    | 1050  | 166   | 172   | 255   | 0   | 47    | 211   | 0   |
| Turn Type              | NA  | Perm  | Perm  | NA    | Perm  | Perm  | NA    | Perm  | NA  | Perm  | NA    |     |
| Protected Phases       |     | 2     |       | 6     |       | 6     | 8     |       | 8   |       | 4     |     |
| Permitted Phases       |     |       | 2     | 6     |       | 6     | 8     |       | 8   |       | 4     |     |
| Detector Phase         |     | 2     | 2     | 6     | 6     | 6     | 8     | 8     |     | 4     | 4     |     |
| Switch Phase           |     |       |       |       |       |       |       |       |     |       |       |     |
| Minimum Initial (s)    |     | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  |     | 10.0  | 10.0  |     |
| Minimum Split (s)      |     | 32.2  | 32.2  | 32.2  | 32.2  | 32.2  | 47.1  | 47.1  |     | 47.1  | 47.1  |     |
| Total Split (s)        |     | 72.9  | 72.9  | 72.9  | 72.9  | 72.9  | 47.1  | 47.1  |     | 47.1  | 47.1  |     |
| Total Split (%)        |     | 60.8% | 60.8% | 60.8% | 60.8% | 60.8% | 39.3% | 39.3% |     | 39.3% | 39.3% |     |
| Yellow Time (s)        |     | 3.7   | 3.7   | 3.7   | 3.7   | 3.7   | 3.7   | 3.7   |     | 3.7   | 3.7   |     |
| All-Red Time (s)       |     | 2.5   | 2.5   | 2.5   | 2.5   | 2.5   | 3.4   | 3.4   |     | 3.4   | 3.4   |     |
| Lost Time Adjust (s)   |     | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     | 0.0   | 0.0   |     |
| Total Lost Time (s)    |     | 6.2   | 6.2   | 6.2   | 6.2   | 6.2   | 7.1   | 7.1   |     | 7.1   | 7.1   |     |
| Lead/Lag               |     |       |       |       |       |       |       |       |     |       |       |     |
| Lead-Lag Optimize?     |     |       |       |       |       |       |       |       |     |       |       |     |
| Recall Mode            |     | C-Max | C-Max | C-Max | C-Max | C-Max | None  | None  |     | None  | None  |     |
| Act Effct Green (s)    |     | 78.9  | 78.9  | 78.9  | 78.9  | 78.9  | 27.8  | 27.8  |     | 27.8  | 27.8  |     |
| Actuated g/C Ratio     |     | 0.66  | 0.66  | 0.66  | 0.66  | 0.66  | 0.23  | 0.23  |     | 0.23  | 0.23  |     |
| v/c Ratio              |     | 0.27  | 0.24  | 0.06  | 0.48  | 0.18  | 0.90  | 0.64  |     | 0.28  | 0.56  |     |
| Control Delay          |     | 10.1  | 2.2   | 4.3   | 4.6   | 0.3   | 85.9  | 47.1  |     | 38.6  | 42.2  |     |
| Queue Delay            |     | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     | 0.0   | 0.0   |     |
| Total Delay            |     | 10.1  | 2.2   | 4.3   | 4.6   | 0.3   | 85.9  | 47.1  |     | 38.6  | 42.2  |     |
| LOS                    |     | B     | A     | A     | A     | A     | F     | D     |     | D     | D     |     |
| Approach Delay         |     | 7.9   |       |       | 4.0   |       | 62.7  |       |     | 41.6  |       |     |
| Approach LOS           |     | A     |       |       | A     |       | E     |       |     | D     |       |     |
| Queue Length 50th (m)  |     | 27.6  | 0.0   | 0.7   | 15.2  | 0.1   | 39.5  | 53.9  |     | 9.2   | 41.5  |     |
| Queue Length 95th (m)  |     | 48.6  | 10.8  | m1.2  | 19.3  | m0.1  | 59.6  | 70.3  |     | 17.7  | 57.1  |     |
| Internal Link Dist (m) |     | 113.5 |       |       | 313.9 |       | 191.2 |       |     | 190.6 |       |     |
| Turn Bay Length (m)    |     |       |       | 62.0  |       | 71.0  | 33.5  |       |     | 82.0  |       |     |
| Base Capacity (vph)    |     | 2158  | 952   | 474   | 2180  | 924   | 276   | 573   |     | 242   | 542   |     |
| Starvation Cap Reductn |     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |     | 0     | 0     |     |
| Spillback Cap Reductn  |     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |     | 0     | 0     |     |
| Storage Cap Reductn    |     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |     | 0     | 0     |     |
| Reduced v/c Ratio      |     | 0.27  | 0.24  | 0.06  | 0.48  | 0.18  | 0.62  | 0.45  |     | 0.19  | 0.39  |     |

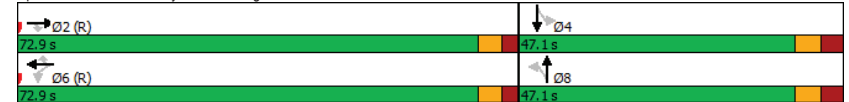
| Intersection Summary   |   |
|------------------------|---|
| Cycle Length:          | 120   |
| Actuated Cycle Length: | 120   |
| Offset:                | 10 (8%), Referenced to phase 2:EBT and 6:WBTL, Start of Green |
| Natural Cycle:         | 80  |
| Control Type:          | Actuated-Coordinated  |

Lanes, Volumes, Timings  
1: Cyrville Rd & Ogilvie Rd

2026 Future Background  
AM Peak Hour

|   |                                 |                     |
|---|---------------------------------|---------------------|
| Maximum v/c Ratio: 0.90   | Intersection Signal Delay: 17.8 | Intersection LOS: B |
| Intersection Capacity Utilization 74.9%                           | ICU Level of Service D          |                     |
| Analysis Period (min) 15  |                                 |                     |
| m Volume for 95th percentile queue is metered by upstream signal. |                                 |                     |

Splits and Phases: 1: Cyrville Rd & Ogilvie Rd



Lanes, Volumes, Timings  
2: Cummings Ave & Donald

2026 Future Background  
AM Peak Hour

| Lane Group             | EBL   | EBR   | NBL   | NBT   | SBT   | SBR |
|------------------------|-------|-------|-------|-------|-------|-----|
| Lane Configurations    |       |       |       |       |       |     |
| Traffic Volume (vph)   | 42    | 167   | 248   | 127   | 208   | 104 |
| Future Volume (vph)    | 42    | 167   | 248   | 127   | 208   | 104 |
| Satd. Flow (prot)      | 1610  | 1469  | 1642  | 1695  | 1606  | 0   |
| Fit Permitted          | 0.950 |       | 0.571 |       |       |     |
| Satd. Flow (perm)      | 1532  | 1382  | 972   | 1695  | 1606  | 0   |
| Satd. Flow (RTOR)      |       | 167   |       |       | 62    |     |
| Lane Group Flow (vph)  | 42    | 167   | 248   | 127   | 312   | 0   |
| Turn Type              | Perm  | Perm  | Perm  | NA    | NA    |     |
| Protected Phases       |       |       |       | 2     | 6     |     |
| Permitted Phases       | 4     | 4     | 2     |       |       |     |
| Detector Phase         | 4     | 4     | 2     | 2     | 6     |     |
| Switch Phase           |       |       |       |       |       |     |
| Minimum Initial (s)    | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  |     |
| Minimum Split (s)      | 22.0  | 22.0  | 39.9  | 39.9  | 39.9  |     |
| Total Split (s)        | 22.0  | 22.0  | 98.0  | 98.0  | 98.0  |     |
| Total Split (%)        | 18.3% | 18.3% | 81.7% | 81.7% | 81.7% |     |
| Yellow Time (s)        | 3.3   | 3.3   | 3.3   | 3.3   | 3.3   |     |
| All-Red Time (s)       | 2.7   | 2.7   | 3.6   | 3.6   | 3.6   |     |
| Lost Time Adjust (s)   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     |
| Total Lost Time (s)    | 6.0   | 6.0   | 6.9   | 6.9   | 6.9   |     |
| Lead/Lag               |       |       |       |       |       |     |
| Lead-Lag Optimize?     |       |       |       |       |       |     |
| Recall Mode            | None  | None  | Min   | Min   | Min   |     |
| Act Effct Green (s)    | 11.3  | 11.3  | 19.5  | 19.5  | 19.5  |     |
| Actuated g/C Ratio     | 0.26  | 0.26  | 0.44  | 0.44  | 0.44  |     |
| v/c Ratio              | 0.11  | 0.35  | 0.58  | 0.17  | 0.42  |     |
| Control Delay          | 14.8  | 5.9   | 15.6  | 8.1   | 8.6   |     |
| Queue Delay            | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     |
| Total Delay            | 14.8  | 5.9   | 15.6  | 8.1   | 8.6   |     |
| LOS                    | B     | A     | B     | A     | A     |     |
| Approach Delay         | 7.6   |       |       | 13.1  | 8.6   |     |
| Approach LOS           | A     |       |       | B     | A     |     |
| Queue Length 50th (m)  | 1.9   | 0.0   | 11.9  | 4.9   | 10.6  |     |
| Queue Length 95th (m)  | 10.1  | 12.0  | 33.0  | 13.6  | 27.9  |     |
| Internal Link Dist (m) | 296.9 |       |       | 237.9 | 259.3 |     |
| Turn Bay Length (m)    | 60.0  |       | 60.0  |       |       |     |
| Base Capacity (vph)    | 577   | 625   | 972   | 1695  | 1606  |     |
| Starvation Cap Reductn | 0     | 0     | 0     | 0     | 0     |     |
| Spillback Cap Reductn  | 0     | 0     | 0     | 0     | 0     |     |
| Storage Cap Reductn    | 0     | 0     | 0     | 0     | 0     |     |
| Reduced v/c Ratio      | 0.07  | 0.27  | 0.26  | 0.07  | 0.19  |     |

Intersection Summary

Cycle Length: 120  
Actuated Cycle Length: 44.3  
Natural Cycle: 65  
Control Type: Actuated-Uncoordinated  
Maximum v/c Ratio: 0.58

Lanes, Volumes, Timings  
2: Cummings Ave & Donald

2026 Future Background  
AM Peak Hour

Intersection Signal Delay: 10.3  
Intersection Capacity Utilization 62.5%  
Analysis Period (min) 15

Intersection LOS: B  
ICU Level of Service B

Splits and Phases: 2: Cummings Ave & Donald



Lanes, Volumes, Timings  
3: Cummings Ave & Ogilvie Rd

2026 Future Background  
AM Peak Hour

| Lane Group             | EBL   | EBT   | EBR | WBL   | WBT   | WBR | NBL   | NBT   | NBR | SBL   | SBT   | SBR |
|------------------------|-------|-------|-----|-------|-------|-----|-------|-------|-----|-------|-------|-----|
| Lane Configurations    | ↔     | ↕     | ↔   | ↔     | ↕     | ↔   | ↔     | ↕     | ↔   | ↔     | ↕     | ↔   |
| Traffic Volume (vph)   | 51    | 601   | 11  | 174   | 1099  | 170 | 64    | 128   | 69  | 138   | 133   | 112 |
| Future Volume (vph)    | 51    | 601   | 11  | 174   | 1099  | 170 | 64    | 128   | 69  | 138   | 133   | 112 |
| Satd. Flow (prot)      | 1626  | 3266  | 0   | 1626  | 3195  | 0   | 1658  | 1514  | 0   | 1626  | 1609  | 0   |
| Fit Permitted          | 0.115 |       |     | 0.356 |       |     | 0.607 |       |     | 0.443 |       |     |
| Satd. Flow (perm)      | 197   | 3266  | 0   | 600   | 3195  | 0   | 1055  | 1514  | 0   | 727   | 1609  | 0   |
| Satd. Flow (RTOR)      |       | 2     |     |       | 19    |     |       | 22    |     |       | 39    |     |
| Lane Group Flow (vph)  | 51    | 612   | 0   | 174   | 1269  | 0   | 64    | 197   | 0   | 138   | 245   | 0   |
| Turn Type              | pm+pt | NA    |     | pm+pt | NA    |     | Perm  | NA    |     | pm+pt | NA    |     |
| Protected Phases       | 5     | 2     |     | 1     | 6     |     | 8     |       |     | 7     | 4     |     |
| Permitted Phases       | 2     |       |     | 6     |       |     | 8     |       |     | 4     |       |     |
| Detector Phase         | 5     | 2     |     | 1     | 6     |     | 8     | 8     |     | 7     | 4     |     |
| Switch Phase           |       |       |     |       |       |     |       |       |     |       |       |     |
| Minimum Initial (s)    | 5.0   | 10.0  |     | 5.0   | 10.0  |     | 10.0  | 10.0  |     | 5.0   | 10.0  |     |
| Minimum Split (s)      | 9.7   | 24.7  |     | 9.7   | 24.7  |     | 36.6  | 36.6  |     | 9.3   | 36.6  |     |
| Total Split (s)        | 11.0  | 61.0  |     | 11.0  | 61.0  |     | 36.6  | 36.6  |     | 11.4  | 48.0  |     |
| Total Split (%)        | 9.2%  | 50.8% |     | 9.2%  | 50.8% |     | 30.5% | 30.5% |     | 9.5%  | 40.0% |     |
| Yellow Time (s)        | 3.7   | 3.7   |     | 3.7   | 3.7   |     | 3.3   | 3.3   |     | 3.3   | 3.3   |     |
| All-Red Time (s)       | 1.0   | 2.0   |     | 1.0   | 2.0   |     | 3.3   | 3.3   |     | 1.0   | 3.3   |     |
| Lost Time Adjust (s)   | 0.0   | 0.0   |     | 0.0   | 0.0   |     | 0.0   | 0.0   |     | 0.0   | 0.0   |     |
| Total Lost Time (s)    | 4.7   | 5.7   |     | 4.7   | 5.7   |     | 6.6   | 6.6   |     | 4.3   | 6.6   |     |
| Lead/Lag               | Lead  | Lag   |     | Lead  | Lag   |     | Lag   | Lag   |     | Lead  |       |     |
| Lead-Lag Optimize?     | Yes   | Yes   |     | Yes   | Yes   |     | Yes   | Yes   |     | Yes   |       |     |
| Recall Mode            | None  | C-Max |     | None  | C-Max |     | None  | None  |     | None  | None  |     |
| Act Effct Green (s)    | 66.0  | 58.8  |     | 67.2  | 61.2  |     | 26.3  | 26.3  |     | 40.0  | 37.7  |     |
| Actuated g/C Ratio     | 0.55  | 0.49  |     | 0.56  | 0.51  |     | 0.22  | 0.22  |     | 0.33  | 0.31  |     |
| v/c Ratio              | 0.28  | 0.38  |     | 0.45  | 0.77  |     | 0.28  | 0.56  |     | 0.47  | 0.46  |     |
| Control Delay          | 22.1  | 18.1  |     | 17.3  | 29.7  |     | 40.2  | 42.4  |     | 33.7  | 29.5  |     |
| Queue Delay            | 0.0   | 0.0   |     | 0.0   | 0.0   |     | 0.0   | 0.0   |     | 0.0   | 0.0   |     |
| Total Delay            | 22.1  | 18.1  |     | 17.3  | 29.7  |     | 40.2  | 42.4  |     | 33.7  | 29.5  |     |
| LOS                    | C     | B     |     | B     | C     |     | D     | D     |     | C     | C     |     |
| Approach Delay         |       | 18.4  |     |       | 28.2  |     |       | 41.9  |     |       | 31.0  |     |
| Approach LOS           |       | B     |     |       | C     |     |       | D     |     |       | C     |     |
| Queue Length 50th (m)  | 4.7   | 38.4  |     | 19.2  | 135.0 |     | 12.1  | 35.4  |     | 22.4  | 36.7  |     |
| Queue Length 95th (m)  | 17.0  | 48.3  |     | 31.1  | 166.6 |     | 24.5  | 58.7  |     | 37.8  | 59.6  |     |
| Internal Link Dist (m) |       | 313.9 |     |       | 184.8 |     |       | 136.9 |     |       | 237.9 |     |
| Turn Bay Length (m)    | 80.0  |       |     | 100.0 |       |     | 34.0  |       |     | 153.0 |       |     |
| Base Capacity (vph)    | 183   | 1602  |     | 391   | 1638  |     | 263   | 395   |     | 295   | 580   |     |
| Starvation Cap Reductn | 0     | 0     |     | 0     | 0     |     | 0     | 0     |     | 0     | 0     |     |
| Spillback Cap Reductn  | 0     | 0     |     | 0     | 0     |     | 0     | 0     |     | 0     | 0     |     |
| Storage Cap Reductn    | 0     | 0     |     | 0     | 0     |     | 0     | 0     |     | 0     | 0     |     |
| Reduced v/c Ratio      | 0.28  | 0.38  |     | 0.45  | 0.77  |     | 0.24  | 0.50  |     | 0.47  | 0.42  |     |

Intersection Summary

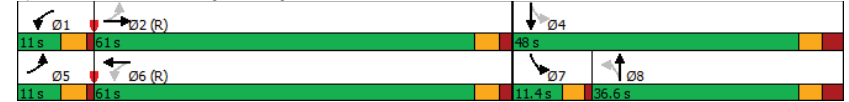
Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 110 (92%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green  
 Natural Cycle: 95  
 Control Type: Actuated-Coordinated

Lanes, Volumes, Timings  
3: Cummings Ave & Ogilvie Rd

2026 Future Background  
AM Peak Hour

|   |                                 |                     |
|---|---------------------------------|---------------------|
| Maximum v/c Ratio: 0.77                 | Intersection Signal Delay: 27.5 | Intersection LOS: C |
| Intersection Capacity Utilization 91.0% | ICU Level of Service E          |                     |
| Analysis Period (min) 15                |                                 |                     |

Splits and Phases: 3: Cummings Ave & Ogilvie Rd



Lanes, Volumes, Timings  
1: Cyrville Rd & Ogilvie Rd

2026 Future Background  
PM Peak Hour

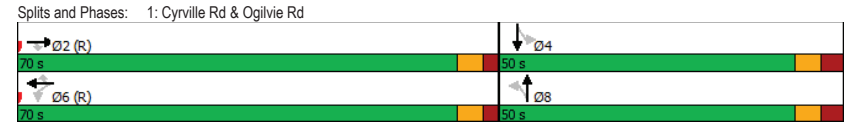
| Lane Group             | EBL | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR | SBL   | SBT   | SBR |
|------------------------|-----|-------|-------|-------|-------|-------|-------|-------|-----|-------|-------|-----|
| Lane Configurations    |     | ↑↑    | ↑     | ↑     | ↑↑    | ↑     | ↑     | ↑     | ↑   | ↑     | ↑     | ↑   |
| Traffic Volume (vph)   | 0   | 1080  | 262   | 44    | 680   | 124   | 122   | 228   | 34  | 134   | 219   | 80  |
| Future Volume (vph)    | 0   | 1080  | 262   | 44    | 680   | 124   | 122   | 228   | 34  | 134   | 219   | 80  |
| Satd. Flow (prot)      | 0   | 3316  | 1469  | 1658  | 3316  | 1469  | 1580  | 1707  | 0   | 1642  | 1637  | 0   |
| Fit Permitted          |     |       |       | 0.223 |       |       | 0.338 |       |     | 0.408 |       |     |
| Satd. Flow (perm)      | 0   | 3316  | 1353  | 387   | 3316  | 1303  | 560   | 1707  | 0   | 702   | 1637  | 0   |
| Satd. Flow (RTOR)      |     |       | 262   |       |       | 124   |       | 7     |     |       | 17    |     |
| Lane Group Flow (vph)  | 0   | 1080  | 262   | 44    | 680   | 124   | 122   | 262   | 0   | 134   | 299   | 0   |
| Turn Type              |     | NA    | Perm  | Perm  | NA    | Perm  | Perm  | NA    |     | Perm  | NA    |     |
| Protected Phases       |     | 2     |       |       | 6     |       |       | 8     |     |       |       | 4   |
| Permitted Phases       |     |       | 2     | 6     |       | 6     | 8     |       |     | 4     |       |     |
| Detector Phase         |     | 2     | 2     | 6     | 6     | 6     | 8     | 8     |     | 4     | 4     |     |
| Switch Phase           |     |       |       |       |       |       |       |       |     |       |       |     |
| Minimum Initial (s)    |     | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  |     | 10.0  | 10.0  |     |
| Minimum Split (s)      |     | 32.2  | 32.2  | 32.2  | 32.2  | 32.2  | 47.1  | 47.1  |     | 47.1  | 47.1  |     |
| Total Split (s)        |     | 70.0  | 70.0  | 70.0  | 70.0  | 70.0  | 50.0  | 50.0  |     | 50.0  | 50.0  |     |
| Total Split (%)        |     | 58.3% | 58.3% | 58.3% | 58.3% | 58.3% | 41.7% | 41.7% |     | 41.7% | 41.7% |     |
| Yellow Time (s)        |     | 3.7   | 3.7   | 3.7   | 3.7   | 3.7   | 3.7   | 3.7   |     | 3.7   | 3.7   |     |
| All-Red Time (s)       |     | 2.5   | 2.5   | 2.5   | 2.5   | 2.5   | 3.4   | 3.4   |     | 3.4   | 3.4   |     |
| Lost Time Adjust (s)   |     | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     | 0.0   | 0.0   |     |
| Total Lost Time (s)    |     | 6.2   | 6.2   | 6.2   | 6.2   | 6.2   | 7.1   | 7.1   |     | 7.1   | 7.1   |     |
| Lead/Lag               |     |       |       |       |       |       |       |       |     |       |       |     |
| Lead-Lag Optimize?     |     |       |       |       |       |       |       |       |     |       |       |     |
| Recall Mode            |     | C-Max | C-Max | C-Max | C-Max | C-Max | None  | None  |     | None  | None  |     |
| Act Effct Green (s)    |     | 79.3  | 79.3  | 79.3  | 79.3  | 79.3  | 27.4  | 27.4  |     | 27.4  | 27.4  |     |
| Actuated g/C Ratio     |     | 0.66  | 0.66  | 0.66  | 0.66  | 0.66  | 0.23  | 0.23  |     | 0.23  | 0.23  |     |
| v/c Ratio              |     | 0.49  | 0.27  | 0.17  | 0.31  | 0.14  | 0.95  | 0.66  |     | 0.84  | 0.77  |     |
| Control Delay          |     | 12.4  | 2.1   | 20.6  | 16.5  | 8.7   | 113.5 | 48.1  |     | 81.1  | 53.5  |     |
| Queue Delay            |     | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     | 0.0   | 0.0   |     |
| Total Delay            |     | 12.4  | 2.1   | 20.6  | 16.5  | 8.7   | 113.5 | 48.1  |     | 81.1  | 53.5  |     |
| LOS                    |     | B     | A     | C     | B     | A     | F     | D     |     | F     | D     |     |
| Approach Delay         |     | 10.4  |       |       | 15.6  |       |       | 68.8  |     |       | 62.1  |     |
| Approach LOS           |     | B     |       |       | B     |       |       | E     |     |       | E     |     |
| Queue Length 50th (m)  |     | 60.3  | 0.0   | 5.3   | 43.8  | 5.7   | 28.8  | 55.5  |     | 30.6  | 63.4  |     |
| Queue Length 95th (m)  |     | 103.7 | 11.4  | m9.0  | m65.9 | m11.4 | #52.3 | 71.5  |     | 48.1  | 81.7  |     |
| Internal Link Dist (m) |     | 113.8 |       |       | 313.9 |       |       | 191.2 |     |       | 190.4 |     |
| Turn Bay Length (m)    |     |       |       | 62.0  |       | 71.0  | 33.5  |       |     | 82.0  |       |     |
| Base Capacity (vph)    |     | 2190  | 982   | 255   | 2190  | 902   | 200   | 614   |     | 250   | 596   |     |
| Starvation Cap Reductn |     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |     | 0     | 0     |     |
| Spillback Cap Reductn  |     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |     | 0     | 0     |     |
| Storage Cap Reductn    |     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |     | 0     | 0     |     |
| Reduced v/c Ratio      |     | 0.49  | 0.27  | 0.17  | 0.31  | 0.14  | 0.61  | 0.43  |     | 0.54  | 0.50  |     |

| Intersection Summary   |  |
|------------------------|--|
| Cycle Length:          | 120  |
| Actuated Cycle Length: | 120  |
| Offset:                | 20 (17%), Referenced to phase 2:EBT and 6:WBTL, Start of Green |
| Natural Cycle:         | 80   |
| Control Type:          | Actuated-Coordinated   |

Lanes, Volumes, Timings  
1: Cyrville Rd & Ogilvie Rd

2026 Future Background  
PM Peak Hour

|   |                        |
|---|------------------------|
| Maximum v/c Ratio: 0.95   | Intersection LOS: C    |
| Intersection Signal Delay: 26.8                                   | ICU Level of Service E |
| Intersection Capacity Utilization 85.2%                           |                        |
| Analysis Period (min) 15  |                        |
| # 95th percentile volume exceeds capacity, queue may be longer.   |                        |
| Queue shown is maximum after two cycles.                          |                        |
| m Volume for 95th percentile queue is metered by upstream signal. |                        |



Lanes, Volumes, Timings  
2: Cummings Ave & Donald

2026 Future Background  
PM Peak Hour

| Lane Group             | EBL   | EBR   | NBL   | NBT   | SBT   | SBR |
|------------------------|-------|-------|-------|-------|-------|-----|
| Lane Configurations    | ↖     | ↗     | ↖     | ↗     | ↖     | ↗   |
| Traffic Volume (vph)   | 88    | 342   | 273   | 258   | 243   | 90  |
| Future Volume (vph)    | 88    | 342   | 273   | 258   | 243   | 90  |
| Satd. Flow (prot)      | 1523  | 1483  | 1658  | 1728  | 1649  | 0   |
| Fit Permitted          | 0.950 |       | 0.560 |       |       |     |
| Satd. Flow (perm)      | 1518  | 1345  | 966   | 1728  | 1649  | 0   |
| Satd. Flow (RTOR)      |       | 342   |       |       | 35    |     |
| Lane Group Flow (vph)  | 88    | 342   | 273   | 258   | 333   | 0   |
| Turn Type              | Perm  | Perm  | Perm  | NA    | NA    |     |
| Protected Phases       |       |       |       | 2     | 6     |     |
| Permitted Phases       | 4     | 4     | 2     |       |       |     |
| Detector Phase         | 4     | 4     | 2     | 2     | 6     |     |
| Switch Phase           |       |       |       |       |       |     |
| Minimum Initial (s)    | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  |     |
| Minimum Split (s)      | 22.0  | 22.0  | 39.9  | 39.9  | 39.9  |     |
| Total Split (s)        | 31.0  | 31.0  | 89.0  | 89.0  | 89.0  |     |
| Total Split (%)        | 25.8% | 25.8% | 74.2% | 74.2% | 74.2% |     |
| Yellow Time (s)        | 3.3   | 3.3   | 3.3   | 3.3   | 3.3   |     |
| All-Red Time (s)       | 2.7   | 2.7   | 3.6   | 3.6   | 3.6   |     |
| Lost Time Adjust (s)   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     |
| Total Lost Time (s)    | 6.0   | 6.0   | 6.9   | 6.9   | 6.9   |     |
| Lead/Lag               |       |       |       |       |       |     |
| Lead-Lag Optimize?     |       |       |       |       |       |     |
| Recall Mode            | None  | None  | Min   | Min   | Min   |     |
| Act Effct Green (s)    | 11.3  | 11.3  | 18.3  | 18.3  | 18.3  |     |
| Actuated g/C Ratio     | 0.26  | 0.26  | 0.42  | 0.42  | 0.42  |     |
| v/c Ratio              | 0.22  | 0.57  | 0.67  | 0.35  | 0.46  |     |
| Control Delay          | 16.7  | 6.8   | 18.5  | 9.4   | 9.7   |     |
| Queue Delay            | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     |
| Total Delay            | 16.7  | 6.8   | 18.5  | 9.4   | 9.7   |     |
| LOS                    | B     | A     | B     | A     | A     |     |
| Approach Delay         | 8.9   |       |       | 14.1  | 9.7   |     |
| Approach LOS           | A     |       |       | B     | A     |     |
| Queue Length 50th (m)  | 4.6   | 0.0   | 13.6  | 10.9  | 13.0  |     |
| Queue Length 95th (m)  | 17.8  | 17.0  | 37.8  | 26.4  | 32.3  |     |
| Internal Link Dist (m) | 296.3 |       |       | 237.9 | 259.3 |     |
| Turn Bay Length (m)    | 60.0  |       | 60.0  |       |       |     |
| Base Capacity (vph)    | 922   | 951   | 966   | 1728  | 1649  |     |
| Starvation Cap Reductn | 0     | 0     | 0     | 0     | 0     |     |
| Spillback Cap Reductn  | 0     | 0     | 0     | 0     | 0     |     |
| Storage Cap Reductn    | 0     | 0     | 0     | 0     | 0     |     |
| Reduced v/c Ratio      | 0.10  | 0.36  | 0.28  | 0.15  | 0.20  |     |

| Intersection Summary   |                  |
|------------------------|------------------|
| Cycle Length:          | 120              |
| Actuated Cycle Length: | 43.1             |
| Natural Cycle:         | 65               |
| Control Type:          | Semi Act-Uncoord |
| Maximum v/c Ratio:     | 0.67             |

Lanes, Volumes, Timings  
2: Cummings Ave & Donald

2026 Future Background  
PM Peak Hour

|   |                        |
|---|------------------------|
| Intersection Signal Delay: 11.2         | Intersection LOS: B    |
| Intersection Capacity Utilization 65.0% | ICU Level of Service C |
| Analysis Period (min) 15                |                        |

Splits and Phases: 2: Cummings Ave & Donald



Lanes, Volumes, Timings  
3: Cummings Ave & Ogilvie Rd

2026 Future Background  
PM Peak Hour

| Lane Group             | EBL   | EBT    | EBR | WBL   | WBT    | WBR | NBL   | NBT    | NBR | SBL   | SBT   | SBR |
|------------------------|-------|--------|-----|-------|--------|-----|-------|--------|-----|-------|-------|-----|
| Lane Configurations    | ↔     | ↕      | ↔   | ↔     | ↕      | ↔   | ↔     | ↕      | ↔   | ↔     | ↕     | ↔   |
| Traffic Volume (vph)   | 129   | 1147   | 23  | 127   | 747    | 209 | 62    | 184    | 219 | 258   | 177   | 84  |
| Future Volume (vph)    | 129   | 1147   | 23  | 127   | 747    | 209 | 62    | 184    | 219 | 258   | 177   | 84  |
| Satd. Flow (prot)      | 1658  | 3298   | 0   | 1626  | 3161   | 0   | 1642  | 1574   | 0   | 1658  | 1638  | 0   |
| Fit Permitted          | 0.130 |        |     | 0.093 |        |     | 0.598 |        |     | 0.173 |       |     |
| Satd. Flow (perm)      | 227   | 3298   | 0   | 159   | 3161   | 0   | 1012  | 1574   | 0   | 300   | 1638  | 0   |
| Satd. Flow (RTOR)      |       | 2      |     |       | 32     |     |       | 49     |     |       | 26    |     |
| Lane Group Flow (vph)  | 129   | 1170   | 0   | 127   | 956    | 0   | 62    | 403    | 0   | 258   | 261   | 0   |
| Turn Type              | pm+pt | NA     |     | pm+pt | NA     |     | Perm  | NA     |     | pm+pt | NA    |     |
| Protected Phases       | 5     | 2      |     | 1     | 6      |     |       | 8      |     | 7     | 4     |     |
| Permitted Phases       | 2     |        |     | 6     |        |     | 8     |        |     | 4     |       |     |
| Detector Phase         | 5     | 2      |     | 1     | 6      |     | 8     | 8      |     | 7     | 4     |     |
| Switch Phase           |       |        |     |       |        |     |       |        |     |       |       |     |
| Minimum Initial (s)    | 5.0   | 10.0   |     | 5.0   | 10.0   |     | 10.0  | 10.0   |     | 5.0   | 10.0  |     |
| Minimum Split (s)      | 9.7   | 24.7   |     | 9.7   | 24.7   |     | 36.6  | 36.6   |     | 9.3   | 36.6  |     |
| Total Split (s)        | 15.0  | 45.0   |     | 15.0  | 45.0   |     | 40.0  | 40.0   |     | 20.0  | 60.0  |     |
| Total Split (%)        | 12.5% | 37.5%  |     | 12.5% | 37.5%  |     | 33.3% | 33.3%  |     | 16.7% | 50.0% |     |
| Yellow Time (s)        | 3.7   | 3.7    |     | 3.7   | 3.7    |     | 3.3   | 3.3    |     | 3.3   | 3.3   |     |
| All-Red Time (s)       | 1.0   | 2.0    |     | 1.0   | 2.0    |     | 3.3   | 3.3    |     | 1.0   | 3.3   |     |
| Lost Time Adjust (s)   | 0.0   | 0.0    |     | 0.0   | 0.0    |     | 0.0   | 0.0    |     | 0.0   | 0.0   |     |
| Total Lost Time (s)    | 4.7   | 5.7    |     | 4.7   | 5.7    |     | 6.6   | 6.6    |     | 4.3   | 6.6   |     |
| Lead/Lag               | Lead  | Lag    |     | Lead  | Lag    |     | Lag   | Lag    |     | Lead  |       |     |
| Lead-Lag Optimize?     | Yes   | Yes    |     | Yes   | Yes    |     | Yes   | Yes    |     | Yes   |       |     |
| Recall Mode            | None  | C-Max  |     | None  | C-Max  |     | None  | None   |     | None  | None  |     |
| Act Effct Green (s)    | 53.2  | 42.7   |     | 53.3  | 42.8   |     | 30.7  | 30.7   |     | 53.0  | 50.7  |     |
| Actuated g/C Ratio     | 0.44  | 0.36   |     | 0.44  | 0.36   |     | 0.26  | 0.26   |     | 0.44  | 0.42  |     |
| v/c Ratio              | 0.61  | 0.99   |     | 0.68  | 0.83   |     | 0.24  | 0.92   |     | 0.83  | 0.37  |     |
| Control Delay          | 33.5  | 57.5   |     | 42.0  | 42.6   |     | 36.8  | 64.7   |     | 46.1  | 22.3  |     |
| Queue Delay            | 0.0   | 0.0    |     | 0.0   | 0.0    |     | 0.0   | 0.0    |     | 0.0   | 0.0   |     |
| Total Delay            | 33.5  | 57.5   |     | 42.0  | 42.6   |     | 36.8  | 64.7   |     | 46.1  | 22.3  |     |
| LOS                    | C     | E      |     | D     | D      |     | D     | E      |     | D     | C     |     |
| Approach Delay         |       | 55.1   |     |       | 42.6   |     |       | 61.0   |     |       | 34.1  |     |
| Approach LOS           |       | E      |     |       | D      |     |       | E      |     |       | C     |     |
| Queue Length 50th (m)  | 12.0  | ~163.6 |     | 17.1  | 109.6  |     | 11.2  | 80.2   |     | 37.6  | 35.4  |     |
| Queue Length 95th (m)  | 29.4  | #205.4 |     | #40.2 | #147.8 |     | 23.2  | #133.2 |     | #75.3 | 55.7  |     |
| Internal Link Dist (m) |       | 313.9  |     |       | 184.8  |     |       | 136.9  |     |       | 237.9 |     |
| Turn Bay Length (m)    | 80.0  |        |     | 100.0 |        |     | 34.0  |        |     | 153.0 |       |     |
| Base Capacity (vph)    | 224   | 1176   |     | 197   | 1147   |     | 281   | 473    |     | 310   | 743   |     |
| Starvation Cap Reductn | 0     | 0      |     | 0     | 0      |     | 0     | 0      |     | 0     | 0     |     |
| Spillback Cap Reductn  | 0     | 0      |     | 0     | 0      |     | 0     | 0      |     | 0     | 0     |     |
| Storage Cap Reductn    | 0     | 0      |     | 0     | 0      |     | 0     | 0      |     | 0     | 0     |     |
| Reduced v/c Ratio      | 0.58  | 0.99   |     | 0.64  | 0.83   |     | 0.22  | 0.85   |     | 0.83  | 0.35  |     |

Intersection Summary

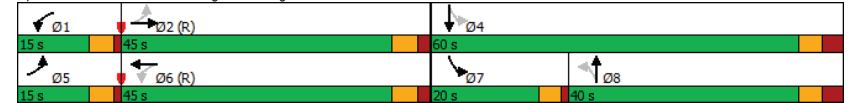
|   |
|---|
| Cycle Length: 120   |
| Actuated Cycle Length: 120  |
| Offset: 46 (38%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green |
| Natural Cycle: 105  |
| Control Type: Actuated-Coordinated                                      |

Lanes, Volumes, Timings  
3: Cummings Ave & Ogilvie Rd

2026 Future Background  
PM Peak Hour

|   |                        |
|---|------------------------|
| Maximum v/c Ratio: 0.99   | Intersection LOS: D    |
| Intersection Signal Delay: 48.6                                 | ICU Level of Service F |
| Intersection Capacity Utilization 99.8%                         |                        |
| Analysis Period (min) 15  |                        |
| ~ Volume exceeds capacity, queue is theoretically infinite.     |                        |
| Queue shown is maximum after two cycles.                        |                        |
| # 95th percentile volume exceeds capacity, queue may be longer. |                        |
| Queue shown is maximum after two cycles.                        |                        |

Splits and Phases: 3: Cummings Ave & Ogilvie Rd



# Appendix H

Synchro Intersection Worksheets – 2031 Future Background Conditions

Lanes, Volumes, Timings  
1: Cyrville Rd & Ogilvie Rd

2031 Future Background  
AM Peak Hour

| Lane Group             | EBL | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR | SBL   | SBT   | SBR |
|------------------------|-----|-------|-------|-------|-------|-------|-------|-------|-----|-------|-------|-----|
| Lane Configurations    |     | ↑↑    | ↑     | ↑     | ↑↑    | ↑     | ↑     | ↑     | ↑   | ↑     | ↑     | ↑   |
| Traffic Volume (vph)   | 0   | 591   | 230   | 28    | 1062  | 166   | 172   | 244   | 14  | 47    | 174   | 45  |
| Future Volume (vph)    | 0   | 591   | 230   | 28    | 1062  | 166   | 172   | 244   | 14  | 47    | 174   | 45  |
| Satd. Flow (prot)      | 0   | 3283  | 1414  | 1658  | 3316  | 1441  | 1551  | 1714  | 0   | 1626  | 1605  | 0   |
| Fit Permitted          |     |       |       | 0.416 |       |       | 0.497 |       |     | 0.423 |       |     |
| Satd. Flow (perm)      | 0   | 3283  | 1329  | 717   | 3316  | 1319  | 808   | 1714  | 0   | 722   | 1605  | 0   |
| Satd. Flow (RTOR)      |     |       | 230   |       |       | 166   |       | 3     |     |       | 12    |     |
| Lane Group Flow (vph)  | 0   | 591   | 230   | 28    | 1062  | 166   | 172   | 258   | 0   | 47    | 219   | 0   |
| Turn Type              | NA  | Perm  | Perm  | NA    | Perm  | Perm  | NA    | Perm  | NA  | Perm  | NA    |     |
| Protected Phases       |     | 2     |       | 6     |       | 6     | 8     |       | 8   |       | 4     |     |
| Permitted Phases       |     |       | 2     | 6     |       | 6     | 8     |       | 8   |       | 4     |     |
| Detector Phase         |     | 2     | 2     | 6     | 6     | 6     | 8     | 8     |     | 4     | 4     |     |
| Switch Phase           |     |       |       |       |       |       |       |       |     |       |       |     |
| Minimum Initial (s)    |     | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  |     | 10.0  | 10.0  |     |
| Minimum Split (s)      |     | 32.2  | 32.2  | 32.2  | 32.2  | 32.2  | 47.1  | 47.1  |     | 47.1  | 47.1  |     |
| Total Split (s)        |     | 72.9  | 72.9  | 72.9  | 72.9  | 72.9  | 47.1  | 47.1  |     | 47.1  | 47.1  |     |
| Total Split (%)        |     | 60.8% | 60.8% | 60.8% | 60.8% | 60.8% | 39.3% | 39.3% |     | 39.3% | 39.3% |     |
| Yellow Time (s)        |     | 3.7   | 3.7   | 3.7   | 3.7   | 3.7   | 3.7   | 3.7   |     | 3.7   | 3.7   |     |
| All-Red Time (s)       |     | 2.5   | 2.5   | 2.5   | 2.5   | 2.5   | 3.4   | 3.4   |     | 3.4   | 3.4   |     |
| Lost Time Adjust (s)   |     | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     | 0.0   | 0.0   |     |
| Total Lost Time (s)    |     | 6.2   | 6.2   | 6.2   | 6.2   | 6.2   | 7.1   | 7.1   |     | 7.1   | 7.1   |     |
| Lead/Lag               |     |       |       |       |       |       |       |       |     |       |       |     |
| Lead-Lag Optimize?     |     |       |       |       |       |       |       |       |     |       |       |     |
| Recall Mode            |     | C-Max | C-Max | C-Max | C-Max | C-Max | None  | None  |     | None  | None  |     |
| Act Effct Green (s)    |     | 78.6  | 78.6  | 78.6  | 78.6  | 78.6  | 28.1  | 28.1  |     | 28.1  | 28.1  |     |
| Actuated g/C Ratio     |     | 0.66  | 0.66  | 0.66  | 0.66  | 0.66  | 0.23  | 0.23  |     | 0.23  | 0.23  |     |
| v/c Ratio              |     | 0.28  | 0.24  | 0.06  | 0.49  | 0.18  | 0.91  | 0.64  |     | 0.28  | 0.57  |     |
| Control Delay          |     | 10.3  | 2.2   | 4.3   | 4.6   | 0.3   | 88.8  | 46.9  |     | 38.3  | 42.5  |     |
| Queue Delay            |     | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     | 0.0   | 0.0   |     |
| Total Delay            |     | 10.3  | 2.2   | 4.3   | 4.6   | 0.3   | 88.8  | 46.9  |     | 38.3  | 42.5  |     |
| LOS                    |     | B     | A     | A     | A     | A     | F     | D     |     | D     | D     |     |
| Approach Delay         |     | 8.0   |       |       | 4.1   |       |       | 63.6  |     |       | 41.8  |     |
| Approach LOS           |     | A     |       |       | A     |       |       | E     |     |       | D     |     |
| Queue Length 50th (m)  |     | 28.5  | 0.0   | 0.7   | 15.3  | 0.1   | 39.5  | 54.3  |     | 9.1   | 43.2  |     |
| Queue Length 95th (m)  |     | 49.3  | 10.8  | m1.2  | 19.5  | m0.1  | 60.3  | 71.3  |     | 17.7  | 59.2  |     |
| Internal Link Dist (m) |     | 113.5 |       |       | 313.9 |       |       | 191.2 |     |       | 190.6 |     |
| Turn Bay Length (m)    |     |       |       | 62.0  |       | 71.0  | 33.5  |       |     | 82.0  |       |     |
| Base Capacity (vph)    |     | 2149  | 949   | 469   | 2171  | 920   | 269   | 573   |     | 240   | 543   |     |
| Starvation Cap Reductn |     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |     | 0     | 0     |     |
| Spillback Cap Reductn  |     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |     | 0     | 0     |     |
| Storage Cap Reductn    |     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |     | 0     | 0     |     |
| Reduced v/c Ratio      |     | 0.28  | 0.24  | 0.06  | 0.49  | 0.18  | 0.64  | 0.45  |     | 0.20  | 0.40  |     |

| Intersection Summary   |   |
|------------------------|---|
| Cycle Length:          | 120   |
| Actuated Cycle Length: | 120   |
| Offset:                | 10 (8%), Referenced to phase 2:EBT and 6:WBTL, Start of Green |
| Natural Cycle:         | 80  |
| Control Type:          | Actuated-Coordinated  |

Lanes, Volumes, Timings  
1: Cyrville Rd & Ogilvie Rd

2031 Future Background  
AM Peak Hour

|   |                                 |                     |
|---|---------------------------------|---------------------|
| Maximum v/c Ratio: 0.91   | Intersection Signal Delay: 18.1 | Intersection LOS: B |
| Intersection Capacity Utilization 75.6%                           | ICU Level of Service D          |                     |
| Analysis Period (min) 15  |                                 |                     |
| m Volume for 95th percentile queue is metered by upstream signal. |                                 |                     |

Splits and Phases: 1: Cyrville Rd & Ogilvie Rd





Lanes, Volumes, Timings  
2: Cummings Ave & Donald

2031 Future Background  
AM Peak Hour

| Lane Group             | EBL   | EBR   | NBL   | NBT   | SBT   | SBR |
|------------------------|-------|-------|-------|-------|-------|-----|
| Lane Configurations    |       |       |       |       |       |     |
| Traffic Volume (vph)   | 42    | 175   | 260   | 128   | 219   | 104 |
| Future Volume (vph)    | 42    | 175   | 260   | 128   | 219   | 104 |
| Satd. Flow (prot)      | 1610  | 1469  | 1642  | 1695  | 1611  | 0   |
| Fit Permitted          | 0.950 |       | 0.565 |       |       |     |
| Satd. Flow (perm)      | 1532  | 1382  | 962   | 1695  | 1611  | 0   |
| Satd. Flow (RTOR)      |       | 175   |       |       | 59    |     |
| Lane Group Flow (vph)  | 42    | 175   | 260   | 128   | 323   | 0   |
| Turn Type              | Perm  | Perm  | Perm  | NA    | NA    |     |
| Protected Phases       |       |       |       | 2     | 6     |     |
| Permitted Phases       | 4     | 4     | 2     |       |       |     |
| Detector Phase         | 4     | 4     | 2     | 2     | 6     |     |
| Switch Phase           |       |       |       |       |       |     |
| Minimum Initial (s)    | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  |     |
| Minimum Split (s)      | 22.0  | 22.0  | 39.9  | 39.9  | 39.9  |     |
| Total Split (s)        | 22.0  | 22.0  | 98.0  | 98.0  | 98.0  |     |
| Total Split (%)        | 18.3% | 18.3% | 81.7% | 81.7% | 81.7% |     |
| Yellow Time (s)        | 3.3   | 3.3   | 3.3   | 3.3   | 3.3   |     |
| All-Red Time (s)       | 2.7   | 2.7   | 3.6   | 3.6   | 3.6   |     |
| Lost Time Adjust (s)   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     |
| Total Lost Time (s)    | 6.0   | 6.0   | 6.9   | 6.9   | 6.9   |     |
| Lead/Lag               |       |       |       |       |       |     |
| Lead-Lag Optimize?     |       |       |       |       |       |     |
| Recall Mode            | None  | None  | Min   | Min   | Min   |     |
| Act Effct Green (s)    | 11.3  | 11.3  | 19.8  | 19.8  | 19.8  |     |
| Actuated g/C Ratio     | 0.25  | 0.25  | 0.44  | 0.44  | 0.44  |     |
| v/c Ratio              | 0.11  | 0.36  | 0.61  | 0.17  | 0.43  |     |
| Control Delay          | 15.0  | 5.9   | 16.5  | 8.1   | 8.8   |     |
| Queue Delay            | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     |
| Total Delay            | 15.0  | 5.9   | 16.5  | 8.1   | 8.8   |     |
| LOS                    | B     | A     | B     | A     | A     |     |
| Approach Delay         | 7.7   |       |       | 13.7  | 8.8   |     |
| Approach LOS           | A     |       |       | B     | A     |     |
| Queue Length 50th (m)  | 2.0   | 0.0   | 12.7  | 4.9   | 11.3  |     |
| Queue Length 95th (m)  | 10.1  | 12.3  | 35.5  | 13.7  | 29.2  |     |
| Internal Link Dist (m) | 296.9 |       |       | 237.9 | 259.3 |     |
| Turn Bay Length (m)    | 60.0  |       | 60.0  |       |       |     |
| Base Capacity (vph)    | 572   | 626   | 962   | 1695  | 1611  |     |
| Starvation Cap Reductn | 0     | 0     | 0     | 0     | 0     |     |
| Spillback Cap Reductn  | 0     | 0     | 0     | 0     | 0     |     |
| Storage Cap Reductn    | 0     | 0     | 0     | 0     | 0     |     |
| Reduced v/c Ratio      | 0.07  | 0.28  | 0.27  | 0.08  | 0.20  |     |

Intersection Summary

Cycle Length: 120  
Actuated Cycle Length: 44.5  
Natural Cycle: 65  
Control Type: Actuated-Uncoordinated  
Maximum v/c Ratio: 0.61

Lanes, Volumes, Timings  
2: Cummings Ave & Donald

2031 Future Background  
AM Peak Hour

Intersection Signal Delay: 10.6  
Intersection Capacity Utilization 63.6%  
Analysis Period (min) 15

Intersection LOS: B  
ICU Level of Service B

Splits and Phases: 2: Cummings Ave & Donald



Lanes, Volumes, Timings  
3: Cummings Ave & Ogilvie Rd

2031 Future Background  
AM Peak Hour

| Lane Group             | EBL   | EBT   | EBR | WBL   | WBT   | WBR | NBL   | NBT   | NBR | SBL   | SBT   | SBR |
|------------------------|-------|-------|-----|-------|-------|-----|-------|-------|-----|-------|-------|-----|
| Lane Configurations    | ↔     | ↕     | ↔   | ↔     | ↕     | ↔   | ↔     | ↕     | ↔   | ↔     | ↕     | ↔   |
| Traffic Volume (vph)   | 51    | 608   | 11  | 174   | 1112  | 170 | 64    | 130   | 69  | 138   | 139   | 112 |
| Future Volume (vph)    | 51    | 608   | 11  | 174   | 1112  | 170 | 64    | 130   | 69  | 138   | 139   | 112 |
| Satd. Flow (prot)      | 1626  | 3266  | 0   | 1626  | 3195  | 0   | 1658  | 1517  | 0   | 1626  | 1613  | 0   |
| Fit Permitted          | 0.111 |       |     | 0.353 |       |     | 0.603 |       |     | 0.439 |       |     |
| Satd. Flow (perm)      | 190   | 3266  | 0   | 595   | 3195  | 0   | 1048  | 1517  | 0   | 721   | 1613  | 0   |
| Satd. Flow (RTOR)      |       | 2     |     |       | 19    |     |       | 21    |     |       | 37    |     |
| Lane Group Flow (vph)  | 51    | 619   | 0   | 174   | 1282  | 0   | 64    | 199   | 0   | 138   | 251   | 0   |
| Turn Type              | pm+pt | NA    |     | pm+pt | NA    |     | Perm  | NA    |     | pm+pt | NA    |     |
| Protected Phases       | 5     | 2     |     | 1     | 6     |     | 8     |       |     | 7     | 4     |     |
| Permitted Phases       | 2     |       |     | 6     |       |     | 8     |       |     | 4     |       |     |
| Detector Phase         | 5     | 2     |     | 1     | 6     |     | 8     | 8     |     | 7     | 4     |     |
| Switch Phase           |       |       |     |       |       |     |       |       |     |       |       |     |
| Minimum Initial (s)    | 5.0   | 10.0  |     | 5.0   | 10.0  |     | 10.0  | 10.0  |     | 5.0   | 10.0  |     |
| Minimum Split (s)      | 9.7   | 24.7  |     | 9.7   | 24.7  |     | 36.6  | 36.6  |     | 9.3   | 36.6  |     |
| Total Split (s)        | 11.0  | 61.0  |     | 11.0  | 61.0  |     | 36.6  | 36.6  |     | 11.4  | 48.0  |     |
| Total Split (%)        | 9.2%  | 50.8% |     | 9.2%  | 50.8% |     | 30.5% | 30.5% |     | 9.5%  | 40.0% |     |
| Yellow Time (s)        | 3.7   | 3.7   |     | 3.7   | 3.7   |     | 3.3   | 3.3   |     | 3.3   | 3.3   |     |
| All-Red Time (s)       | 1.0   | 2.0   |     | 1.0   | 2.0   |     | 3.3   | 3.3   |     | 1.0   | 3.3   |     |
| Lost Time Adjust (s)   | 0.0   | 0.0   |     | 0.0   | 0.0   |     | 0.0   | 0.0   |     | 0.0   | 0.0   |     |
| Total Lost Time (s)    | 4.7   | 5.7   |     | 4.7   | 5.7   |     | 6.6   | 6.6   |     | 4.3   | 6.6   |     |
| Lead/Lag               | Lead  | Lag   |     | Lead  | Lag   |     | Lag   | Lag   |     | Lead  |       |     |
| Lead-Lag Optimize?     | Yes   | Yes   |     | Yes   | Yes   |     | Yes   | Yes   |     | Yes   |       |     |
| Recall Mode            | None  | C-Max |     | None  | C-Max |     | None  | None  |     | None  | None  |     |
| Act Effct Green (s)    | 65.9  | 58.8  |     | 67.2  | 61.2  |     | 26.3  | 26.3  |     | 40.0  | 37.7  |     |
| Actuated g/C Ratio     | 0.55  | 0.49  |     | 0.56  | 0.51  |     | 0.22  | 0.22  |     | 0.33  | 0.31  |     |
| v/c Ratio              | 0.29  | 0.39  |     | 0.45  | 0.78  |     | 0.28  | 0.57  |     | 0.47  | 0.47  |     |
| Control Delay          | 22.8  | 18.2  |     | 17.4  | 30.1  |     | 40.2  | 42.9  |     | 33.7  | 30.1  |     |
| Queue Delay            | 0.0   | 0.0   |     | 0.0   | 0.0   |     | 0.0   | 0.0   |     | 0.0   | 0.0   |     |
| Total Delay            | 22.8  | 18.2  |     | 17.4  | 30.1  |     | 40.2  | 42.9  |     | 33.7  | 30.1  |     |
| LOS                    | C     | B     |     | B     | C     |     | D     | D     |     | C     | C     |     |
| Approach Delay         |       | 18.6  |     |       | 28.6  |     |       | 42.2  |     |       | 31.4  |     |
| Approach LOS           |       | B     |     |       | C     |     |       | D     |     |       | C     |     |
| Queue Length 50th (m)  | 4.7   | 38.7  |     | 19.2  | 137.4 |     | 12.1  | 36.0  |     | 22.4  | 38.3  |     |
| Queue Length 95th (m)  | 17.3  | 49.4  |     | 31.1  | 169.7 |     | 24.5  | 59.5  |     | 37.8  | 61.9  |     |
| Internal Link Dist (m) |       | 313.9 |     |       | 184.8 |     |       | 136.9 |     |       | 237.9 |     |
| Turn Bay Length (m)    | 80.0  |       |     | 100.0 |       |     | 34.0  |       |     | 153.0 |       |     |
| Base Capacity (vph)    | 179   | 1600  |     | 389   | 1637  |     | 262   | 395   |     | 294   | 580   |     |
| Starvation Cap Reductn | 0     | 0     |     | 0     | 0     |     | 0     | 0     |     | 0     | 0     |     |
| Spillback Cap Reductn  | 0     | 0     |     | 0     | 0     |     | 0     | 0     |     | 0     | 0     |     |
| Storage Cap Reductn    | 0     | 0     |     | 0     | 0     |     | 0     | 0     |     | 0     | 0     |     |
| Reduced v/c Ratio      | 0.28  | 0.39  |     | 0.45  | 0.78  |     | 0.24  | 0.50  |     | 0.47  | 0.43  |     |

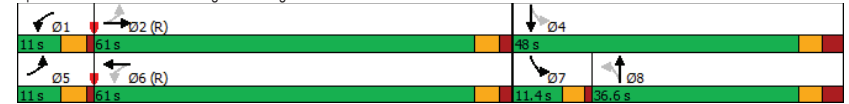
| Intersection Summary   |  |
|------------------------|--|
| Cycle Length:          | 120  |
| Actuated Cycle Length: | 120  |
| Offset:                | 110 (92%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green |
| Natural Cycle:         | 95   |
| Control Type:          | Actuated-Coordinated   |

Lanes, Volumes, Timings  
3: Cummings Ave & Ogilvie Rd

2031 Future Background  
AM Peak Hour

|   |                        |
|---|------------------------|
| Maximum v/c Ratio: 0.78                 | Intersection LOS: C    |
| Intersection Signal Delay: 27.8         | ICU Level of Service F |
| Intersection Capacity Utilization 91.4% |                        |
| Analysis Period (min) 15                |                        |

Splits and Phases: 3: Cummings Ave & Ogilvie Rd



Lanes, Volumes, Timings  
1: Cyrville Rd & Ogilvie Rd

2031 Future Background  
PM Peak Hour

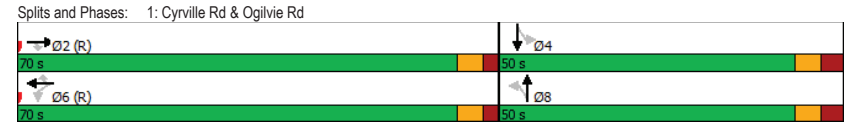
| Lane Group             | EBL | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR | SBL   | SBT   | SBR |
|------------------------|-----|-------|-------|-------|-------|-------|-------|-------|-----|-------|-------|-----|
| Lane Configurations    |     | ↑↑    | ↑     | ↑     | ↑↑    | ↑     | ↑     | ↑     | ↑   | ↑     | ↑     | ↑   |
| Traffic Volume (vph)   | 0   | 1092  | 262   | 44    | 688   | 124   | 122   | 240   | 34  | 134   | 222   | 80  |
| Future Volume (vph)    | 0   | 1092  | 262   | 44    | 688   | 124   | 122   | 240   | 34  | 134   | 222   | 80  |
| Satd. Flow (prot)      | 0   | 3316  | 1469  | 1658  | 3316  | 1469  | 1580  | 1707  | 0   | 1642  | 1637  | 0   |
| Fit Permitted          |     |       |       | 0.219 |       |       | 0.335 |       |     | 0.388 |       |     |
| Satd. Flow (perm)      | 0   | 3316  | 1353  | 380   | 3316  | 1303  | 555   | 1707  | 0   | 668   | 1637  | 0   |
| Satd. Flow (RTOR)      |     |       | 262   |       |       | 124   |       | 7     |     |       | 17    |     |
| Lane Group Flow (vph)  | 0   | 1092  | 262   | 44    | 688   | 124   | 122   | 274   | 0   | 134   | 302   | 0   |
| Turn Type              |     | NA    | Perm  | Perm  | NA    | Perm  | Perm  | NA    |     | Perm  | NA    |     |
| Protected Phases       |     | 2     |       |       | 6     |       |       | 8     |     |       | 4     |     |
| Permitted Phases       |     |       | 2     | 6     |       | 6     | 8     |       |     | 4     |       |     |
| Detector Phase         |     | 2     | 2     | 6     | 6     | 6     | 8     | 8     |     | 4     | 4     |     |
| Switch Phase           |     |       |       |       |       |       |       |       |     |       |       |     |
| Minimum Initial (s)    |     | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  |     | 10.0  | 10.0  |     |
| Minimum Split (s)      |     | 32.2  | 32.2  | 32.2  | 32.2  | 32.2  | 47.1  | 47.1  |     | 47.1  | 47.1  |     |
| Total Split (s)        |     | 70.0  | 70.0  | 70.0  | 70.0  | 70.0  | 50.0  | 50.0  |     | 50.0  | 50.0  |     |
| Total Split (%)        |     | 58.3% | 58.3% | 58.3% | 58.3% | 58.3% | 41.7% | 41.7% |     | 41.7% | 41.7% |     |
| Yellow Time (s)        |     | 3.7   | 3.7   | 3.7   | 3.7   | 3.7   | 3.7   | 3.7   |     | 3.7   | 3.7   |     |
| All-Red Time (s)       |     | 2.5   | 2.5   | 2.5   | 2.5   | 2.5   | 3.4   | 3.4   |     | 3.4   | 3.4   |     |
| Lost Time Adjust (s)   |     | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     | 0.0   | 0.0   |     |
| Total Lost Time (s)    |     | 6.2   | 6.2   | 6.2   | 6.2   | 6.2   | 7.1   | 7.1   |     | 7.1   | 7.1   |     |
| Lead/Lag               |     |       |       |       |       |       |       |       |     |       |       |     |
| Lead-Lag Optimize?     |     |       |       |       |       |       |       |       |     |       |       |     |
| Recall Mode            |     | C-Max | C-Max | C-Max | C-Max | C-Max | None  | None  |     | None  | None  |     |
| Act Effct Green (s)    |     | 79.1  | 79.1  | 79.1  | 79.1  | 79.1  | 27.6  | 27.6  |     | 27.6  | 27.6  |     |
| Actuated g/C Ratio     |     | 0.66  | 0.66  | 0.66  | 0.66  | 0.66  | 0.23  | 0.23  |     | 0.23  | 0.23  |     |
| v/c Ratio              |     | 0.50  | 0.27  | 0.18  | 0.31  | 0.14  | 0.96  | 0.69  |     | 0.88  | 0.78  |     |
| Control Delay          |     | 12.6  | 2.1   | 20.9  | 16.9  | 8.9   | 114.7 | 49.3  |     | 88.9  | 53.7  |     |
| Queue Delay            |     | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     | 0.0   | 0.0   |     |
| Total Delay            |     | 12.6  | 2.1   | 20.9  | 16.9  | 8.9   | 114.7 | 49.3  |     | 88.9  | 53.7  |     |
| LOS                    |     | B     | A     | C     | B     | A     | F     | D     |     | F     | D     |     |
| Approach Delay         |     | 10.6  |       |       | 16.0  |       |       | 69.5  |     |       | 64.5  |     |
| Approach LOS           |     | B     |       |       | B     |       |       | E     |     |       | E     |     |
| Queue Length 50th (m)  |     | 61.6  | 0.0   | 5.4   | 44.7  | 6.0   | 28.8  | 58.5  |     | 30.9  | 64.1  |     |
| Queue Length 95th (m)  |     | 105.5 | 11.4  | m8.6  | m65.2 | m11.2 | #52.7 | 75.1  |     | 49.2  | 82.4  |     |
| Internal Link Dist (m) |     | 113.8 |       |       | 313.9 |       |       | 191.2 |     |       | 190.4 |     |
| Turn Bay Length (m)    |     |       |       | 62.0  |       | 71.0  | 33.5  |       |     | 82.0  |       |     |
| Base Capacity (vph)    |     | 2186  | 981   | 250   | 2186  | 901   | 198   | 614   |     | 238   | 596   |     |
| Starvation Cap Reductn |     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |     | 0     | 0     |     |
| Spillback Cap Reductn  |     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |     | 0     | 0     |     |
| Storage Cap Reductn    |     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |     | 0     | 0     |     |
| Reduced v/c Ratio      |     | 0.50  | 0.27  | 0.18  | 0.31  | 0.14  | 0.62  | 0.45  |     | 0.56  | 0.51  |     |

| Intersection Summary   |  |
|------------------------|--|
| Cycle Length:          | 120  |
| Actuated Cycle Length: | 120  |
| Offset:                | 20 (17%), Referenced to phase 2:EBT and 6:WBTL, Start of Green |
| Natural Cycle:         | 80   |
| Control Type:          | Actuated-Coordinated   |

Lanes, Volumes, Timings  
1: Cyrville Rd & Ogilvie Rd

2031 Future Background  
PM Peak Hour

|   |                        |
|---|------------------------|
| Maximum v/c Ratio: 0.96   | Intersection LOS: C    |
| Intersection Signal Delay: 27.5                                   | ICU Level of Service E |
| Intersection Capacity Utilization 85.3%                           |                        |
| Analysis Period (min) 15  |                        |
| # 95th percentile volume exceeds capacity, queue may be longer.   |                        |
| Queue shown is maximum after two cycles.                          |                        |
| m Volume for 95th percentile queue is metered by upstream signal. |                        |



Lanes, Volumes, Timings  
2: Cummings Ave & Donald

2031 Future Background  
PM Peak Hour

| Lane Group             | EBL   | EBR   | NBL   | NBT   | SBT   | SBR |
|------------------------|-------|-------|-------|-------|-------|-----|
| Lane Configurations    | ↖     | ↗     | ↖     | ↗     | ↖     | ↗   |
| Traffic Volume (vph)   | 88    | 359   | 287   | 271   | 246   | 90  |
| Future Volume (vph)    | 88    | 359   | 287   | 271   | 246   | 90  |
| Satd. Flow (prot)      | 1523  | 1483  | 1658  | 1728  | 1649  | 0   |
| Fit Permitted          | 0.950 |       | 0.558 |       |       |     |
| Satd. Flow (perm)      | 1518  | 1345  | 963   | 1728  | 1649  | 0   |
| Satd. Flow (RTOR)      |       | 359   |       |       | 35    |     |
| Lane Group Flow (vph)  | 88    | 359   | 287   | 271   | 336   | 0   |
| Turn Type              | Perm  | Perm  | Perm  | NA    | NA    |     |
| Protected Phases       |       |       |       | 2     | 6     |     |
| Permitted Phases       | 4     | 4     | 2     |       |       |     |
| Detector Phase         | 4     | 4     | 2     | 2     | 6     |     |
| Switch Phase           |       |       |       |       |       |     |
| Minimum Initial (s)    | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  |     |
| Minimum Split (s)      | 22.0  | 22.0  | 39.9  | 39.9  | 39.9  |     |
| Total Split (s)        | 31.0  | 31.0  | 89.0  | 89.0  | 89.0  |     |
| Total Split (%)        | 25.8% | 25.8% | 74.2% | 74.2% | 74.2% |     |
| Yellow Time (s)        | 3.3   | 3.3   | 3.3   | 3.3   | 3.3   |     |
| All-Red Time (s)       | 2.7   | 2.7   | 3.6   | 3.6   | 3.6   |     |
| Lost Time Adjust (s)   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     |
| Total Lost Time (s)    | 6.0   | 6.0   | 6.9   | 6.9   | 6.9   |     |
| Lead/Lag               |       |       |       |       |       |     |
| Lead-Lag Optimize?     |       |       |       |       |       |     |
| Recall Mode            | None  | None  | Min   | Min   | Min   |     |
| Act Effct Green (s)    | 11.3  | 11.3  | 19.1  | 19.1  | 19.1  |     |
| Actuated g/C Ratio     | 0.26  | 0.26  | 0.44  | 0.44  | 0.44  |     |
| v/c Ratio              | 0.23  | 0.59  | 0.69  | 0.36  | 0.46  |     |
| Control Delay          | 17.3  | 7.1   | 19.1  | 9.4   | 9.5   |     |
| Queue Delay            | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     |
| Total Delay            | 17.3  | 7.1   | 19.1  | 9.4   | 9.5   |     |
| LOS                    | B     | A     | B     | A     | A     |     |
| Approach Delay         | 9.1   |       |       | 14.4  | 9.5   |     |
| Approach LOS           | A     |       |       | B     | A     |     |
| Queue Length 50th (m)  | 4.8   | 0.0   | 14.6  | 11.5  | 13.2  |     |
| Queue Length 95th (m)  | 18.1  | 17.9  | 40.6  | 27.5  | 32.5  |     |
| Internal Link Dist (m) | 296.3 |       |       | 237.9 | 259.3 |     |
| Turn Bay Length (m)    | 60.0  |       | 60.0  |       |       |     |
| Base Capacity (vph)    | 905   | 947   | 963   | 1728  | 1649  |     |
| Starvation Cap Reductn | 0     | 0     | 0     | 0     | 0     |     |
| Spillback Cap Reductn  | 0     | 0     | 0     | 0     | 0     |     |
| Storage Cap Reductn    | 0     | 0     | 0     | 0     | 0     |     |
| Reduced v/c Ratio      | 0.10  | 0.38  | 0.30  | 0.16  | 0.20  |     |

| Intersection Summary   |                  |
|------------------------|------------------|
| Cycle Length:          | 120              |
| Actuated Cycle Length: | 43.9             |
| Natural Cycle:         | 65               |
| Control Type:          | Semi Act-Uncoord |
| Maximum v/c Ratio:     | 0.69             |

Lanes, Volumes, Timings  
2: Cummings Ave & Donald

2031 Future Background  
PM Peak Hour

|   |                        |
|---|------------------------|
| Intersection Signal Delay: 11.4         | Intersection LOS: B    |
| Intersection Capacity Utilization 66.0% | ICU Level of Service C |
| Analysis Period (min) 15                |                        |

Splits and Phases: 2: Cummings Ave & Donald



Lanes, Volumes, Timings  
3: Cummings Ave & Ogilvie Rd

2031 Future Background  
PM Peak Hour

| Lane Group             | EBL   | EBT    | EBR | WBL   | WBT    | WBR | NBL   | NBT    | NBR | SBL   | SBT   | SBR |
|------------------------|-------|--------|-----|-------|--------|-----|-------|--------|-----|-------|-------|-----|
| Lane Configurations    | ↔     | ↕      | ↔   | ↔     | ↕      | ↔   | ↔     | ↕      | ↔   | ↔     | ↕     | ↔   |
| Traffic Volume (vph)   | 129   | 1161   | 23  | 127   | 756    | 209 | 62    | 193    | 219 | 258   | 179   | 84  |
| Future Volume (vph)    | 129   | 1161   | 23  | 127   | 756    | 209 | 62    | 193    | 219 | 258   | 179   | 84  |
| Satd. Flow (prot)      | 1658  | 3298   | 0   | 1626  | 3165   | 0   | 1642  | 1578   | 0   | 1658  | 1638  | 0   |
| Fit Permitted          | 0.122 |        |     | 0.095 |        |     | 0.597 |        |     | 0.168 |       |     |
| Satd. Flow (perm)      | 213   | 3298   | 0   | 163   | 3165   | 0   | 1010  | 1578   | 0   | 291   | 1638  | 0   |
| Satd. Flow (RTOR)      |       | 2      |     |       | 31     |     |       | 47     |     |       | 25    |     |
| Lane Group Flow (vph)  | 129   | 1184   | 0   | 127   | 965    | 0   | 62    | 412    | 0   | 258   | 263   | 0   |
| Turn Type              | pm+pt | NA     |     | pm+pt | NA     |     | Perm  | NA     |     | pm+pt | NA    |     |
| Protected Phases       | 5     | 2      |     | 1     | 6      |     |       | 8      |     | 7     | 4     |     |
| Permitted Phases       | 2     |        |     | 6     |        |     | 8     |        |     | 4     |       |     |
| Detector Phase         | 5     | 2      |     | 1     | 6      |     | 8     | 8      |     | 7     | 4     |     |
| Switch Phase           |       |        |     |       |        |     |       |        |     |       |       |     |
| Minimum Initial (s)    | 5.0   | 10.0   |     | 5.0   | 10.0   |     | 10.0  | 10.0   |     | 5.0   | 10.0  |     |
| Minimum Split (s)      | 9.7   | 24.7   |     | 9.7   | 24.7   |     | 36.6  | 36.6   |     | 9.3   | 36.6  |     |
| Total Split (s)        | 15.0  | 45.0   |     | 15.0  | 45.0   |     | 40.0  | 40.0   |     | 20.0  | 60.0  |     |
| Total Split (%)        | 12.5% | 37.5%  |     | 12.5% | 37.5%  |     | 33.3% | 33.3%  |     | 16.7% | 50.0% |     |
| Yellow Time (s)        | 3.7   | 3.7    |     | 3.7   | 3.7    |     | 3.3   | 3.3    |     | 3.3   | 3.3   |     |
| All-Red Time (s)       | 1.0   | 2.0    |     | 1.0   | 2.0    |     | 3.3   | 3.3    |     | 1.0   | 3.3   |     |
| Lost Time Adjust (s)   | 0.0   | 0.0    |     | 0.0   | 0.0    |     | 0.0   | 0.0    |     | 0.0   | 0.0   |     |
| Total Lost Time (s)    | 4.7   | 5.7    |     | 4.7   | 5.7    |     | 6.6   | 6.6    |     | 4.3   | 6.6   |     |
| Lead/Lag               | Lead  | Lag    |     | Lead  | Lag    |     | Lag   | Lag    |     | Lead  |       |     |
| Lead-Lag Optimize?     | Yes   | Yes    |     | Yes   | Yes    |     | Yes   | Yes    |     | Yes   |       |     |
| Recall Mode            | None  | C-Max  |     | None  | C-Max  |     | None  | None   |     | None  | None  |     |
| Act Effct Green (s)    | 52.8  | 42.3   |     | 52.8  | 42.3   |     | 31.2  | 31.2   |     | 53.5  | 51.2  |     |
| Actuated g/C Ratio     | 0.44  | 0.35   |     | 0.44  | 0.35   |     | 0.26  | 0.26   |     | 0.45  | 0.43  |     |
| v/c Ratio              | 0.62  | 1.02   |     | 0.68  | 0.85   |     | 0.24  | 0.93   |     | 0.84  | 0.37  |     |
| Control Delay          | 35.8  | 63.3   |     | 41.3  | 44.0   |     | 36.6  | 66.1   |     | 47.0  | 22.2  |     |
| Queue Delay            | 0.0   | 0.0    |     | 0.0   | 0.0    |     | 0.0   | 0.0    |     | 0.0   | 0.0   |     |
| Total Delay            | 35.8  | 63.3   |     | 41.3  | 44.0   |     | 36.6  | 66.1   |     | 47.0  | 22.2  |     |
| LOS                    | D     | E      |     | D     | D      |     | D     | E      |     | D     | C     |     |
| Approach Delay         |       | 60.6   |     |       | 43.7   |     |       | 62.2   |     |       | 34.5  |     |
| Approach LOS           |       | E      |     |       | D      |     |       | E      |     |       | C     |     |
| Queue Length 50th (m)  | 11.7  | ~167.2 |     | 17.1  | 111.2  |     | 11.2  | 83.3   |     | 37.6  | 35.9  |     |
| Queue Length 95th (m)  | 30.6  | #209.4 |     | #39.6 | #150.2 |     | 23.2  | #138.7 |     | #76.8 | 56.2  |     |
| Internal Link Dist (m) |       | 313.9  |     |       | 184.8  |     |       | 136.9  |     |       | 237.9 |     |
| Turn Bay Length (m)    | 80.0  |        |     | 100.0 |        |     | 34.0  |        |     | 153.0 |       |     |
| Base Capacity (vph)    | 218   | 1162   |     | 198   | 1135   |     | 281   | 473    |     | 308   | 742   |     |
| Starvation Cap Reductn | 0     | 0      |     | 0     | 0      |     | 0     | 0      |     | 0     | 0     |     |
| Spillback Cap Reductn  | 0     | 0      |     | 0     | 0      |     | 0     | 0      |     | 0     | 0     |     |
| Storage Cap Reductn    | 0     | 0      |     | 0     | 0      |     | 0     | 0      |     | 0     | 0     |     |
| Reduced v/c Ratio      | 0.59  | 1.02   |     | 0.64  | 0.85   |     | 0.22  | 0.87   |     | 0.84  | 0.35  |     |

Intersection Summary

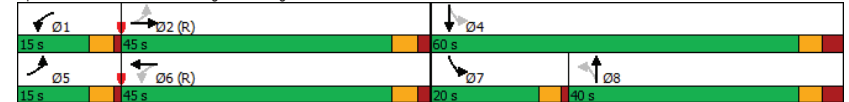
|   |
|---|
| Cycle Length: 120   |
| Actuated Cycle Length: 120  |
| Offset: 46 (38%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green |
| Natural Cycle: 105  |
| Control Type: Actuated-Coordinated                                      |

Lanes, Volumes, Timings  
3: Cummings Ave & Ogilvie Rd

2031 Future Background  
PM Peak Hour

|   |                        |
|---|------------------------|
| Maximum v/c Ratio: 1.02   | Intersection LOS: D    |
| Intersection Signal Delay: 51.4                                 | ICU Level of Service G |
| Intersection Capacity Utilization 100.7%                        |                        |
| Analysis Period (min) 15  |                        |
| ~ Volume exceeds capacity, queue is theoretically infinite.     |                        |
| Queue shown is maximum after two cycles.                        |                        |
| # 95th percentile volume exceeds capacity, queue may be longer. |                        |
| Queue shown is maximum after two cycles.                        |                        |

Splits and Phases: 3: Cummings Ave & Ogilvie Rd



# Appendix I

Synchro Intersection Worksheets – 2026 Future Total Conditions

Lanes, Volumes, Timings  
1: Cyrville Rd & Ogilvie Rd

2026 Future Total  
AM Peak Hour

| Lane Group             | EBL | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR | SBL   | SBT   | SBR |
|------------------------|-----|-------|-------|-------|-------|-------|-------|-------|-----|-------|-------|-----|
| Lane Configurations    |     | ↑↑    | ↑     | ↑     | ↑↑    | ↑     | ↑     | ↑     | ↑   | ↑     | ↑     | ↑   |
| Traffic Volume (vph)   | 0   | 587   | 230   | 28    | 1058  | 166   | 172   | 241   | 14  | 47    | 166   | 45  |
| Future Volume (vph)    | 0   | 587   | 230   | 28    | 1058  | 166   | 172   | 241   | 14  | 47    | 166   | 45  |
| Satd. Flow (prot)      | 0   | 3283  | 1414  | 1658  | 3316  | 1441  | 1551  | 1714  | 0   | 1626  | 1604  | 0   |
| Fit Permitted          |     |       |       | 0.418 |       |       | 0.510 |       |     | 0.426 |       |     |
| Satd. Flow (perm)      | 0   | 3283  | 1329  | 721   | 3316  | 1319  | 829   | 1714  | 0   | 727   | 1604  | 0   |
| Satd. Flow (RTOR)      |     |       | 230   |       |       | 166   |       | 3     |     |       | 12    |     |
| Lane Group Flow (vph)  | 0   | 587   | 230   | 28    | 1058  | 166   | 172   | 255   | 0   | 47    | 211   | 0   |
| Turn Type              | NA  | Perm  | Perm  | NA    | Perm  | Perm  | NA    | Perm  | NA  | Perm  | NA    |     |
| Protected Phases       |     | 2     |       | 6     |       | 6     | 8     |       | 8   |       | 4     |     |
| Permitted Phases       |     |       | 2     | 6     |       | 6     | 8     |       | 8   |       | 4     |     |
| Detector Phase         |     | 2     | 2     | 6     | 6     | 6     | 8     | 8     |     | 4     | 4     |     |
| Switch Phase           |     |       |       |       |       |       |       |       |     |       |       |     |
| Minimum Initial (s)    |     | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  |     | 10.0  | 10.0  |     |
| Minimum Split (s)      |     | 32.2  | 32.2  | 32.2  | 32.2  | 32.2  | 47.1  | 47.1  |     | 47.1  | 47.1  |     |
| Total Split (s)        |     | 72.9  | 72.9  | 72.9  | 72.9  | 72.9  | 47.1  | 47.1  |     | 47.1  | 47.1  |     |
| Total Split (%)        |     | 60.8% | 60.8% | 60.8% | 60.8% | 60.8% | 39.3% | 39.3% |     | 39.3% | 39.3% |     |
| Yellow Time (s)        |     | 3.7   | 3.7   | 3.7   | 3.7   | 3.7   | 3.7   | 3.7   |     | 3.7   | 3.7   |     |
| All-Red Time (s)       |     | 2.5   | 2.5   | 2.5   | 2.5   | 2.5   | 3.4   | 3.4   |     | 3.4   | 3.4   |     |
| Lost Time Adjust (s)   |     | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     | 0.0   | 0.0   |     |
| Total Lost Time (s)    |     | 6.2   | 6.2   | 6.2   | 6.2   | 6.2   | 7.1   | 7.1   |     | 7.1   | 7.1   |     |
| Lead/Lag               |     |       |       |       |       |       |       |       |     |       |       |     |
| Lead-Lag Optimize?     |     |       |       |       |       |       |       |       |     |       |       |     |
| Recall Mode            |     | C-Max | C-Max | C-Max | C-Max | C-Max | None  | None  |     | None  | None  |     |
| Act Effct Green (s)    |     | 78.9  | 78.9  | 78.9  | 78.9  | 78.9  | 27.8  | 27.8  |     | 27.8  | 27.8  |     |
| Actuated g/C Ratio     |     | 0.66  | 0.66  | 0.66  | 0.66  | 0.66  | 0.23  | 0.23  |     | 0.23  | 0.23  |     |
| v/c Ratio              |     | 0.27  | 0.24  | 0.06  | 0.49  | 0.18  | 0.90  | 0.64  |     | 0.28  | 0.56  |     |
| Control Delay          |     | 10.1  | 2.2   | 4.5   | 4.7   | 0.4   | 85.9  | 47.1  |     | 38.6  | 42.2  |     |
| Queue Delay            |     | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     | 0.0   | 0.0   |     |
| Total Delay            |     | 10.1  | 2.2   | 4.5   | 4.7   | 0.4   | 85.9  | 47.1  |     | 38.6  | 42.2  |     |
| LOS                    |     | B     | A     | A     | A     | A     | F     | D     |     | D     | D     |     |
| Approach Delay         |     | 7.9   |       |       | 4.2   |       | 62.7  |       |     | 41.6  |       |     |
| Approach LOS           |     | A     |       |       | A     |       | E     |       |     | D     |       |     |
| Queue Length 50th (m)  |     | 27.8  | 0.0   | 0.8   | 15.8  | 0.1   | 39.5  | 53.9  |     | 9.2   | 41.5  |     |
| Queue Length 95th (m)  |     | 48.9  | 10.8  | m1.2  | 20.2  | m0.2  | 59.6  | 70.3  |     | 17.7  | 57.1  |     |
| Internal Link Dist (m) |     | 113.5 |       |       | 313.9 |       | 191.2 |       |     | 190.6 |       |     |
| Turn Bay Length (m)    |     |       |       | 62.0  |       | 71.0  | 33.5  |       |     | 82.0  |       |     |
| Base Capacity (vph)    |     | 2158  | 952   | 474   | 2180  | 924   | 276   | 573   |     | 242   | 542   |     |
| Starvation Cap Reductn |     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |     | 0     | 0     |     |
| Spillback Cap Reductn  |     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |     | 0     | 0     |     |
| Storage Cap Reductn    |     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |     | 0     | 0     |     |
| Reduced v/c Ratio      |     | 0.27  | 0.24  | 0.06  | 0.49  | 0.18  | 0.62  | 0.45  |     | 0.19  | 0.39  |     |

Intersection Summary

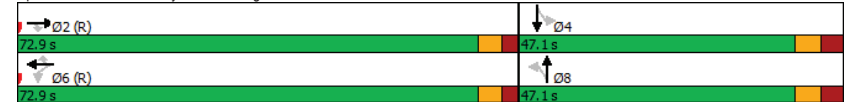
|   |
|---|
| Cycle Length: 120   |
| Actuated Cycle Length: 120  |
| Offset: 10 (8%), Referenced to phase 2:EBT and 6:WBTL, Start of Green |
| Natural Cycle: 80   |
| Control Type: Actuated-Coordinated                                    |

Lanes, Volumes, Timings  
1: Cyrville Rd & Ogilvie Rd

2026 Future Total  
AM Peak Hour

|   |                                 |                     |
|---|---------------------------------|---------------------|
| Maximum v/c Ratio: 0.90   | Intersection Signal Delay: 17.9 | Intersection LOS: B |
| Intersection Capacity Utilization 75.1%                           | ICU Level of Service D          |                     |
| Analysis Period (min) 15  |                                 |                     |
| m Volume for 95th percentile queue is metered by upstream signal. |                                 |                     |

Splits and Phases: 1: Cyrville Rd & Ogilvie Rd



Lanes, Volumes, Timings  
2: Cummings Ave & Donald

2026 Future Total  
AM Peak Hour

| Lane Group             | EBL   | EBR   | NBL   | NBT   | SBT   | SBR |
|------------------------|-------|-------|-------|-------|-------|-----|
| Lane Configurations    |       |       |       |       |       |     |
| Traffic Volume (vph)   | 42    | 167   | 248   | 129   | 209   | 104 |
| Future Volume (vph)    | 42    | 167   | 248   | 129   | 209   | 104 |
| Satd. Flow (prot)      | 1610  | 1469  | 1642  | 1695  | 1606  | 0   |
| Fit Permitted          | 0.950 |       | 0.570 |       |       |     |
| Satd. Flow (perm)      | 1532  | 1382  | 970   | 1695  | 1606  | 0   |
| Satd. Flow (RTOR)      |       | 167   |       |       | 62    |     |
| Lane Group Flow (vph)  | 42    | 167   | 248   | 129   | 313   | 0   |
| Turn Type              | Perm  | Perm  | Perm  | NA    | NA    |     |
| Protected Phases       |       |       |       | 2     | 6     |     |
| Permitted Phases       | 4     | 4     | 2     |       |       |     |
| Detector Phase         | 4     | 4     | 2     | 2     | 6     |     |
| Switch Phase           |       |       |       |       |       |     |
| Minimum Initial (s)    | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  |     |
| Minimum Split (s)      | 22.0  | 22.0  | 39.9  | 39.9  | 39.9  |     |
| Total Split (s)        | 22.0  | 22.0  | 98.0  | 98.0  | 98.0  |     |
| Total Split (%)        | 18.3% | 18.3% | 81.7% | 81.7% | 81.7% |     |
| Yellow Time (s)        | 3.3   | 3.3   | 3.3   | 3.3   | 3.3   |     |
| All-Red Time (s)       | 2.7   | 2.7   | 3.6   | 3.6   | 3.6   |     |
| Lost Time Adjust (s)   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     |
| Total Lost Time (s)    | 6.0   | 6.0   | 6.9   | 6.9   | 6.9   |     |
| Lead/Lag               |       |       |       |       |       |     |
| Lead-Lag Optimize?     |       |       |       |       |       |     |
| Recall Mode            | None  | None  | Min   | Min   | Min   |     |
| Act Effct Green (s)    | 11.3  | 11.3  | 19.5  | 19.5  | 19.5  |     |
| Actuated g/C Ratio     | 0.26  | 0.26  | 0.44  | 0.44  | 0.44  |     |
| v/c Ratio              | 0.11  | 0.35  | 0.58  | 0.17  | 0.42  |     |
| Control Delay          | 14.8  | 5.9   | 15.7  | 8.2   | 8.6   |     |
| Queue Delay            | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     |
| Total Delay            | 14.8  | 5.9   | 15.7  | 8.2   | 8.6   |     |
| LOS                    | B     | A     | B     | A     | A     |     |
| Approach Delay         | 7.6   |       |       | 13.1  | 8.6   |     |
| Approach LOS           | A     |       |       | B     | A     |     |
| Queue Length 50th (m)  | 1.9   | 0.0   | 11.9  | 5.0   | 10.6  |     |
| Queue Length 95th (m)  | 10.1  | 12.0  | 33.1  | 13.8  | 27.9  |     |
| Internal Link Dist (m) | 296.9 |       |       | 132.3 | 259.3 |     |
| Turn Bay Length (m)    | 60.0  |       | 60.0  |       |       |     |
| Base Capacity (vph)    | 577   | 625   | 970   | 1695  | 1606  |     |
| Starvation Cap Reductn | 0     | 0     | 0     | 0     | 0     |     |
| Spillback Cap Reductn  | 0     | 0     | 0     | 0     | 0     |     |
| Storage Cap Reductn    | 0     | 0     | 0     | 0     | 0     |     |
| Reduced v/c Ratio      | 0.07  | 0.27  | 0.26  | 0.08  | 0.19  |     |

Intersection Summary

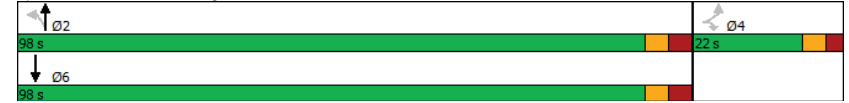
|                                      |
|--------------------------------------|
| Cycle Length: 120                    |
| Actuated Cycle Length: 44.3          |
| Natural Cycle: 65                    |
| Control Type: Actuated-Uncoordinated |
| Maximum v/c Ratio: 0.58              |

Lanes, Volumes, Timings  
2: Cummings Ave & Donald

2026 Future Total  
AM Peak Hour

|   |                        |
|---|------------------------|
| Intersection Signal Delay: 10.3         | Intersection LOS: B    |
| Intersection Capacity Utilization 62.6% | ICU Level of Service B |
| Analysis Period (min) 15                |                        |

Splits and Phases: 2: Cummings Ave & Donald





Lanes, Volumes, Timings  
3: Cummings Ave & Ogilvie Rd

2026 Future Total  
AM Peak Hour

| Lane Group             | EBL   | EBT   | EBR | WBL   | WBT   | WBR | NBL   | NBT   | NBR | SBL   | SBT   | SBR |
|------------------------|-------|-------|-----|-------|-------|-----|-------|-------|-----|-------|-------|-----|
| Lane Configurations    | ↔     | ↕     | ↔   | ↔     | ↕     | ↔   | ↔     | ↕     | ↔   | ↔     | ↕     | ↔   |
| Traffic Volume (vph)   | 54    | 601   | 11  | 174   | 1099  | 171 | 64    | 128   | 69  | 140   | 134   | 120 |
| Future Volume (vph)    | 54    | 601   | 11  | 174   | 1099  | 171 | 64    | 128   | 69  | 140   | 134   | 120 |
| Satd. Flow (prot)      | 1626  | 3266  | 0   | 1626  | 3194  | 0   | 1658  | 1514  | 0   | 1626  | 1605  | 0   |
| Fit Permitted          | 0.114 |       |     | 0.356 |       |     | 0.602 |       |     | 0.443 |       |     |
| Satd. Flow (perm)      | 195   | 3266  | 0   | 600   | 3194  | 0   | 1046  | 1514  | 0   | 727   | 1605  | 0   |
| Satd. Flow (RTOR)      |       | 2     |     |       | 19    |     |       | 22    |     |       | 41    |     |
| Lane Group Flow (vph)  | 54    | 612   | 0   | 174   | 1270  | 0   | 64    | 197   | 0   | 140   | 254   | 0   |
| Turn Type              | pm+pt | NA    |     | pm+pt | NA    |     | Perm  | NA    |     | pm+pt | NA    |     |
| Protected Phases       | 5     | 2     |     | 1     | 6     |     | 8     |       |     | 7     | 4     |     |
| Permitted Phases       | 2     |       |     | 6     |       |     | 8     |       |     | 4     |       |     |
| Detector Phase         | 5     | 2     |     | 1     | 6     |     | 8     | 8     |     | 7     | 4     |     |
| Switch Phase           |       |       |     |       |       |     |       |       |     |       |       |     |
| Minimum Initial (s)    | 5.0   | 10.0  |     | 5.0   | 10.0  |     | 10.0  | 10.0  |     | 5.0   | 10.0  |     |
| Minimum Split (s)      | 9.7   | 24.7  |     | 9.7   | 24.7  |     | 36.6  | 36.6  |     | 9.3   | 36.6  |     |
| Total Split (s)        | 11.0  | 61.0  |     | 11.0  | 61.0  |     | 36.6  | 36.6  |     | 11.4  | 48.0  |     |
| Total Split (%)        | 9.2%  | 50.8% |     | 9.2%  | 50.8% |     | 30.5% | 30.5% |     | 9.5%  | 40.0% |     |
| Yellow Time (s)        | 3.7   | 3.7   |     | 3.7   | 3.7   |     | 3.3   | 3.3   |     | 3.3   | 3.3   |     |
| All-Red Time (s)       | 1.0   | 2.0   |     | 1.0   | 2.0   |     | 3.3   | 3.3   |     | 1.0   | 3.3   |     |
| Lost Time Adjust (s)   | 0.0   | 0.0   |     | 0.0   | 0.0   |     | 0.0   | 0.0   |     | 0.0   | 0.0   |     |
| Total Lost Time (s)    | 4.7   | 5.7   |     | 4.7   | 5.7   |     | 6.6   | 6.6   |     | 4.3   | 6.6   |     |
| Lead/Lag               | Lead  | Lag   |     | Lead  | Lag   |     | Lag   | Lag   |     | Lead  |       |     |
| Lead-Lag Optimize?     | Yes   | Yes   |     | Yes   | Yes   |     | Yes   | Yes   |     | Yes   |       |     |
| Recall Mode            | None  | C-Max |     | None  | C-Max |     | None  | None  |     | None  | None  |     |
| Act Effct Green (s)    | 66.0  | 58.8  |     | 67.2  | 61.2  |     | 26.3  | 26.3  |     | 40.0  | 37.7  |     |
| Actuated g/C Ratio     | 0.55  | 0.49  |     | 0.56  | 0.51  |     | 0.22  | 0.22  |     | 0.33  | 0.31  |     |
| v/c Ratio              | 0.30  | 0.38  |     | 0.45  | 0.78  |     | 0.28  | 0.56  |     | 0.47  | 0.48  |     |
| Control Delay          | 22.9  | 18.1  |     | 17.3  | 29.7  |     | 40.2  | 42.4  |     | 33.9  | 29.8  |     |
| Queue Delay            | 0.0   | 0.0   |     | 0.0   | 0.0   |     | 0.0   | 0.0   |     | 0.0   | 0.0   |     |
| Total Delay            | 22.9  | 18.1  |     | 17.3  | 29.7  |     | 40.2  | 42.4  |     | 33.9  | 29.8  |     |
| LOS                    | C     | B     |     | B     | C     |     | D     | D     |     | C     | C     |     |
| Approach Delay         |       | 18.5  |     |       | 28.2  |     |       | 41.9  |     |       | 31.3  |     |
| Approach LOS           |       | B     |     |       | C     |     |       | D     |     |       | C     |     |
| Queue Length 50th (m)  | 5.0   | 38.3  |     | 19.2  | 135.3 |     | 12.1  | 35.4  |     | 22.7  | 38.2  |     |
| Queue Length 95th (m)  | 17.9  | 48.6  |     | 31.1  | 166.8 |     | 24.5  | 58.7  |     | 38.2  | 61.9  |     |
| Internal Link Dist (m) |       | 313.9 |     |       | 184.8 |     |       | 136.9 |     |       | 81.8  |     |
| Turn Bay Length (m)    | 80.0  |       |     | 100.0 |       |     | 34.0  |       |     | 153.0 |       |     |
| Base Capacity (vph)    | 182   | 1602  |     | 391   | 1638  |     | 261   | 395   |     | 295   | 580   |     |
| Starvation Cap Reductn | 0     | 0     |     | 0     | 0     |     | 0     | 0     |     | 0     | 0     |     |
| Spillback Cap Reductn  | 0     | 0     |     | 0     | 0     |     | 0     | 0     |     | 0     | 0     |     |
| Storage Cap Reductn    | 0     | 0     |     | 0     | 0     |     | 0     | 0     |     | 0     | 0     |     |
| Reduced v/c Ratio      | 0.30  | 0.38  |     | 0.45  | 0.78  |     | 0.25  | 0.50  |     | 0.47  | 0.44  |     |

Intersection Summary

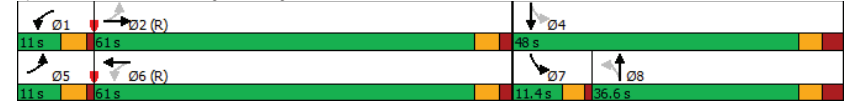
Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 110 (92%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green  
 Natural Cycle: 95  
 Control Type: Actuated-Coordinated

Lanes, Volumes, Timings  
3: Cummings Ave & Ogilvie Rd

2026 Future Total  
AM Peak Hour

|   |                        |
|---|------------------------|
| Maximum v/c Ratio: 0.78                 | Intersection LOS: C    |
| Intersection Signal Delay: 27.6         | ICU Level of Service F |
| Intersection Capacity Utilization 91.1% |                        |
| Analysis Period (min) 15                |                        |

Splits and Phases: 3: Cummings Ave & Ogilvie Rd



HCM 2010 TWSC  
4: Cummings Ave & Site Access

2026 Future Total  
AM Peak Hour

| Intersection             |             |        |        |      |      |      |
|--------------------------|-------------|--------|--------|------|------|------|
| Int Delay, s/veh         | 0.2         |        |        |      |      |      |
| Movement                 | EBL         | EBR    | NBL    | NBT  | SBT  | SBR  |
| Lane Configurations      | ↔ ↗ ↘ ↙ ↘ ↗ |        |        |      |      |      |
| Traffic Vol, veh/h       | 2           | 10     | 4      | 334  | 376  | 1    |
| Future Vol, veh/h        | 2           | 10     | 4      | 334  | 376  | 1    |
| Conflicting Peds, #/hr   | 0           | 0      | 0      | 0    | 0    | 0    |
| Sign Control             | Stop        | Stop   | Free   | Free | Free | Free |
| RT Channelized           | -           | None   | -      | None | -    | None |
| Storage Length           | 0           | -      | -      | -    | -    | -    |
| Veh in Median Storage, # | 0           | -      | -      | 0    | 0    | -    |
| Grade, %                 | 0           | -      | -      | 0    | 0    | -    |
| Peak Hour Factor         | 100         | 100    | 100    | 100  | 100  | 100  |
| Heavy Vehicles, %        | 2           | 2      | 2      | 2    | 2    | 2    |
| Mvmt Flow                | 2           | 10     | 4      | 334  | 376  | 1    |
| Major/Minor              | Minor2      | Major1 | Major2 |      |      |      |
| Conflicting Flow All     | 719         | 377    | 377    | 0    | -    | 0    |
| Stage 1                  | 377         | -      | -      | -    | -    | -    |
| Stage 2                  | 342         | -      | -      | -    | -    | -    |
| Critical Hdwy            | 6.42        | 6.22   | 4.12   | -    | -    | -    |
| Critical Hdwy Stg 1      | 5.42        | -      | -      | -    | -    | -    |
| Critical Hdwy Stg 2      | 5.42        | -      | -      | -    | -    | -    |
| Follow-up Hdwy           | 3.518       | 3.318  | 2.218  | -    | -    | -    |
| Pot Cap-1 Maneuver       | 395         | 670    | 1181   | -    | -    | -    |
| Stage 1                  | 694         | -      | -      | -    | -    | -    |
| Stage 2                  | 719         | -      | -      | -    | -    | -    |
| Platoon blocked, %       | -           | -      | -      | -    | -    | -    |
| Mov Cap-1 Maneuver       | 393         | 670    | 1181   | -    | -    | -    |
| Mov Cap-2 Maneuver       | 393         | -      | -      | -    | -    | -    |
| Stage 1                  | 691         | -      | -      | -    | -    | -    |
| Stage 2                  | 719         | -      | -      | -    | -    | -    |
| Approach                 | EB          | NB     | SB     |      |      |      |
| HCM Control Delay, s     | 11.1        | 0.1    | 0      |      |      |      |
| HCM LOS                  | B           |        |        |      |      |      |
| Minor Lane/Major Mvmt    | NBL         | NBT    | EBLn1  | SBT  | SBR  |      |
| Capacity (veh/h)         | 1181        | -      | 600    | -    | -    |      |
| HCM Lane V/C Ratio       | 0.003       | -      | 0.02   | -    | -    |      |
| HCM Control Delay (s)    | 8.1         | 0      | 11.1   | -    | -    |      |
| HCM Lane LOS             | A           | A      | B      | -    | -    |      |
| HCM 95th %tile Q(veh)    | 0           | -      | 0.1    | -    | -    |      |

Lanes, Volumes, Timings  
1: Cyrville Rd & Ogilvie Rd

2026 Future Total  
PM Peak Hour

| Lane Group             | EBL                     | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR | SBL   | SBT   | SBR |
|------------------------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-----|-------|-------|-----|
| Lane Configurations    | ↔ ↗ ↘ ↙ ↘ ↗ ↗ ↘ ↙ ↘ ↗ ↘ |       |       |       |       |       |       |       |     |       |       |     |
| Traffic Volume (vph)   | 0                       | 1087  | 262   | 44    | 685   | 124   | 122   | 228   | 34  | 134   | 219   | 80  |
| Future Volume (vph)    | 0                       | 1087  | 262   | 44    | 685   | 124   | 122   | 228   | 34  | 134   | 219   | 80  |
| Satd. Flow (prot)      | 0                       | 3316  | 1469  | 1658  | 3316  | 1469  | 1580  | 1707  | 0   | 1642  | 1637  | 0   |
| Fit Permitted          |                         |       |       | 0.221 |       |       | 0.338 |       |     | 0.408 |       |     |
| Satd. Flow (perm)      | 0                       | 3316  | 1353  | 383   | 3316  | 1303  | 560   | 1707  | 0   | 702   | 1637  | 0   |
| Satd. Flow (RTOR)      |                         |       | 262   |       |       | 124   |       | 7     |     |       | 17    |     |
| Lane Group Flow (vph)  | 0                       | 1087  | 262   | 44    | 685   | 124   | 122   | 262   | 0   | 134   | 299   | 0   |
| Turn Type              |                         | NA    | Perm  | Perm  | NA    | Perm  | Perm  | NA    |     | Perm  | NA    |     |
| Protected Phases       |                         |       | 2     |       |       | 6     |       | 8     |     |       | 8     | 4   |
| Permitted Phases       |                         |       |       | 2     | 6     |       | 6     | 8     |     |       |       | 4   |
| Detector Phase         |                         | 2     | 2     | 6     | 6     | 6     | 8     | 8     |     |       | 4     | 4   |
| Switch Phase           |                         |       |       |       |       |       |       |       |     |       |       |     |
| Minimum Initial (s)    | 10.0                    | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  |     | 10.0  | 10.0  |     |
| Minimum Split (s)      |                         | 32.2  | 32.2  | 32.2  | 32.2  | 32.2  | 47.1  | 47.1  |     | 47.1  | 47.1  |     |
| Total Split (s)        |                         | 70.0  | 70.0  | 70.0  | 70.0  | 70.0  | 50.0  | 50.0  |     | 50.0  | 50.0  |     |
| Total Split (%)        |                         | 58.3% | 58.3% | 58.3% | 58.3% | 58.3% | 41.7% | 41.7% |     | 41.7% | 41.7% |     |
| Yellow Time (s)        |                         | 3.7   | 3.7   | 3.7   | 3.7   | 3.7   | 3.7   | 3.7   |     | 3.7   | 3.7   |     |
| All-Red Time (s)       |                         | 2.5   | 2.5   | 2.5   | 2.5   | 2.5   | 3.4   | 3.4   |     | 3.4   | 3.4   |     |
| Lost Time Adjust (s)   |                         | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     | 0.0   | 0.0   |     |
| Total Lost Time (s)    |                         | 6.2   | 6.2   | 6.2   | 6.2   | 6.2   | 7.1   | 7.1   |     | 7.1   | 7.1   |     |
| Lead/Lag               |                         |       |       |       |       |       |       |       |     |       |       |     |
| Lead-Lag Optimize?     |                         |       |       |       |       |       |       |       |     |       |       |     |
| Recall Mode            |                         | C-Max | C-Max | C-Max | C-Max | C-Max | None  | None  |     | None  | None  |     |
| Act Effct Green (s)    |                         | 79.3  | 79.3  | 79.3  | 79.3  | 79.3  | 27.4  | 27.4  |     | 27.4  | 27.4  |     |
| Actuated g/C Ratio     |                         | 0.66  | 0.66  | 0.66  | 0.66  | 0.66  | 0.23  | 0.23  |     | 0.23  | 0.23  |     |
| v/c Ratio              |                         | 0.50  | 0.27  | 0.17  | 0.31  | 0.14  | 0.95  | 0.66  |     | 0.84  | 0.77  |     |
| Control Delay          |                         | 12.5  | 2.1   | 20.6  | 16.6  | 8.7   | 113.5 | 48.1  |     | 81.1  | 53.5  |     |
| Queue Delay            |                         | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     | 0.0   | 0.0   |     |
| Total Delay            |                         | 12.5  | 2.1   | 20.6  | 16.6  | 8.7   | 113.5 | 48.1  |     | 81.1  | 53.5  |     |
| LOS                    |                         | B     | A     | C     | B     | A     | F     | D     |     | F     | D     |     |
| Approach Delay         |                         | 10.5  |       |       | 15.7  |       | 68.8  |       |     | 62.1  |       |     |
| Approach LOS           |                         | B     |       |       | B     |       | E     |       |     | E     |       |     |
| Queue Length 50th (m)  |                         | 60.9  | 0.0   | 5.3   | 44.3  | 5.7   | 28.8  | 55.5  |     | 30.6  | 63.4  |     |
| Queue Length 95th (m)  |                         | 104.8 | 11.4  | m8.8  | m66.1 | m11.3 | #52.3 | 71.5  |     | 48.1  | 81.7  |     |
| Internal Link Dist (m) |                         | 113.8 |       |       | 313.9 |       | 191.2 |       |     |       | 190.4 |     |
| Turn Bay Length (m)    |                         |       |       | 62.0  |       | 71.0  | 33.5  |       |     | 82.0  |       |     |
| Base Capacity (vph)    |                         | 2190  | 982   | 252   | 2190  | 902   | 200   | 614   |     | 250   | 596   |     |
| Starvation Cap Reductn |                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     |     | 0     | 0     |     |
| Spillback Cap Reductn  |                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     |     | 0     | 0     |     |
| Storage Cap Reductn    |                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     |     | 0     | 0     |     |
| Reduced v/c Ratio      |                         | 0.50  | 0.27  | 0.17  | 0.31  | 0.14  | 0.61  | 0.43  |     | 0.54  | 0.50  |     |

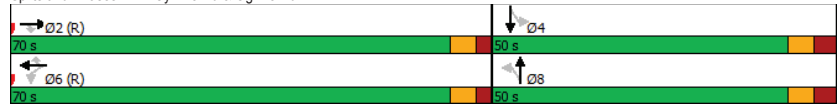
| Intersection Summary   |  |
|------------------------|--|
| Cycle Length:          | 120  |
| Actuated Cycle Length: | 120  |
| Offset:                | 20 (17%), Referenced to phase 2:EBT and 6:WBTL, Start of Green |
| Natural Cycle:         | 80   |
| Control Type:          | Actuated-Coordinated   |

Lanes, Volumes, Timings  
1: Cyrville Rd & Ogilvie Rd

2026 Future Total  
PM Peak Hour

|   |                        |
|---|------------------------|
| Maximum v/c Ratio: 0.95   | Intersection LOS: C    |
| Intersection Signal Delay: 26.8                                   | ICU Level of Service E |
| Intersection Capacity Utilization 85.2%                           |                        |
| Analysis Period (min) 15  |                        |
| # 95th percentile volume exceeds capacity, queue may be longer.   |                        |
| Queue shown is maximum after two cycles.                          |                        |
| m Volume for 95th percentile queue is metered by upstream signal. |                        |

Splits and Phases: 1: Cyrville Rd & Ogilvie Rd



Lanes, Volumes, Timings  
2: Cummings Ave & Donald

2026 Future Total  
PM Peak Hour

| Lane Group             | EBL   | EBR   | NBL   | NBT   | SBT   | SBR |
|------------------------|-------|-------|-------|-------|-------|-----|
| Lane Configurations    | ↔     | ↔     | ↔     | ↔     | ↔     | ↔   |
| Traffic Volume (vph)   | 88    | 342   | 273   | 259   | 245   | 90  |
| Future Volume (vph)    | 88    | 342   | 273   | 259   | 245   | 90  |
| Satd. Flow (prot)      | 1523  | 1483  | 1658  | 1728  | 1649  | 0   |
| Fit Permitted          | 0.950 |       | 0.559 |       |       |     |
| Satd. Flow (perm)      | 1518  | 1345  | 965   | 1728  | 1649  | 0   |
| Satd. Flow (RTOR)      |       | 342   |       |       | 35    |     |
| Lane Group Flow (vph)  | 88    | 342   | 273   | 259   | 335   | 0   |
| Turn Type              | Perm  | Perm  | Perm  | NA    | NA    |     |
| Protected Phases       |       |       |       | 2     | 6     |     |
| Permitted Phases       | 4     | 4     | 2     |       |       |     |
| Detector Phase         | 4     | 4     | 2     | 2     | 6     |     |
| Switch Phase           |       |       |       |       |       |     |
| Minimum Initial (s)    | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  |     |
| Minimum Split (s)      | 22.0  | 22.0  | 39.9  | 39.9  | 39.9  |     |
| Total Split (s)        | 31.0  | 31.0  | 89.0  | 89.0  | 89.0  |     |
| Total Split (%)        | 25.8% | 25.8% | 74.2% | 74.2% | 74.2% |     |
| Yellow Time (s)        | 3.3   | 3.3   | 3.3   | 3.3   | 3.3   |     |
| All-Red Time (s)       | 2.7   | 2.7   | 3.6   | 3.6   | 3.6   |     |
| Lost Time Adjust (s)   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     |
| Total Lost Time (s)    | 6.0   | 6.0   | 6.9   | 6.9   | 6.9   |     |
| Lead/Lag               |       |       |       |       |       |     |
| Lead-Lag Optimize?     |       |       |       |       |       |     |
| Recall Mode            | None  | None  | Min   | Min   | Min   |     |
| Act Effct Green (s)    | 11.3  | 11.3  | 18.3  | 18.3  | 18.3  |     |
| Actuated g/C Ratio     | 0.26  | 0.26  | 0.42  | 0.42  | 0.42  |     |
| v/c Ratio              | 0.22  | 0.57  | 0.67  | 0.35  | 0.47  |     |
| Control Delay          | 16.7  | 6.8   | 18.6  | 9.4   | 9.8   |     |
| Queue Delay            | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     |
| Total Delay            | 16.7  | 6.8   | 18.6  | 9.4   | 9.8   |     |
| LOS                    | B     | A     | B     | A     | A     |     |
| Approach Delay         | 8.9   |       |       | 14.1  | 9.8   |     |
| Approach LOS           | A     |       |       | B     | A     |     |
| Queue Length 50th (m)  | 4.6   | 0.0   | 13.6  | 10.9  | 13.2  |     |
| Queue Length 95th (m)  | 17.8  | 17.0  | 37.9  | 26.4  | 32.5  |     |
| Internal Link Dist (m) | 296.3 |       |       | 141.5 | 259.3 |     |
| Turn Bay Length (m)    | 60.0  |       | 60.0  |       |       |     |
| Base Capacity (vph)    | 922   | 951   | 965   | 1728  | 1649  |     |
| Starvation Cap Reductn | 0     | 0     | 0     | 0     | 0     |     |
| Spillback Cap Reductn  | 0     | 0     | 0     | 0     | 0     |     |
| Storage Cap Reductn    | 0     | 0     | 0     | 0     | 0     |     |
| Reduced v/c Ratio      | 0.10  | 0.36  | 0.28  | 0.15  | 0.20  |     |

Intersection Summary

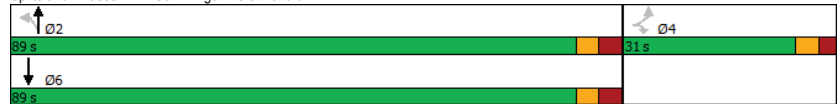
|                                |
|--------------------------------|
| Cycle Length: 120              |
| Actuated Cycle Length: 43.1    |
| Natural Cycle: 65              |
| Control Type: Semi Act-Uncoord |
| Maximum v/c Ratio: 0.67        |

Lanes, Volumes, Timings  
2: Cummings Ave & Donald

2026 Future Total  
PM Peak Hour

|   |                        |
|---|------------------------|
| Intersection Signal Delay: 11.3         | Intersection LOS: B    |
| Intersection Capacity Utilization 65.1% | ICU Level of Service C |
| Analysis Period (min) 15                |                        |

Splits and Phases: 2: Cummings Ave & Donald



Lanes, Volumes, Timings  
3: Cummings Ave & Oglvie Rd

2026 Future Total  
PM Peak Hour

|                        | EBL   | EBT    | EBR | WBL   | WBT    | WBR | NBL   | NBT    | NBR | SBL   | SBT   | SBR |
|------------------------|-------|--------|-----|-------|--------|-----|-------|--------|-----|-------|-------|-----|
| Lane Configurations    | ↔     | ↕      | ↔   | ↔     | ↕      | ↔   | ↔     | ↕      | ↔   | ↔     | ↕     | ↔   |
| Traffic Volume (vph)   | 136   | 1147   | 23  | 127   | 747    | 211 | 62    | 185    | 219 | 259   | 177   | 89  |
| Future Volume (vph)    | 136   | 1147   | 23  | 127   | 747    | 211 | 62    | 185    | 219 | 259   | 177   | 89  |
| Satd. Flow (prot)      | 1658  | 3298   | 0   | 1626  | 3161   | 0   | 1642  | 1576   | 0   | 1658  | 1634  | 0   |
| Fit Permitted          | 0.126 |        |     | 0.094 |        |     | 0.595 |        |     | 0.173 |       |     |
| Satd. Flow (perm)      | 220   | 3298   | 0   | 161   | 3161   | 0   | 1007  | 1576   | 0   | 300   | 1634  | 0   |
| Satd. Flow (RTOR)      |       | 2      |     |       | 32     |     |       | 49     |     |       | 27    |     |
| Lane Group Flow (vph)  | 136   | 1170   | 0   | 127   | 958    | 0   | 62    | 404    | 0   | 259   | 266   | 0   |
| Turn Type              | pm+pt | NA     |     | pm+pt | NA     |     | Perm  | NA     |     | pm+pt | NA    |     |
| Protected Phases       | 5     | 2      |     | 1     | 6      |     |       | 8      |     | 7     | 4     |     |
| Permitted Phases       | 2     |        |     | 6     |        |     | 8     |        |     | 4     |       |     |
| Detector Phase         | 5     | 2      |     | 1     | 6      |     | 8     | 8      |     | 7     | 4     |     |
| Switch Phase           |       |        |     |       |        |     |       |        |     |       |       |     |
| Minimum Initial (s)    | 5.0   | 10.0   |     | 5.0   | 10.0   |     | 10.0  | 10.0   |     | 5.0   | 10.0  |     |
| Minimum Split (s)      | 9.7   | 24.7   |     | 9.7   | 24.7   |     | 36.6  | 36.6   |     | 9.3   | 36.6  |     |
| Total Split (s)        | 15.0  | 45.0   |     | 15.0  | 45.0   |     | 40.0  | 40.0   |     | 20.0  | 60.0  |     |
| Total Split (%)        | 12.5% | 37.5%  |     | 12.5% | 37.5%  |     | 33.3% | 33.3%  |     | 16.7% | 50.0% |     |
| Yellow Time (s)        | 3.7   | 3.7    |     | 3.7   | 3.7    |     | 3.3   | 3.3    |     | 3.3   | 3.3   |     |
| All-Red Time (s)       | 1.0   | 2.0    |     | 1.0   | 2.0    |     | 3.3   | 3.3    |     | 1.0   | 3.3   |     |
| Lost Time Adjust (s)   | 0.0   | 0.0    |     | 0.0   | 0.0    |     | 0.0   | 0.0    |     | 0.0   | 0.0   |     |
| Total Lost Time (s)    | 4.7   | 5.7    |     | 4.7   | 5.7    |     | 6.6   | 6.6    |     | 4.3   | 6.6   |     |
| Lead/Lag               | Lead  | Lag    |     | Lead  | Lag    |     | Lag   | Lag    |     | Lead  |       |     |
| Lead-Lag Optimize?     | Yes   | Yes    |     | Yes   | Yes    |     | Yes   | Yes    |     | Yes   |       |     |
| Recall Mode            | None  | C-Max  |     | None  | C-Max  |     | None  | None   |     | None  | None  |     |
| Act Effct Green (s)    | 53.4  | 42.7   |     | 53.1  | 42.6   |     | 30.8  | 30.8   |     | 53.1  | 50.8  |     |
| Actuated g/C Ratio     | 0.44  | 0.36   |     | 0.44  | 0.36   |     | 0.26  | 0.26   |     | 0.44  | 0.42  |     |
| v/c Ratio              | 0.64  | 1.00   |     | 0.68  | 0.84   |     | 0.24  | 0.92   |     | 0.84  | 0.38  |     |
| Control Delay          | 36.3  | 57.7   |     | 41.6  | 43.1   |     | 36.8  | 64.5   |     | 46.5  | 22.4  |     |
| Queue Delay            | 0.0   | 0.0    |     | 0.0   | 0.0    |     | 0.0   | 0.0    |     | 0.0   | 0.0   |     |
| Total Delay            | 36.3  | 57.7   |     | 41.6  | 43.1   |     | 36.8  | 64.5   |     | 46.5  | 22.4  |     |
| LOS                    | D     | E      |     | D     | D      |     | D     | E      |     | D     | C     |     |
| Approach Delay         |       | 55.5   |     |       | 42.9   |     |       | 60.8   |     |       | 34.3  |     |
| Approach LOS           |       | E      |     |       | D      |     |       | E      |     |       | C     |     |
| Queue Length 50th (m)  | 12.8  | ~163.7 |     | 17.1  | 110.0  |     | 11.2  | 80.4   |     | 37.8  | 36.1  |     |
| Queue Length 95th (m)  | #32.5 | #205.6 |     | #39.9 | #148.1 |     | 23.2  | #133.6 |     | #75.8 | 56.8  |     |
| Internal Link Dist (m) |       | 313.9  |     |       | 184.8  |     |       | 136.9  |     |       | 72.5  |     |
| Turn Bay Length (m)    | 80.0  |        |     | 100.0 |        |     | 34.0  |        |     | 153.0 |       |     |
| Base Capacity (vph)    | 222   | 1174   |     | 197   | 1141   |     | 280   | 474    |     | 310   | 742   |     |
| Starvation Cap Reductn | 0     | 0      |     | 0     | 0      |     | 0     | 0      |     | 0     | 0     |     |
| Spillback Cap Reductn  | 0     | 0      |     | 0     | 0      |     | 0     | 0      |     | 0     | 0     |     |
| Storage Cap Reductn    | 0     | 0      |     | 0     | 0      |     | 0     | 0      |     | 0     | 0     |     |
| Reduced v/c Ratio      | 0.61  | 1.00   |     | 0.64  | 0.84   |     | 0.22  | 0.85   |     | 0.84  | 0.36  |     |

Intersection Summary

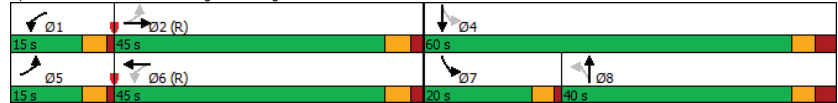
|   |
|---|
| Cycle Length: 120   |
| Actuated Cycle Length: 120  |
| Offset: 46 (38%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green |
| Natural Cycle: 105  |
| Control Type: Actuated-Coordinated                                      |

Lanes, Volumes, Timings  
3: Cummings Ave & Ogilvie Rd

2026 Future Total  
PM Peak Hour

|   |                        |
|---|------------------------|
| Maximum v/c Ratio: 1.00   | Intersection LOS: D    |
| Intersection Signal Delay: 48.9                                 | ICU Level of Service F |
| Intersection Capacity Utilization 99.9%                         |                        |
| Analysis Period (min) 15  |                        |
| ~ Volume exceeds capacity, queue is theoretically infinite.     |                        |
| Queue shown is maximum after two cycles.                        |                        |
| # 95th percentile volume exceeds capacity, queue may be longer. |                        |
| Queue shown is maximum after two cycles.                        |                        |

Splits and Phases: 3: Cummings Ave & Ogilvie Rd



HCM 2010 TWSC  
4: Cummings Ave & Site Access

2026 Future Total  
PM Peak Hour

| Intersection             |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|
| Int Delay, s/veh         | 0.1  |      |      |      |      |      |
| Movement                 | EBL  | EBR  | NBL  | NBT  | SBT  | SBR  |
| Lane Configurations      | ↔    |      | ↔    |      | ↔    |      |
| Traffic Vol, veh/h       | 1    | 6    | 9    | 513  | 508  | 2    |
| Future Vol, veh/h        | 1    | 6    | 9    | 513  | 508  | 2    |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Stop | Stop | Free | Free | Free | Free |
| RT Channelized           | -    | None | -    | None | -    | None |
| Storage Length           | 0    | -    | -    | -    | -    | -    |
| Veh in Median Storage, # | 0    | -    | -    | 0    | 0    | -    |
| Grade, %                 | 0    | -    | -    | 0    | 0    | -    |
| Peak Hour Factor         | 100  | 100  | 100  | 100  | 100  | 100  |
| Heavy Vehicles, %        | 2    | 2    | 2    | 2    | 2    | 2    |
| Mvmt Flow                | 1    | 6    | 9    | 513  | 508  | 2    |

| Major/Minor          | Minor2 | Major1 | Major2 |
|----------------------|--------|--------|--------|
| Conflicting Flow All | 1040   | 509    | 510    |
| Stage 1              | 509    | -      | -      |
| Stage 2              | 531    | -      | -      |
| Critical Hdwy        | 6.42   | 6.22   | 4.12   |
| Critical Hdwy Stg 1  | 5.42   | -      | -      |
| Critical Hdwy Stg 2  | 5.42   | -      | -      |
| Follow-up Hdwy       | 3.518  | 3.318  | 2.218  |
| Pot Cap-1 Maneuver   | 255    | 564    | 1055   |
| Stage 1              | 604    | -      | -      |
| Stage 2              | 590    | -      | -      |
| Platoon blocked, %   | -      | -      | -      |
| Mov Cap-1 Maneuver   | 252    | 564    | 1055   |
| Mov Cap-2 Maneuver   | 252    | -      | -      |
| Stage 1              | 597    | -      | -      |
| Stage 2              | 590    | -      | -      |

| Approach             | EB   | NB  | SB |
|----------------------|------|-----|----|
| HCM Control Delay, s | 12.6 | 0.1 | 0  |
| HCM LOS              | B    |     |    |

| Minor Lane/Major Mvmt | NBL   | NBT EBLn1 | SBT   | SBR |
|-----------------------|-------|-----------|-------|-----|
| Capacity (veh/h)      | 1055  | -         | 479   | -   |
| HCM Lane V/C Ratio    | 0.009 | -         | 0.015 | -   |
| HCM Control Delay (s) | 8.4   | 0         | 12.6  | -   |
| HCM Lane LOS          | A     | A         | B     | -   |
| HCM 95th %tile Q(veh) | 0     | -         | 0     | -   |

# Appendix J

Synchro Intersection Worksheets – 2031 Future Total Conditions

Lanes, Volumes, Timings  
1: Cyrville Rd & Ogilvie Rd

2031 Future Total  
AM Peak Hour

| Lane Group             | EBL | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR | SBL   | SBT   | SBR |
|------------------------|-----|-------|-------|-------|-------|-------|-------|-------|-----|-------|-------|-----|
| Lane Configurations    |     | ↑↑    | ↑     | ↑     | ↑↑    | ↑     | ↑     | ↑     | ↑   | ↑     | ↑     | ↑   |
| Traffic Volume (vph)   | 0   | 594   | 230   | 28    | 1070  | 166   | 172   | 244   | 14  | 47    | 174   | 45  |
| Future Volume (vph)    | 0   | 594   | 230   | 28    | 1070  | 166   | 172   | 244   | 14  | 47    | 174   | 45  |
| Satd. Flow (prot)      | 0   | 3283  | 1414  | 1658  | 3316  | 1441  | 1551  | 1714  | 0   | 1626  | 1605  | 0   |
| Fit Permitted          |     |       |       | 0.414 |       |       | 0.497 |       |     | 0.423 |       |     |
| Satd. Flow (perm)      | 0   | 3283  | 1329  | 714   | 3316  | 1319  | 808   | 1714  | 0   | 722   | 1605  | 0   |
| Satd. Flow (RTOR)      |     |       | 230   |       |       | 166   |       | 3     |     |       | 12    |     |
| Lane Group Flow (vph)  | 0   | 594   | 230   | 28    | 1070  | 166   | 172   | 258   | 0   | 47    | 219   | 0   |
| Turn Type              | NA  | Perm  | Perm  | NA    | Perm  | Perm  | NA    | Perm  | NA  | Perm  | NA    |     |
| Protected Phases       |     | 2     |       | 6     |       | 6     | 8     |       | 8   |       | 4     |     |
| Permitted Phases       |     |       | 2     | 6     |       | 6     | 8     |       | 8   |       | 4     |     |
| Detector Phase         |     | 2     | 2     | 6     | 6     | 6     | 8     | 8     |     | 4     | 4     |     |
| Switch Phase           |     |       |       |       |       |       |       |       |     |       |       |     |
| Minimum Initial (s)    |     | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  |     | 10.0  | 10.0  |     |
| Minimum Split (s)      |     | 32.2  | 32.2  | 32.2  | 32.2  | 32.2  | 47.1  | 47.1  |     | 47.1  | 47.1  |     |
| Total Split (s)        |     | 72.9  | 72.9  | 72.9  | 72.9  | 72.9  | 47.1  | 47.1  |     | 47.1  | 47.1  |     |
| Total Split (%)        |     | 60.8% | 60.8% | 60.8% | 60.8% | 60.8% | 39.3% | 39.3% |     | 39.3% | 39.3% |     |
| Yellow Time (s)        |     | 3.7   | 3.7   | 3.7   | 3.7   | 3.7   | 3.7   | 3.7   |     | 3.7   | 3.7   |     |
| All-Red Time (s)       |     | 2.5   | 2.5   | 2.5   | 2.5   | 2.5   | 3.4   | 3.4   |     | 3.4   | 3.4   |     |
| Lost Time Adjust (s)   |     | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     | 0.0   | 0.0   |     |
| Total Lost Time (s)    |     | 6.2   | 6.2   | 6.2   | 6.2   | 6.2   | 7.1   | 7.1   |     | 7.1   | 7.1   |     |
| Lead/Lag               |     |       |       |       |       |       |       |       |     |       |       |     |
| Lead-Lag Optimize?     |     |       |       |       |       |       |       |       |     |       |       |     |
| Recall Mode            |     | C-Max | C-Max | C-Max | C-Max | C-Max | None  | None  |     | None  | None  |     |
| Act Effct Green (s)    |     | 78.6  | 78.6  | 78.6  | 78.6  | 78.6  | 28.1  | 28.1  |     | 28.1  | 28.1  |     |
| Actuated g/C Ratio     |     | 0.66  | 0.66  | 0.66  | 0.66  | 0.66  | 0.23  | 0.23  |     | 0.23  | 0.23  |     |
| v/c Ratio              |     | 0.28  | 0.24  | 0.06  | 0.49  | 0.18  | 0.91  | 0.64  |     | 0.28  | 0.57  |     |
| Control Delay          |     | 10.3  | 2.2   | 4.5   | 4.8   | 0.4   | 88.8  | 46.9  |     | 38.3  | 42.5  |     |
| Queue Delay            |     | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     | 0.0   | 0.0   |     |
| Total Delay            |     | 10.3  | 2.2   | 4.5   | 4.8   | 0.4   | 88.8  | 46.9  |     | 38.3  | 42.5  |     |
| LOS                    |     | B     | A     | A     | A     | A     | F     | D     |     | D     | D     |     |
| Approach Delay         |     | 8.0   |       |       | 4.2   |       | 63.6  |       |     | 41.8  |       |     |
| Approach LOS           |     | A     |       |       | A     |       | E     |       |     | D     |       |     |
| Queue Length 50th (m)  |     | 28.6  | 0.0   | 0.8   | 16.0  | 0.2   | 39.5  | 54.3  |     | 9.1   | 43.2  |     |
| Queue Length 95th (m)  |     | 49.6  | 10.8  | m1.2  | 20.3  | m0.2  | 60.3  | 71.3  |     | 17.7  | 59.2  |     |
| Internal Link Dist (m) |     | 113.5 |       |       | 313.9 |       | 191.2 |       |     | 190.6 |       |     |
| Turn Bay Length (m)    |     |       |       | 62.0  |       | 71.0  | 33.5  |       |     | 82.0  |       |     |
| Base Capacity (vph)    |     | 2149  | 949   | 467   | 2171  | 920   | 269   | 573   |     | 240   | 543   |     |
| Starvation Cap Reductn |     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |     | 0     | 0     |     |
| Spillback Cap Reductn  |     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |     | 0     | 0     |     |
| Storage Cap Reductn    |     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |     | 0     | 0     |     |
| Reduced v/c Ratio      |     | 0.28  | 0.24  | 0.06  | 0.49  | 0.18  | 0.64  | 0.45  |     | 0.20  | 0.40  |     |

Intersection Summary

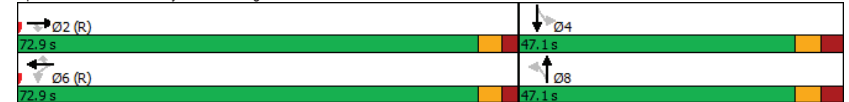
|   |
|---|
| Cycle Length: 120   |
| Actuated Cycle Length: 120  |
| Offset: 10 (8%), Referenced to phase 2:EBT and 6:WBTL, Start of Green |
| Natural Cycle: 80   |
| Control Type: Actuated-Coordinated                                    |

Lanes, Volumes, Timings  
1: Cyrville Rd & Ogilvie Rd

2031 Future Total  
AM Peak Hour

|   |                                 |                     |
|---|---------------------------------|---------------------|
| Maximum v/c Ratio: 0.91   | Intersection Signal Delay: 18.1 | Intersection LOS: B |
| Intersection Capacity Utilization 75.8%                           | ICU Level of Service D          |                     |
| Analysis Period (min) 15  |                                 |                     |
| m Volume for 95th percentile queue is metered by upstream signal. |                                 |                     |

Splits and Phases: 1: Cyrville Rd & Ogilvie Rd



Lanes, Volumes, Timings  
2: Cummings Ave & Donald

2031 Future Total  
AM Peak Hour

| Lane Group             | EBL   | EBR   | NBL   | NBT   | SBT   | SBR |
|------------------------|-------|-------|-------|-------|-------|-----|
| Lane Configurations    |       |       |       |       |       |     |
| Traffic Volume (vph)   | 42    | 175   | 260   | 130   | 220   | 104 |
| Future Volume (vph)    | 42    | 175   | 260   | 130   | 220   | 104 |
| Satd. Flow (prot)      | 1610  | 1469  | 1642  | 1695  | 1611  | 0   |
| Fit Permitted          | 0.950 |       | 0.564 |       |       |     |
| Satd. Flow (perm)      | 1532  | 1382  | 960   | 1695  | 1611  | 0   |
| Satd. Flow (RTOR)      |       | 175   |       |       | 59    |     |
| Lane Group Flow (vph)  | 42    | 175   | 260   | 130   | 324   | 0   |
| Turn Type              | Perm  | Perm  | Perm  | NA    | NA    |     |
| Protected Phases       |       |       |       | 2     | 6     |     |
| Permitted Phases       | 4     | 4     | 2     |       |       |     |
| Detector Phase         | 4     | 4     | 2     | 2     | 6     |     |
| Switch Phase           |       |       |       |       |       |     |
| Minimum Initial (s)    | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  |     |
| Minimum Split (s)      | 22.0  | 22.0  | 39.9  | 39.9  | 39.9  |     |
| Total Split (s)        | 22.0  | 22.0  | 98.0  | 98.0  | 98.0  |     |
| Total Split (%)        | 18.3% | 18.3% | 81.7% | 81.7% | 81.7% |     |
| Yellow Time (s)        | 3.3   | 3.3   | 3.3   | 3.3   | 3.3   |     |
| All-Red Time (s)       | 2.7   | 2.7   | 3.6   | 3.6   | 3.6   |     |
| Lost Time Adjust (s)   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     |
| Total Lost Time (s)    | 6.0   | 6.0   | 6.9   | 6.9   | 6.9   |     |
| Lead/Lag               |       |       |       |       |       |     |
| Lead-Lag Optimize?     |       |       |       |       |       |     |
| Recall Mode            | None  | None  | Min   | Min   | Min   |     |
| Act Effct Green (s)    | 11.3  | 11.3  | 19.8  | 19.8  | 19.8  |     |
| Actuated g/C Ratio     | 0.25  | 0.25  | 0.44  | 0.44  | 0.44  |     |
| v/c Ratio              | 0.11  | 0.36  | 0.61  | 0.17  | 0.43  |     |
| Control Delay          | 15.0  | 5.9   | 16.5  | 8.1   | 8.8   |     |
| Queue Delay            | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     |
| Total Delay            | 15.0  | 5.9   | 16.5  | 8.1   | 8.8   |     |
| LOS                    | B     | A     | B     | A     | A     |     |
| Approach Delay         | 7.7   |       |       | 13.7  | 8.8   |     |
| Approach LOS           | A     |       |       | B     | A     |     |
| Queue Length 50th (m)  | 2.0   | 0.0   | 12.8  | 5.1   | 11.3  |     |
| Queue Length 95th (m)  | 10.1  | 12.3  | 35.5  | 14.0  | 29.4  |     |
| Internal Link Dist (m) | 296.9 |       |       | 132.3 | 259.3 |     |
| Turn Bay Length (m)    | 60.0  |       | 60.0  |       |       |     |
| Base Capacity (vph)    | 572   | 626   | 960   | 1695  | 1611  |     |
| Starvation Cap Reductn | 0     | 0     | 0     | 0     | 0     |     |
| Spillback Cap Reductn  | 0     | 0     | 0     | 0     | 0     |     |
| Storage Cap Reductn    | 0     | 0     | 0     | 0     | 0     |     |
| Reduced v/c Ratio      | 0.07  | 0.28  | 0.27  | 0.08  | 0.20  |     |

| Intersection Summary   |                        |
|------------------------|------------------------|
| Cycle Length:          | 120                    |
| Actuated Cycle Length: | 44.5                   |
| Natural Cycle:         | 65                     |
| Control Type:          | Actuated-Uncoordinated |
| Maximum v/c Ratio:     | 0.61                   |

Lanes, Volumes, Timings  
2: Cummings Ave & Donald

2031 Future Total  
AM Peak Hour

|   |                        |
|---|------------------------|
| Intersection Signal Delay: 10.6         | Intersection LOS: B    |
| Intersection Capacity Utilization 63.7% | ICU Level of Service B |
| Analysis Period (min) 15                |                        |

Splits and Phases: 2: Cummings Ave & Donald





Lanes, Volumes, Timings  
3: Cummings Ave & Ogilvie Rd

2031 Future Total  
AM Peak Hour

| Lane Group             | EBL   | EBT   | EBR | WBL   | WBT   | WBR | NBL   | NBT   | NBR | SBL   | SBT   | SBR |
|------------------------|-------|-------|-----|-------|-------|-----|-------|-------|-----|-------|-------|-----|
| Lane Configurations    | ↔     | ↕     | ↔   | ↔     | ↕     | ↔   | ↔     | ↕     | ↔   | ↔     | ↕     | ↔   |
| Traffic Volume (vph)   | 54    | 608   | 11  | 174   | 1112  | 171 | 64    | 130   | 69  | 140   | 140   | 120 |
| Future Volume (vph)    | 54    | 608   | 11  | 174   | 1112  | 171 | 64    | 130   | 69  | 140   | 140   | 120 |
| Satd. Flow (prot)      | 1626  | 3266  | 0   | 1626  | 3195  | 0   | 1658  | 1517  | 0   | 1626  | 1609  | 0   |
| Fit Permitted          | 0.111 |       |     | 0.353 |       |     | 0.599 |       |     | 0.439 |       |     |
| Satd. Flow (perm)      | 190   | 3266  | 0   | 595   | 3195  | 0   | 1041  | 1517  | 0   | 721   | 1609  | 0   |
| Satd. Flow (RTOR)      |       | 2     |     |       | 19    |     |       | 21    |     |       | 39    |     |
| Lane Group Flow (vph)  | 54    | 619   | 0   | 174   | 1283  | 0   | 64    | 199   | 0   | 140   | 260   | 0   |
| Turn Type              | pm+pt | NA    |     | pm+pt | NA    |     | Perm  | NA    |     | pm+pt | NA    |     |
| Protected Phases       | 5     | 2     |     | 1     | 6     |     | 8     |       |     | 7     | 4     |     |
| Permitted Phases       | 2     |       |     | 6     |       |     | 8     |       |     | 4     |       |     |
| Detector Phase         | 5     | 2     |     | 1     | 6     |     | 8     | 8     |     | 7     | 4     |     |
| Switch Phase           |       |       |     |       |       |     |       |       |     |       |       |     |
| Minimum Initial (s)    | 5.0   | 10.0  |     | 5.0   | 10.0  |     | 10.0  | 10.0  |     | 5.0   | 10.0  |     |
| Minimum Split (s)      | 9.7   | 24.7  |     | 9.7   | 24.7  |     | 36.6  | 36.6  |     | 9.3   | 36.6  |     |
| Total Split (s)        | 11.0  | 61.0  |     | 11.0  | 61.0  |     | 36.6  | 36.6  |     | 11.4  | 48.0  |     |
| Total Split (%)        | 9.2%  | 50.8% |     | 9.2%  | 50.8% |     | 30.5% | 30.5% |     | 9.5%  | 40.0% |     |
| Yellow Time (s)        | 3.7   | 3.7   |     | 3.7   | 3.7   |     | 3.3   | 3.3   |     | 3.3   | 3.3   |     |
| All-Red Time (s)       | 1.0   | 2.0   |     | 1.0   | 2.0   |     | 3.3   | 3.3   |     | 1.0   | 3.3   |     |
| Lost Time Adjust (s)   | 0.0   | 0.0   |     | 0.0   | 0.0   |     | 0.0   | 0.0   |     | 0.0   | 0.0   |     |
| Total Lost Time (s)    | 4.7   | 5.7   |     | 4.7   | 5.7   |     | 6.6   | 6.6   |     | 4.3   | 6.6   |     |
| Lead/Lag               | Lead  | Lag   |     | Lead  | Lag   |     | Lag   | Lag   |     | Lead  |       |     |
| Lead-Lag Optimize?     | Yes   | Yes   |     | Yes   | Yes   |     | Yes   | Yes   |     | Yes   |       |     |
| Recall Mode            | None  | C-Max |     | None  | C-Max |     | None  | None  |     | None  | None  |     |
| Act Effct Green (s)    | 65.9  | 58.8  |     | 67.2  | 61.2  |     | 26.3  | 26.3  |     | 40.0  | 37.7  |     |
| Actuated g/C Ratio     | 0.55  | 0.49  |     | 0.56  | 0.51  |     | 0.22  | 0.22  |     | 0.33  | 0.31  |     |
| v/c Ratio              | 0.31  | 0.39  |     | 0.45  | 0.78  |     | 0.28  | 0.57  |     | 0.48  | 0.49  |     |
| Control Delay          | 23.7  | 18.3  |     | 17.4  | 30.1  |     | 40.3  | 42.9  |     | 34.0  | 30.4  |     |
| Queue Delay            | 0.0   | 0.0   |     | 0.0   | 0.0   |     | 0.0   | 0.0   |     | 0.0   | 0.0   |     |
| Total Delay            | 23.7  | 18.3  |     | 17.4  | 30.1  |     | 40.3  | 42.9  |     | 34.0  | 30.4  |     |
| LOS                    | C     | B     |     | B     | C     |     | D     | D     |     | C     | C     |     |
| Approach Delay         |       | 18.7  |     |       | 28.6  |     |       | 42.2  |     |       | 31.7  |     |
| Approach LOS           |       | B     |     |       | C     |     |       | D     |     |       | C     |     |
| Queue Length 50th (m)  | 5.0   | 38.8  |     | 19.2  | 137.5 |     | 12.1  | 36.0  |     | 22.7  | 39.8  |     |
| Queue Length 95th (m)  | 18.2  | 49.5  |     | 31.1  | 169.7 |     | 24.5  | 59.5  |     | 38.2  | 64.0  |     |
| Internal Link Dist (m) |       | 313.9 |     |       | 184.8 |     |       | 136.9 |     |       | 81.8  |     |
| Turn Bay Length (m)    | 80.0  |       |     | 100.0 |       |     | 34.0  |       |     | 153.0 |       |     |
| Base Capacity (vph)    | 179   | 1600  |     | 389   | 1637  |     | 260   | 395   |     | 294   | 580   |     |
| Starvation Cap Reductn | 0     | 0     |     | 0     | 0     |     | 0     | 0     |     | 0     | 0     |     |
| Spillback Cap Reductn  | 0     | 0     |     | 0     | 0     |     | 0     | 0     |     | 0     | 0     |     |
| Storage Cap Reductn    | 0     | 0     |     | 0     | 0     |     | 0     | 0     |     | 0     | 0     |     |
| Reduced v/c Ratio      | 0.30  | 0.39  |     | 0.45  | 0.78  |     | 0.25  | 0.50  |     | 0.48  | 0.45  |     |

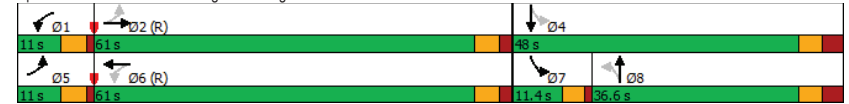
| Intersection Summary   |  |
|------------------------|--|
| Cycle Length:          | 120  |
| Actuated Cycle Length: | 120  |
| Offset:                | 110 (92%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green |
| Natural Cycle:         | 95   |
| Control Type:          | Actuated-Coordinated   |

Lanes, Volumes, Timings  
3: Cummings Ave & Ogilvie Rd

2031 Future Total  
AM Peak Hour

|   |                        |
|---|------------------------|
| Maximum v/c Ratio: 0.78                 | Intersection LOS: C    |
| Intersection Signal Delay: 27.9         | ICU Level of Service F |
| Intersection Capacity Utilization 91.5% |                        |
| Analysis Period (min) 15                |                        |

Splits and Phases: 3: Cummings Ave & Ogilvie Rd



HCM 2010 TWSC  
4: Cummings Ave & Site Access

2031 Future Total  
AM Peak Hour

| Intersection             |             |        |        |      |      |      |
|--------------------------|-------------|--------|--------|------|------|------|
| Int Delay, s/veh         | 0.2         |        |        |      |      |      |
| Movement                 | EBL         | EBR    | NBL    | NBT  | SBT  | SBR  |
| Lane Configurations      | ↔ ↗ ↘ ↖ ↗ ↘ |        |        |      |      |      |
| Traffic Vol, veh/h       | 2           | 10     | 4      | 336  | 382  | 1    |
| Future Vol, veh/h        | 2           | 10     | 4      | 336  | 382  | 1    |
| Conflicting Peds, #/hr   | 0           | 0      | 0      | 0    | 0    | 0    |
| Sign Control             | Stop        | Stop   | Free   | Free | Free | Free |
| RT Channelized           | -           | None   | -      | None | -    | None |
| Storage Length           | 0           | -      | -      | -    | -    | -    |
| Veh in Median Storage, # | 0           | -      | -      | 0    | 0    | -    |
| Grade, %                 | 0           | -      | -      | 0    | 0    | -    |
| Peak Hour Factor         | 100         | 100    | 100    | 100  | 100  | 100  |
| Heavy Vehicles, %        | 2           | 2      | 2      | 2    | 2    | 2    |
| Mvmt Flow                | 2           | 10     | 4      | 336  | 382  | 1    |
| Major/Minor              | Minor2      | Major1 | Major2 |      |      |      |
| Conflicting Flow All     | 727         | 383    | 383    | 0    | -    | 0    |
| Stage 1                  | 383         | -      | -      | -    | -    | -    |
| Stage 2                  | 344         | -      | -      | -    | -    | -    |
| Critical Hdwy            | 6.42        | 6.22   | 4.12   | -    | -    | -    |
| Critical Hdwy Stg 1      | 5.42        | -      | -      | -    | -    | -    |
| Critical Hdwy Stg 2      | 5.42        | -      | -      | -    | -    | -    |
| Follow-up Hdwy           | 3.518       | 3.318  | 2.218  | -    | -    | -    |
| Pot Cap-1 Maneuver       | 391         | 664    | 1175   | -    | -    | -    |
| Stage 1                  | 689         | -      | -      | -    | -    | -    |
| Stage 2                  | 718         | -      | -      | -    | -    | -    |
| Platoon blocked, %       | -           | -      | -      | -    | -    | -    |
| Mov Cap-1 Maneuver       | 389         | 664    | 1175   | -    | -    | -    |
| Mov Cap-2 Maneuver       | 389         | -      | -      | -    | -    | -    |
| Stage 1                  | 686         | -      | -      | -    | -    | -    |
| Stage 2                  | 718         | -      | -      | -    | -    | -    |
| Approach                 | EB          | NB     | SB     |      |      |      |
| HCM Control Delay, s     | 11.2        | 0.1    | 0      |      |      |      |
| HCM LOS                  | B           |        |        |      |      |      |
| Minor Lane/Major Mvmt    | NBL         | NBT    | EBLn1  | SBT  | SBR  |      |
| Capacity (veh/h)         | 1175        | -      | 594    | -    | -    |      |
| HCM Lane V/C Ratio       | 0.003       | -      | 0.02   | -    | -    |      |
| HCM Control Delay (s)    | 8.1         | 0      | 11.2   | -    | -    |      |
| HCM Lane LOS             | A           | A      | B      | -    | -    |      |
| HCM 95th %tile Q(veh)    | 0           | -      | 0.1    | -    | -    |      |

Lanes, Volumes, Timings  
1: Cyrville Rd & Ogilvie Rd

2031 Future Total  
PM Peak Hour

| Lane Group                              | EBL                           | EBT  | EBR   | WBL  | WBT   | WBR  | NBL   | NBT  | NBR   | SBL  | SBT   | SBR |
|---|-------------------------------|------|-------|------|-------|------|-------|------|-------|------|-------|-----|
| ↖ → ↗ ↘ ↙ ↘ ↗ ↖ ↗ ↘ ↙ ↘ ↙ ↘ ↙ ↘ ↙ ↘ ↙ ↘ |                               |      |       |      |       |      |       |      |       |      |       |     |
| Lane Configurations                     | ↔ ↗ ↘ ↖ ↗ ↘ ↖ ↗ ↘ ↖ ↗ ↘ ↖ ↗ ↘ |      |       |      |       |      |       |      |       |      |       |     |
| Traffic Volume (vph)                    | 0                             | 1099 | 262   | 44   | 693   | 124  | 122   | 240  | 34    | 134  | 222   | 80  |
| Future Volume (vph)                     | 0                             | 1099 | 262   | 44   | 693   | 124  | 122   | 240  | 34    | 134  | 222   | 80  |
| Satd. Flow (prot)                       | 0                             | 3316 | 1469  | 1658 | 3316  | 1469 | 1580  | 1707 | 0     | 1642 | 1637  | 0   |
| Fit Permitted                           | 0.216                         |      |       |      |       |      | 0.335 |      |       |      |       |     |
| Satd. Flow (perm)                       | 0                             | 3316 | 1353  | 375  | 3316  | 1303 | 555   | 1707 | 0     | 668  | 1637  | 0   |
| Satd. Flow (RTOR)                       | 262                           |      |       | 124  |       |      | 7     |      |       | 17   |       |     |
| Lane Group Flow (vph)                   | 0                             | 1099 | 262   | 44   | 693   | 124  | 122   | 274  | 0     | 134  | 302   | 0   |
| Turn Type                               | NA                            |      | Perm  |      | Perm  |      | NA    |      | Perm  |      | NA    |     |
| Protected Phases                        | 2                             |      |       |      |       |      | 6     |      |       |      |       |     |
| Permitted Phases                        | 2                             |      |       |      |       |      | 6     |      |       |      |       |     |
| Detector Phase                          | 2                             |      | 2     |      | 6     |      | 6     |      | 8     |      | 8     |     |
| Switch Phase                            |                               |      |       |      |       |      |       |      |       |      |       |     |
| Minimum Initial (s)                     | 10.0                          |      | 10.0  |      | 10.0  |      | 10.0  |      | 10.0  |      | 10.0  |     |
| Minimum Split (s)                       | 32.2                          |      | 32.2  |      | 32.2  |      | 32.2  |      | 47.1  |      | 47.1  |     |
| Total Split (s)                         | 70.0                          |      | 70.0  |      | 70.0  |      | 70.0  |      | 50.0  |      | 50.0  |     |
| Total Split (%)                         | 58.3%                         |      | 58.3% |      | 58.3% |      | 58.3% |      | 41.7% |      | 41.7% |     |
| Yellow Time (s)                         | 3.7                           |      | 3.7   |      | 3.7   |      | 3.7   |      | 3.7   |      | 3.7   |     |
| All-Red Time (s)                        | 2.5                           |      | 2.5   |      | 2.5   |      | 2.5   |      | 3.4   |      | 3.4   |     |
| Lost Time Adjust (s)                    | 0.0                           |      | 0.0   |      | 0.0   |      | 0.0   |      | 0.0   |      | 0.0   |     |
| Total Lost Time (s)                     | 6.2                           |      | 6.2   |      | 6.2   |      | 6.2   |      | 7.1   |      | 7.1   |     |
| Lead/Lag                                |                               |      |       |      |       |      |       |      |       |      |       |     |
| Lead-Lag Optimize?                      |                               |      |       |      |       |      |       |      |       |      |       |     |
| Recall Mode                             | C-Max                         |      | C-Max |      | C-Max |      | C-Max |      | None  |      | None  |     |
| Act Effct Green (s)                     | 79.1                          |      | 79.1  |      | 79.1  |      | 79.1  |      | 27.6  |      | 27.6  |     |
| Actuated g/C Ratio                      | 0.66                          |      | 0.66  |      | 0.66  |      | 0.66  |      | 0.23  |      | 0.23  |     |
| v/c Ratio                               | 0.50                          |      | 0.27  |      | 0.18  |      | 0.32  |      | 0.14  |      | 0.96  |     |
| Control Delay                           | 12.6                          |      | 2.1   |      | 21.0  |      | 17.1  |      | 8.9   |      | 114.7 |     |
| Queue Delay                             | 0.0                           |      | 0.0   |      | 0.0   |      | 0.0   |      | 0.0   |      | 0.0   |     |
| Total Delay                             | 12.6                          |      | 2.1   |      | 21.0  |      | 17.1  |      | 8.9   |      | 114.7 |     |
| LOS                                     | B                             |      | A     |      | C     |      | B     |      | A     |      | F     |     |
| Approach Delay                          | 10.6                          |      |       |      | 16.1  |      |       |      | 69.5  |      | 64.5  |     |
| Approach LOS                            | B                             |      |       |      | B     |      |       |      | E     |      | E     |     |
| Queue Length 50th (m)                   | 62.3                          |      | 0.0   |      | 5.4   |      | 45.2  |      | 5.9   |      | 28.8  |     |
| Queue Length 95th (m)                   | 106.5                         |      | 11.4  |      | m8.6  |      | m65.6 |      | m11.1 |      | #52.7 |     |
| Internal Link Dist (m)                  | 113.8                         |      |       |      | 313.9 |      |       |      | 191.2 |      | 190.4 |     |
| Turn Bay Length (m)                     |                               |      |       |      | 62.0  |      | 71.0  |      | 33.5  |      | 82.0  |     |
| Base Capacity (vph)                     | 2186                          |      | 981   |      | 247   |      | 2186  |      | 901   |      | 198   |     |
| Starvation Cap Reductn                  | 0                             |      | 0     |      | 0     |      | 0     |      | 0     |      | 0     |     |
| Spillback Cap Reductn                   | 0                             |      | 0     |      | 0     |      | 0     |      | 0     |      | 0     |     |
| Storage Cap Reductn                     | 0                             |      | 0     |      | 0     |      | 0     |      | 0     |      | 0     |     |
| Reduced v/c Ratio                       | 0.50                          |      | 0.27  |      | 0.18  |      | 0.32  |      | 0.14  |      | 0.62  |     |

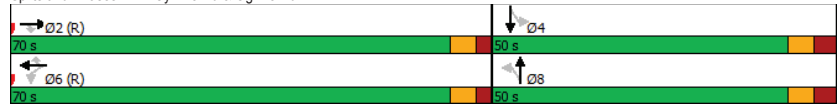
| Intersection Summary   |  |
|------------------------|--|
| Cycle Length:          | 120  |
| Actuated Cycle Length: | 120  |
| Offset:                | 20 (17%), Referenced to phase 2:EBT and 6:WBTL, Start of Green |
| Natural Cycle:         | 80   |
| Control Type:          | Actuated-Coordinated   |

Lanes, Volumes, Timings  
1: Cyrville Rd & Ogilvie Rd

2031 Future Total  
PM Peak Hour

|   |                        |
|---|------------------------|
| Maximum v/c Ratio: 0.96   | Intersection LOS: C    |
| Intersection Signal Delay: 27.5                                   | ICU Level of Service E |
| Intersection Capacity Utilization 85.3%                           |                        |
| Analysis Period (min) 15  |                        |
| # 95th percentile volume exceeds capacity, queue may be longer.   |                        |
| Queue shown is maximum after two cycles.                          |                        |
| m Volume for 95th percentile queue is metered by upstream signal. |                        |

Splits and Phases: 1: Cyrville Rd & Ogilvie Rd



Lanes, Volumes, Timings  
2: Cummings Ave & Donald

2031 Future Total  
PM Peak Hour

| Lane Group             | EBL   | EBR   | NBL   | NBT   | SBT   | SBR |
|------------------------|-------|-------|-------|-------|-------|-----|
| Lane Configurations    | ↔     | ↔     | ↔     | ↔     | ↔     | ↔   |
| Traffic Volume (vph)   | 88    | 359   | 287   | 272   | 248   | 90  |
| Future Volume (vph)    | 88    | 359   | 287   | 272   | 248   | 90  |
| Satd. Flow (prot)      | 1523  | 1483  | 1658  | 1728  | 1649  | 0   |
| Fit Permitted          | 0.950 |       | 0.557 |       |       |     |
| Satd. Flow (perm)      | 1518  | 1345  | 961   | 1728  | 1649  | 0   |
| Satd. Flow (RTOR)      |       | 359   |       |       | 34    |     |
| Lane Group Flow (vph)  | 88    | 359   | 287   | 272   | 338   | 0   |
| Turn Type              | Perm  | Perm  | Perm  | NA    | NA    |     |
| Protected Phases       |       |       |       | 2     | 6     |     |
| Permitted Phases       | 4     | 4     | 2     |       |       |     |
| Detector Phase         | 4     | 4     | 2     | 2     | 6     |     |
| Switch Phase           |       |       |       |       |       |     |
| Minimum Initial (s)    | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  |     |
| Minimum Split (s)      | 22.0  | 22.0  | 39.9  | 39.9  | 39.9  |     |
| Total Split (s)        | 31.0  | 31.0  | 89.0  | 89.0  | 89.0  |     |
| Total Split (%)        | 25.8% | 25.8% | 74.2% | 74.2% | 74.2% |     |
| Yellow Time (s)        | 3.3   | 3.3   | 3.3   | 3.3   | 3.3   |     |
| All-Red Time (s)       | 2.7   | 2.7   | 3.6   | 3.6   | 3.6   |     |
| Lost Time Adjust (s)   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     |
| Total Lost Time (s)    | 6.0   | 6.0   | 6.9   | 6.9   | 6.9   |     |
| Lead/Lag               |       |       |       |       |       |     |
| Lead-Lag Optimize?     |       |       |       |       |       |     |
| Recall Mode            | None  | None  | Min   | Min   | Min   |     |
| Act Effct Green (s)    | 11.3  | 11.3  | 19.1  | 19.1  | 19.1  |     |
| Actuated g/C Ratio     | 0.26  | 0.26  | 0.44  | 0.44  | 0.44  |     |
| v/c Ratio              | 0.23  | 0.59  | 0.69  | 0.36  | 0.46  |     |
| Control Delay          | 17.3  | 7.1   | 19.2  | 9.4   | 9.6   |     |
| Queue Delay            | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |     |
| Total Delay            | 17.3  | 7.1   | 19.2  | 9.4   | 9.6   |     |
| LOS                    | B     | A     | B     | A     | A     |     |
| Approach Delay         | 9.1   |       |       | 14.4  | 9.6   |     |
| Approach LOS           | A     |       |       | B     | A     |     |
| Queue Length 50th (m)  | 4.8   | 0.0   | 14.6  | 11.5  | 13.3  |     |
| Queue Length 95th (m)  | 18.1  | 17.9  | 40.6  | 27.7  | 32.7  |     |
| Internal Link Dist (m) | 296.3 |       |       | 141.5 | 259.3 |     |
| Turn Bay Length (m)    | 60.0  |       | 60.0  |       |       |     |
| Base Capacity (vph)    | 905   | 947   | 961   | 1728  | 1649  |     |
| Starvation Cap Reductn | 0     | 0     | 0     | 0     | 0     |     |
| Spillback Cap Reductn  | 0     | 0     | 0     | 0     | 0     |     |
| Storage Cap Reductn    | 0     | 0     | 0     | 0     | 0     |     |
| Reduced v/c Ratio      | 0.10  | 0.38  | 0.30  | 0.16  | 0.20  |     |

Intersection Summary

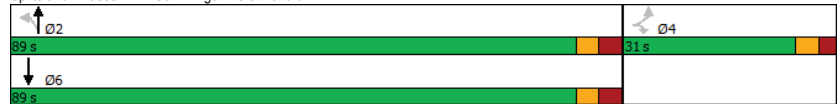
|                                |
|--------------------------------|
| Cycle Length: 120              |
| Actuated Cycle Length: 43.9    |
| Natural Cycle: 65              |
| Control Type: Semi Act-Uncoord |
| Maximum v/c Ratio: 0.69        |

Lanes, Volumes, Timings  
2: Cummings Ave & Donald

2031 Future Total  
PM Peak Hour

|   |                        |
|---|------------------------|
| Intersection Signal Delay: 11.4         | Intersection LOS: B    |
| Intersection Capacity Utilization 66.1% | ICU Level of Service C |
| Analysis Period (min) 15                |                        |

Splits and Phases: 2: Cummings Ave & Donald



Lanes, Volumes, Timings  
3: Cummings Ave & Ogilvie Rd

2031 Future Total  
PM Peak Hour

| Lane Group             | EBL   | EBT    | EBR | WBL   | WBT    | WBR | NBL   | NBT    | NBR | SBL   | SBT   | SBR |
|------------------------|-------|--------|-----|-------|--------|-----|-------|--------|-----|-------|-------|-----|
| Lane Configurations    | ↔     | ↕      | ↔   | ↔     | ↕      | ↔   | ↔     | ↕      | ↔   | ↔     | ↕     | ↔   |
| Traffic Volume (vph)   | 136   | 1161   | 23  | 127   | 756    | 211 | 62    | 194    | 219 | 259   | 179   | 89  |
| Future Volume (vph)    | 136   | 1161   | 23  | 127   | 756    | 211 | 62    | 194    | 219 | 259   | 179   | 89  |
| Satd. Flow (prot)      | 1658  | 3298   | 0   | 1626  | 3161   | 0   | 1642  | 1578   | 0   | 1658  | 1634  | 0   |
| Fit Permitted          | 0.119 |        |     | 0.095 |        |     | 0.594 |        |     | 0.168 |       |     |
| Satd. Flow (perm)      | 208   | 3298   | 0   | 163   | 3161   | 0   | 1005  | 1578   | 0   | 291   | 1634  | 0   |
| Satd. Flow (RTOR)      |       | 2      |     |       | 32     |     |       | 47     |     |       | 27    |     |
| Lane Group Flow (vph)  | 136   | 1184   | 0   | 127   | 967    | 0   | 62    | 413    | 0   | 259   | 268   | 0   |
| Turn Type              | pm+pt | NA     |     | pm+pt | NA     |     | Perm  | NA     |     | pm+pt | NA    |     |
| Protected Phases       | 5     | 2      |     | 1     | 6      |     |       | 8      |     | 7     | 4     |     |
| Permitted Phases       | 2     |        |     | 6     |        |     | 8     |        |     | 4     |       |     |
| Detector Phase         | 5     | 2      |     | 1     | 6      |     | 8     | 8      |     | 7     | 4     |     |
| Switch Phase           |       |        |     |       |        |     |       |        |     |       |       |     |
| Minimum Initial (s)    | 5.0   | 10.0   |     | 5.0   | 10.0   |     | 10.0  | 10.0   |     | 5.0   | 10.0  |     |
| Minimum Split (s)      | 9.7   | 24.7   |     | 9.7   | 24.7   |     | 36.6  | 36.6   |     | 9.3   | 36.6  |     |
| Total Split (s)        | 15.0  | 45.0   |     | 15.0  | 45.0   |     | 40.0  | 40.0   |     | 20.0  | 60.0  |     |
| Total Split (%)        | 12.5% | 37.5%  |     | 12.5% | 37.5%  |     | 33.3% | 33.3%  |     | 16.7% | 50.0% |     |
| Yellow Time (s)        | 3.7   | 3.7    |     | 3.7   | 3.7    |     | 3.3   | 3.3    |     | 3.3   | 3.3   |     |
| All-Red Time (s)       | 1.0   | 2.0    |     | 1.0   | 2.0    |     | 3.3   | 3.3    |     | 1.0   | 3.3   |     |
| Lost Time Adjust (s)   | 0.0   | 0.0    |     | 0.0   | 0.0    |     | 0.0   | 0.0    |     | 0.0   | 0.0   |     |
| Total Lost Time (s)    | 4.7   | 5.7    |     | 4.7   | 5.7    |     | 6.6   | 6.6    |     | 4.3   | 6.6   |     |
| Lead/Lag               | Lead  | Lag    |     | Lead  | Lag    |     | Lag   | Lag    |     | Lead  |       |     |
| Lead-Lag Optimize?     | Yes   | Yes    |     | Yes   | Yes    |     | Yes   | Yes    |     | Yes   |       |     |
| Recall Mode            | None  | C-Max  |     | None  | C-Max  |     | None  | None   |     | None  | None  |     |
| Act Effct Green (s)    | 52.9  | 42.2   |     | 52.6  | 42.0   |     | 31.3  | 31.3   |     | 53.6  | 51.3  |     |
| Actuated g/C Ratio     | 0.44  | 0.35   |     | 0.44  | 0.35   |     | 0.26  | 0.26   |     | 0.45  | 0.43  |     |
| v/c Ratio              | 0.65  | 1.02   |     | 0.68  | 0.86   |     | 0.24  | 0.93   |     | 0.84  | 0.38  |     |
| Control Delay          | 38.6  | 63.7   |     | 41.5  | 44.6   |     | 36.6  | 66.1   |     | 47.3  | 22.2  |     |
| Queue Delay            | 0.0   | 0.0    |     | 0.0   | 0.0    |     | 0.0   | 0.0    |     | 0.0   | 0.0   |     |
| Total Delay            | 38.6  | 63.7   |     | 41.5  | 44.6   |     | 36.6  | 66.1   |     | 47.3  | 22.2  |     |
| LOS                    | D     | E      |     | D     | D      |     | D     | E      |     | D     | C     |     |
| Approach Delay         |       | 61.1   |     |       | 44.3   |     |       | 62.2   |     |       | 34.5  |     |
| Approach LOS           |       | E      |     |       | D      |     |       | E      |     |       | C     |     |
| Queue Length 50th (m)  | 12.4  | ~167.2 |     | 17.1  | 111.5  |     | 11.2  | 83.6   |     | 37.8  | 36.5  |     |
| Queue Length 95th (m)  | #35.3 | #209.6 |     | #39.6 | #150.5 |     | 23.2  | #138.7 |     | #77.3 | 57.1  |     |
| Internal Link Dist (m) |       | 313.9  |     |       | 184.8  |     |       | 136.9  |     |       | 72.5  |     |
| Turn Bay Length (m)    | 80.0  |        |     | 100.0 |        |     | 34.0  |        |     | 153.0 |       |     |
| Base Capacity (vph)    | 217   | 1160   |     | 198   | 1127   |     | 279   | 473    |     | 308   | 742   |     |
| Starvation Cap Reductn | 0     | 0      |     | 0     | 0      |     | 0     | 0      |     | 0     | 0     |     |
| Spillback Cap Reductn  | 0     | 0      |     | 0     | 0      |     | 0     | 0      |     | 0     | 0     |     |
| Storage Cap Reductn    | 0     | 0      |     | 0     | 0      |     | 0     | 0      |     | 0     | 0     |     |
| Reduced v/c Ratio      | 0.63  | 1.02   |     | 0.64  | 0.86   |     | 0.22  | 0.87   |     | 0.84  | 0.36  |     |

Intersection Summary

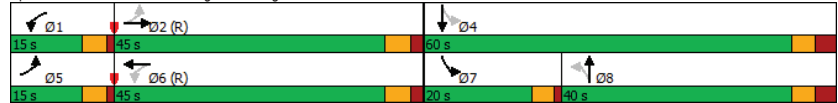
|   |
|---|
| Cycle Length: 120   |
| Actuated Cycle Length: 120  |
| Offset: 46 (38%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green |
| Natural Cycle: 105  |
| Control Type: Actuated-Coordinated                                      |

Lanes, Volumes, Timings  
3: Cummings Ave & Ogilvie Rd

2031 Future Total  
PM Peak Hour

|   |                        |
|---|------------------------|
| Maximum v/c Ratio: 1.02   | Intersection LOS: D    |
| Intersection Signal Delay: 51.8   | ICU Level of Service G |
| Intersection Capacity Utilization 100.8%  |                        |
| Analysis Period (min) 15  |                        |
| ~ Volume exceeds capacity, queue is theoretically infinite.<br>Queue shown is maximum after two cycles.     |                        |
| # 95th percentile volume exceeds capacity, queue may be longer.<br>Queue shown is maximum after two cycles. |                        |

Splits and Phases: 3: Cummings Ave & Ogilvie Rd



Lanes, Volumes, Timings  
4: Cummings Ave & Site Access

2031 Future Total  
PM Peak Hour

| Lane Group            | EBL   | EBR | NBL | NBT   | SBT  | SBR |
|-----------------------|-------|-----|-----|-------|------|-----|
| Lane Configurations   | ↔     | ↔   | ↔   | ↕     | ↕    | ↔   |
| Traffic Volume (vph)  | 1     | 6   | 9   | 522   | 510  | 2   |
| Future Volume (vph)   | 1     | 6   | 9   | 522   | 510  | 2   |
| Satd. Flow (prot)     | 1532  | 0   | 0   | 1743  | 1743 | 0   |
| Fit Permitted         | 0.993 |     |     | 0.999 |      |     |
| Satd. Flow (perm)     | 1532  | 0   | 0   | 1743  | 1743 | 0   |
| Lane Group Flow (vph) | 7     | 0   | 0   | 531   | 512  | 0   |
| Sign Control          | Stop  |     |     | Free  | Free |     |

| Intersection Summary                    |                        |
|---|------------------------|
| Control Type: Unsignalized              |                        |
| Intersection Capacity Utilization 46.6% | ICU Level of Service A |
| Analysis Period (min) 15                |                        |

| Intersection             |        |        |        |      |      |      |
|--------------------------|--------|--------|--------|------|------|------|
| Int Delay, s/veh         | 0.1    |        |        |      |      |      |
| Movement                 | EBL    | EBR    | NBL    | NBT  | SBT  | SBR  |
| Lane Configurations      | ↔      |        |        | ↔    | ↔    |      |
| Traffic Vol, veh/h       | 1      | 6      | 9      | 522  | 510  | 2    |
| Future Vol, veh/h        | 1      | 6      | 9      | 522  | 510  | 2    |
| Conflicting Peds, #/hr   | 0      | 0      | 0      | 0    | 0    | 0    |
| Sign Control             | Stop   | Stop   | Free   | Free | Free | Free |
| RT Channelized           | -      | None   | -      | None | -    | None |
| Storage Length           | 0      | -      | -      | -    | -    | -    |
| Veh in Median Storage, # | 0      | -      | -      | 0    | 0    | -    |
| Grade, %                 | 0      | -      | -      | 0    | 0    | -    |
| Peak Hour Factor         | 100    | 100    | 100    | 100  | 100  | 100  |
| Heavy Vehicles, %        | 2      | 2      | 2      | 2    | 2    | 2    |
| Mvmt Flow                | 1      | 6      | 9      | 522  | 510  | 2    |
| Major/Minor              | Minor2 | Major1 | Major2 |      |      |      |
| Conflicting Flow All     | 1051   | 511    | 512    | 0    | -    | 0    |
| Stage 1                  | 511    | -      | -      | -    | -    | -    |
| Stage 2                  | 540    | -      | -      | -    | -    | -    |
| Critical Hdwy            | 6.42   | 6.22   | 4.12   | -    | -    | -    |
| Critical Hdwy Stg 1      | 5.42   | -      | -      | -    | -    | -    |
| Critical Hdwy Stg 2      | 5.42   | -      | -      | -    | -    | -    |
| Follow-up Hdwy           | 3.518  | 3.318  | 2.218  | -    | -    | -    |
| Pot Cap-1 Maneuver       | 251    | 563    | 1053   | -    | -    | -    |
| Stage 1                  | 602    | -      | -      | -    | -    | -    |
| Stage 2                  | 584    | -      | -      | -    | -    | -    |
| Platoon blocked, %       | -      | -      | -      | -    | -    | -    |
| Mov Cap-1 Maneuver       | 248    | 563    | 1053   | -    | -    | -    |
| Mov Cap-2 Maneuver       | 248    | -      | -      | -    | -    | -    |
| Stage 1                  | 595    | -      | -      | -    | -    | -    |
| Stage 2                  | 584    | -      | -      | -    | -    | -    |
| Approach                 | EB     | NB     | SB     |      |      |      |
| HCM Control Delay, s     | 12.7   | 0.1    | 0      |      |      |      |
| HCM LOS                  | B      |        |        |      |      |      |
| Minor Lane/Major Mvmt    | NBL    | NBT    | EBLn1  | SBT  | SBR  |      |
| Capacity (veh/h)         | 1053   | -      | 477    | -    | -    |      |
| HCM Lane V/C Ratio       | 0.009  | -      | 0.015  | -    | -    |      |
| HCM Control Delay (s)    | 8.4    | 0      | 12.7   | -    | -    |      |
| HCM Lane LOS             | A      | A      | B      | -    | -    |      |
| HCM 95th %tile Q(veh)    | 0      | -      | 0      | -    | -    |      |

# Appendix K

MMLOS Analysis

**Multi-Modal Level of Service - Intersections Form**

|            |                        |         |          |
|------------|------------------------|---------|----------|
| Consultant | CGH Transportation Inc | Project | 2022-168 |
| Scenario   | Existing/Future        | Date    | 4/5/2023 |
| Comments   |                        |         |          |

| INTERSECTIONS            |  | Ogilvie Road at Cyrville Road    |                                   |                                   |                                   | Donald Street at Cummings Avenue |                             |                   |                             | Ogilvie Road at Cummings Avenue |                             |                                   |                                   |
|--------------------------|--|----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|----------------------------------|-----------------------------|-------------------|-----------------------------|---------------------------------|-----------------------------|-----------------------------------|-----------------------------------|
| Crossing Side            |  | NORTH                            | SOUTH                             | EAST                              | WEST                              | NORTH                            | SOUTH                       | EAST              | WEST                        | NORTH                           | SOUTH                       | EAST                              | WEST                              |
| Pedestrian               | Lanes  | 9                                | 6                                 | 10+                               | 9                                 | 4                                | 4                           |                   | 6                           | 5                               | 7                           | 6                                 | 8                                 |
|                          | Median   | No Median - 2.4 m                | No Median - 2.4 m                 | No Median - 2.4 m                 | No Median - 2.4 m                 | No Median - 2.4 m                | No Median - 2.4 m           |                   | No Median - 2.4 m           | No Median - 2.4 m               | No Median - 2.4 m           | No Median - 2.4 m                 | No Median - 2.4 m                 |
|                          | Conflicting Left Turns                                   | No left turn / Prohib.           | Permissive                        | Permissive                        | Permissive                        | Permissive                       | No left turn / Prohib.      |                   | Permissive                  | Protected/<br>Permissive        | Protected/<br>Permissive    | Protected/<br>Permissive          | Permissive                        |
|                          | Conflicting Right Turns                                  | Permissive or yield control      | Permissive or yield control       | Permissive or yield control       | Permissive or yield control       | No right turn                    | Permissive or yield control |                   | Permissive or yield control | Permissive or yield control     | Permissive or yield control | Permissive or yield control       | Permissive or yield control       |
|                          | Right Turns on Red (RTor) ?                              | RTOR allowed                     | RTOR allowed                      | RTOR allowed                      | RTOR allowed                      | RTOR allowed                     | RTOR allowed                |                   | RTOR allowed                | RTOR allowed                    | RTOR allowed                | RTOR allowed                      | RTOR allowed                      |
|                          | Ped Signal Leading Interval?                             | No                               | No                                | No                                | No                                | No                               | No                          |                   | No                          | No                              | No                          | No                                | No                                |
|                          | Right Turn Channel                                       | Conventional with Receiving Lane | No Channel                        | No Channel                        | No Channel                        | No Channel                       | No Right Turn               |                   | No Channel                  | Conv'tl without Receiving Lane  | No Channel                  | No Channel                        | No Channel                        |
|                          | Corner Radius  | 5-10m                            | 5-10m                             | 15-25m                            | 15-25m                            | 10-15m                           | No Right Turn               |                   | 10-15m                      | 15-25m                          | 5-10m                       | 5-10m                             | 5-10m                             |
|                          | Crosswalk Type   | Std transverse markings          | Std transverse markings           | Std transverse markings           | Std transverse markings           | Std transverse markings          | Std transverse markings     |                   | Std transverse markings     | Std transverse markings         | Std transverse markings     | Std transverse markings           | Std transverse markings           |
|                          | PETSI Score  | -19                              | 21                                | -47                               | -31                               | 58                               | 71                          |                   | 20                          | 37                              | 6                           | 21                                | -11                               |
|                          | Ped. Exposure to Traffic LoS                             | F                                | F                                 | F                                 | F                                 | D                                | C                           |                   | F                           | E                               | F                           | F                                 | F                                 |
|                          | Cycle Length   | 120                              | 120                               | 120                               | 120                               | 120                              | 120                         |                   | 120                         | 120                             | 120                         | 120                               | 120                               |
| Effective Walk Time      | 7  | 7                                | 47                                | 47                                | 63                                | 82                               |                             | 7                 | 18                          | 6                               | 27                          | 27                                |                                   |
| Average Pedestrian Delay | 53   | 53                               | 22                                | 22                                | 14                                | 6                                |                             | 53                | 43                          | 54                              | 36                          | 36                                |                                   |
| Pedestrian Delay LoS     | E  | E                                | C                                 | C                                 | B                                 | A                                |                             | E                 | E                           | E                               | D                           | D                                 |                                   |
| Level of Service         | F  | F                                | F                                 | F                                 | D                                 | C                                |                             | F                 | E                           | F                               | F                           | F                                 |                                   |
| Approach From            |  | NORTH                            | SOUTH                             | EAST                              | WEST                              | NORTH                            | SOUTH                       | EAST              | WEST                        | NORTH                           | SOUTH                       | EAST                              | WEST                              |
| Bicycle                  | Bicycle Lane Arrangement on Approach                     | Mixed Traffic                    | Curb Bike Lane, Cycletrack or MUP | Curb Bike Lane, Cycletrack or MUP | Curb Bike Lane, Cycletrack or MUP | Mixed Traffic                    |                             |                   | Mixed Traffic               | Mixed Traffic                   | Mixed Traffic               | Curb Bike Lane, Cycletrack or MUP | Curb Bike Lane, Cycletrack or MUP |
|                          | Right Turn Lane Configuration                            |                                  |                                   |                                   |                                   |                                  |                             |                   |                             |                                 |                             |                                   |                                   |
|                          | Right Turning Speed                                      |                                  |                                   |                                   |                                   |                                  |                             |                   |                             |                                 |                             |                                   |                                   |
|                          | Cyclist relative to RT motorists                         | #N/A                             | Not Applicable                    | Not Applicable                    | Not Applicable                    | #N/A                             | -                           | -                 | #N/A                        | #N/A                            | #N/A                        | Not Applicable                    | Not Applicable                    |
|                          | Separated or Mixed Traffic                               | Mixed Traffic                    | Separated                         | Separated                         | Separated                         | Mixed Traffic                    | -                           | -                 | Mixed Traffic               | Mixed Traffic                   | Mixed Traffic               | Separated                         | Separated                         |
|                          | Left Turn Approach                                       | One lane crossed                 | 1 lane crossed                    |                                   | ≥ 2 lanes crossed                 |                                  | One lane crossed            |                   | One lane crossed            | One lane crossed                | One lane crossed            | ≥ 2 lanes crossed                 | ≥ 2 lanes crossed                 |
| Operating Speed          | ≥ 60 km/h  | ≥ 60 km/h                        |                                   | ≥ 60 km/h                         |                                   | > 50 to < 60 km/h                |                             | > 50 to < 60 km/h | > 50 to < 60 km/h           | > 50 to < 60 km/h               | > 50 to < 60 km/h           | > 50 to < 60 km/h                 |                                   |
| Left Turning Cyclist     | F  | E                                | -                                 | F                                 | -                                 | E                                | -                           | E                 | E                           | E                               | F                           | F                                 |                                   |
| Level of Service         | #N/A   | E                                | -                                 | F                                 | #N/A                              | -                                | -                           | #N/A              | #N/A                        | #N/A                            | F                           | F                                 |                                   |
| Level of Service         |  | F                                |                                   |                                   |                                   | E                                |                             |                   |                             | F                               |                             |                                   |                                   |
| Transit                  | Average Signal Delay                                     |                                  |                                   | ≤ 20 sec                          | ≤ 20 sec                          |                                  |                             |                   |                             |                                 |                             | > 40 sec                          | > 40 sec                          |
|                          | Level of Service   | -                                | -                                 | C                                 | C                                 | -                                | -                           | -                 | -                           | -                               | -                           | F                                 | F                                 |
| Truck                    | Effective Corner Radius                                  | > 15 m                           | > 15 m                            | > 15 m                            | > 15 m                            | > 15 m                           |                             |                   | > 15 m                      | > 15 m                          | > 15 m                      | > 15 m                            | > 15 m                            |
|                          | Number of Receiving Lanes on Departure from Intersection | ≥ 2                              | ≥ 2                               | 1                                 | 1                                 | 1                                |                             |                   | 1                           | ≥ 2                             | ≥ 2                         | 1                                 | 1                                 |
|                          | Level of Service   | A                                | A                                 | C                                 | C                                 | C                                | -                           | -                 | C                           | A                               | A                           | C                                 | C                                 |
| Level of Service         |  | C                                |                                   |                                   |                                   | C                                |                             |                   |                             | C                               |                             |                                   |                                   |
| Auto                     | Volume to Capacity Ratio                                 | 0.61 - 0.70                      |                                   |                                   |                                   | 0.0 - 0.60                       |                             |                   |                             | 0.91 - 1.00                     |                             |                                   |                                   |
|                          | Level of Service   | B                                |                                   |                                   |                                   | A                                |                             |                   |                             | E                               |                             |                                   |                                   |



### Multi-Modal Level of Service - Segments Form

|            |                        |         |          |
|------------|------------------------|---------|----------|
| Consultant | CGH Transportation Inc | Project | 2022-168 |
| Scenario   | Existing               | Date    | 4/5/2024 |
| Comments   |                        |         |          |

| SEGMENTS                                  |   |   | Cummings Ave        | Section 2 | Section 3 |
|---|---|---|---------------------|-----------|-----------|
|   |   |   | 1                   | 2         | 3         |
| Pedestrian                                | Sidewalk Width                              | - | ≥ 2 m               |           |           |
|   | Boulevard Width                             |   | < 0.5               |           |           |
|   | Avg Daily Curb Lane Traffic Volume          |   | > 3000              |           |           |
|   | Operating Speed                             |   | > 50 to 60 km/h     |           |           |
|   | On-Street Parking                           |   | no                  |           |           |
|   | <b>Exposure to Traffic PLoS</b>             |   | <b>E</b>            | -         | -         |
|   | Effective Sidewalk Width                    |   |                     |           |           |
| Pedestrian Volume                         |   |   |                     |           |           |
| <b>Crowding PLoS</b>                      | <b>-</b>                                    | - | -                   |           |           |
| <b>Level of Service</b>                   | <b>-</b>                                    | - | -                   |           |           |
| Bicycle                                   | Type of Cycling Facility                    | D | Mixed Traffic       |           |           |
|   | Number of Travel Lanes                      |   | ≤ 2 (no centreline) |           |           |
|   | Operating Speed                             |   | ≥ 50 to 60 km/h     |           |           |
|   | <b># of Lanes &amp; Operating Speed LoS</b> |   | <b>D</b>            | -         | -         |
|   | Bike Lane (+ Parking Lane) Width            |   |                     |           |           |
|   | <b>Bike Lane Width LoS</b>                  |   | <b>-</b>            | -         | -         |
|   | Bike Lane Blockages                         |   |                     |           |           |
|   | <b>Blockage LoS</b>                         |   | <b>-</b>            | -         | -         |
|   | Median Refuge Width (no median = < 1.8 m)   |   | < 1.8 m refuge      |           |           |
|   | No. of Lanes at Unsignalized Crossing       |   | ≤ 3 lanes           |           |           |
| Sidestreet Operating Speed                | >50 to 60 km/h                              |   |                     |           |           |
| <b>Unsignalized Crossing - Lowest LoS</b> | <b>C</b>                                    | - | -                   |           |           |
| <b>Level of Service</b>                   | <b>D</b>                                    | - | -                   |           |           |
| Transit                                   | Facility Type                               | D | Mixed Traffic       |           |           |
|   | Friction or Ratio Transit:Posted Speed      |   | Vt/Vp ≥ 0.8         |           |           |
|   | <b>Level of Service</b>                     |   | <b>D</b>            | -         | -         |
| Truck                                     | Truck Lane Width                            | C | ≤ 3.5 m             |           |           |
|   | Travel Lanes per Direction                  |   | 1                   |           |           |
|   | <b>Level of Service</b>                     |   | <b>C</b>            | -         | -         |

# Appendix L

TDM Checklist

**TDM Measures Checklist:**  
*Residential Developments (multi-family, condominium or subdivision)*

| Legend        |  |
|---------------|--|
| <b>BASIC</b>  | The measure is generally feasible and effective, and in most cases would benefit the development and its users |
| <b>BETTER</b> | The measure could maximize support for users of sustainable modes, and optimize development performance        |
| <b>★</b>      | The measure is one of the most dependably effective tools to encourage the use of sustainable modes            |

| TDM measures: Residential developments                              |   | Check if proposed & add descriptions |
|---|---|--------------------------------------|
| <b>1. TDM PROGRAM MANAGEMENT</b>                                    |   |                                      |
| <b>1.1 Program coordinator</b>                                      |   |                                      |
| <b>BASIC</b> ★  | 1.1.1 Designate an internal coordinator, or contract with an external coordinator   | <input type="checkbox"/>             |
| <b>1.2 Travel surveys</b>   |   |                                      |
| <b>BETTER</b>   | 1.2.1 Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress              | <input type="checkbox"/>             |
| <b>2. WALKING AND CYCLING</b>                                       |   |                                      |
| <b>2.1 Information on walking/cycling routes &amp; destinations</b> |   |                                      |
| <b>BASIC</b>  | 2.1.1 Display local area maps with walking/cycling access routes and key destinations at major entrances ( <i>multi-family, condominium</i> ) | <input checked="" type="checkbox"/>  |
| <b>2.2 Bicycle skills training</b>                                  |   |                                      |
| <b>BETTER</b>   | 2.2.1 Offer on-site cycling courses for residents, or subsidize off-site courses  | <input type="checkbox"/>             |

| TDM measures: Residential developments          |  | Check if proposed & add descriptions |
|---|--|--------------------------------------|
| <b>3. TRANSIT</b>                               |  |                                      |
| <b>3.1 Transit information</b>                  |  |                                      |
| <b>BASIC</b>                                    | 3.1.1 Display relevant transit schedules and route maps at entrances ( <i>multi-family, condominium</i> )  | <input checked="" type="checkbox"/>  |
| <b>BETTER</b>                                   | 3.1.2 Provide real-time arrival information display at entrances ( <i>multi-family, condominium</i> )  | <input type="checkbox"/>             |
| <b>3.2 Transit fare incentives</b>              |  |                                      |
| <b>BASIC</b> ★                                  | 3.2.1 Offer PRESTO cards preloaded with one monthly transit pass on residence purchase/move-in, to encourage residents to use transit            | <input type="checkbox"/>             |
| <b>BETTER</b>                                   | 3.2.2 Offer at least one year of free monthly transit passes on residence purchase/move-in   | <input checked="" type="checkbox"/>  |
| <b>3.3 Enhanced public transit service</b>      |  |                                      |
| <b>BETTER</b> ★                                 | 3.3.1 Contract with OC Transpo to provide early transit services until regular services are warranted by occupancy levels ( <i>subdivision</i> ) | <input type="checkbox"/>             |
| <b>3.4 Private transit service</b>              |  |                                      |
| <b>BETTER</b>                                   | 3.4.1 Provide shuttle service for seniors homes or lifestyle communities (e.g. scheduled mall or supermarket runs)                               | <input type="checkbox"/>             |
| <b>4. CARSHARING &amp; BIKESHARING</b>          |  |                                      |
| <b>4.1 Bikeshare stations &amp; memberships</b> |  |                                      |
| <b>BETTER</b>                                   | 4.1.1 Contract with provider to install on-site bikeshare station ( <i>multi-family</i> )  | <input type="checkbox"/>             |
| <b>BETTER</b>                                   | 4.1.2 Provide residents with bikeshare memberships, either free or subsidized ( <i>multi-family</i> )  | <input type="checkbox"/>             |
| <b>4.2 Carshare vehicles &amp; memberships</b>  |  |                                      |
| <b>BETTER</b>                                   | 4.2.1 Contract with provider to install on-site carshare vehicles and promote their use by residents   | <input type="checkbox"/>             |
| <b>BETTER</b>                                   | 4.2.2 Provide residents with carshare memberships, either free or subsidized   | <input type="checkbox"/>             |
| <b>5. PARKING</b>                               |  |                                      |
| <b>5.1 Priced parking</b>                       |  |                                      |
| <b>BASIC</b> ★                                  | 5.1.1 Unbundle parking cost from purchase price ( <i>condominium</i> )   | <input checked="" type="checkbox"/>  |
| <b>BASIC</b> ★                                  | 5.1.2 Unbundle parking cost from monthly rent ( <i>multi-family</i> )  | <input checked="" type="checkbox"/>  |

| TDM measures: Residential developments       |   | Check if proposed & add descriptions |
|--|---|--------------------------------------|
| <b>6. TDM MARKETING &amp; COMMUNICATIONS</b> |   |                                      |
| <b>6.1 Multimodal travel information</b>     |   |                                      |
| BASIC ★                                      | 6.1.1 Provide a multimodal travel option information package to new residents | <input checked="" type="checkbox"/>  |
| <b>6.2 Personalized trip planning</b>        |   |                                      |
| BETTER ★                                     | 6.2.1 Offer personalized trip planning to new residents                       | <input type="checkbox"/>             |

**TDM-Supportive Development Design and Infrastructure Checklist:**  
*Residential Developments (multi-family or condominium)*

| Legend          |  |
|-----------------|--|
| <b>REQUIRED</b> | The Official Plan or Zoning By-law provides related guidance that must be followed                             |
| <b>BASIC</b>    | The measure is generally feasible and effective, and in most cases would benefit the development and its users |
| <b>BETTER</b>   | The measure could maximize support for users of sustainable modes, and optimize development performance        |

| TDM-supportive design & infrastructure measures: Residential developments |  | Check if completed & add descriptions, explanations or plan/drawing references |
|---|--|--|
| <b>1. WALKING &amp; CYCLING: ROUTES</b>                                   |  |  |
| <b>1.1 Building location &amp; access points</b>                          |  |  |
| BASIC   | 1.1.1 Locate building close to the street, and do not locate parking areas between the street and building entrances   | <input checked="" type="checkbox"/>  |
| BASIC   | 1.1.2 Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations   | <input checked="" type="checkbox"/>  |
| BASIC   | 1.1.3 Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort  | <input checked="" type="checkbox"/>  |
| <b>1.2 Facilities for walking &amp; cycling</b>                           |  |  |
| REQUIRED  | 1.2.1 Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations (see Official Plan policy 4.3.3)  | <input checked="" type="checkbox"/>  |
| REQUIRED  | 1.2.2 Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major building entrances; providing walkways from public streets to major building entrances; within a site, providing walkways along the front of adjoining buildings, between adjacent buildings, and connecting areas where people may congregate, such as courtyards and transit stops; and providing weather protection through canopies, colonnades, and other design elements wherever possible (see Official Plan policy 4.3.12) | <input checked="" type="checkbox"/>  |

| TDM-supportive design & infrastructure measures:<br><i>Residential developments</i> |   | Check if completed &<br>add descriptions, explanations<br>or plan/drawing references |
|---|---|--|
| REQUIRED  | 1.2.3 Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas from vehicle areas, and provide marked pedestrian crosswalks at intersection sidewalks (see <i>Official Plan policy 4.3.10</i> )  | <input checked="" type="checkbox"/>  |
| REQUIRED  | 1.2.4 Make sidewalks and open space areas easily accessible through features such as gradual grade transition, depressed curbs at street corners and convenient access to extra-wide parking spaces and ramps (see <i>Official Plan policy 4.3.10</i> )   | <input checked="" type="checkbox"/>  |
| REQUIRED  | 1.2.5 Include adequately spaced inter-block/street cycling and pedestrian connections to facilitate travel by active transportation. Provide links to the existing or planned network of public sidewalks, multi-use pathways and on-road cycle routes. Where public sidewalks and multi-use pathways intersect with roads, consider providing traffic control devices to give priority to cyclists and pedestrians (see <i>Official Plan policy 4.3.11</i> ) | <input checked="" type="checkbox"/>  |
| BASIC   | 1.2.6 Provide safe, direct and attractive walking routes from building entrances to nearby transit stops  | <input checked="" type="checkbox"/>  |
| BASIC   | 1.2.7 Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible   | <input checked="" type="checkbox"/>  |
| BASIC   | 1.2.8 Design roads used for access or circulation by cyclists using a target operating speed of no more than 30 km/h, or provide a separated cycling facility   | <input type="checkbox"/>   |
| <b>1.3 Amenities for walking &amp; cycling</b>                                      |   |  |
| BASIC   | 1.3.1 Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails   | <input type="checkbox"/>   |
| BASIC   | 1.3.2 Provide wayfinding signage for site access (where required, e.g. when multiple buildings or entrances exist) and egress (where warranted, such as when directions to reach transit stops/stations, trails or other common destinations are not obvious)   | <input type="checkbox"/>   |

| TDM-supportive design & infrastructure measures:<br><i>Residential developments</i> |  | Check if completed &<br>add descriptions, explanations<br>or plan/drawing references |
|---|--|--|
| <b>2. WALKING &amp; CYCLING: END-OF-TRIP FACILITIES</b>                             |  |  |
| <b>2.1 Bicycle parking</b>  |  |  |
| REQUIRED  | 2.1.1 Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible (see <i>Official Plan policy 4.3.6</i> )   | <input checked="" type="checkbox"/>  |
| REQUIRED  | 2.1.2 Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas (see <i>Zoning By-law Section 111</i> )  | <input checked="" type="checkbox"/>  |
| REQUIRED  | 2.1.3 Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored (see <i>Zoning By-law Section 111</i> )  | <input checked="" type="checkbox"/>  |
| BASIC   | 2.1.4 Provide bicycle parking spaces equivalent to the expected number of resident-owned bicycles, plus the expected peak number of visitor cyclists   | <input type="checkbox"/>   |
| <b>2.2 Secure bicycle parking</b>   |  |  |
| REQUIRED  | 2.2.1 Where more than 50 bicycle parking spaces are provided for a single residential building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers (see <i>Zoning By-law Section 111</i> ) | <input checked="" type="checkbox"/>  |
| BETTER  | 2.2.2 Provide secure bicycle parking spaces equivalent to at least the number of units at condominiums or multi-family residential developments  | <input checked="" type="checkbox"/>  |
| <b>2.3 Bicycle repair station</b>   |  |  |
| BETTER  | 2.3.1 Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)   | <input type="checkbox"/>   |
| <b>3. TRANSIT</b>   |  |  |
| <b>3.1 Customer amenities</b>   |  |  |
| BASIC   | 3.1.1 Provide shelters, lighting and benches at any on-site transit stops  | <input type="checkbox"/>   |
| BASIC   | 3.1.2 Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter  | <input type="checkbox"/>   |
| BETTER  | 3.1.3 Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building  | <input type="checkbox"/>   |

| TDM-supportive design & infrastructure measures:<br><i>Residential developments</i> |  | Check if completed &<br>add descriptions, explanations<br>or plan/drawing references |
|---|--|--|
| <b>4. RIDESHARING</b>   |  |  |
| <b>4.1 Pick-up &amp; drop-off facilities</b>  |  |  |
| BASIC   | 4.1.1 Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones   | <input type="checkbox"/>   |
| <b>5. CARSHARING &amp; BIKESHARING</b>  |  |  |
| <b>5.1 Carshare parking spaces</b>  |  |  |
| BETTER  | 5.1.1 Provide up to three carshare parking spaces in an R3, R4 or R5 Zone for specified residential uses (see <i>Zoning By-law Section 94</i> )  | <input type="checkbox"/>   |
| <b>5.2 Bikeshare station location</b>   |  |  |
| BETTER  | 5.2.1 Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection  | <input type="checkbox"/>   |
| <b>6. PARKING</b>   |  |  |
| <b>6.1 Number of parking spaces</b>   |  |  |
| REQUIRED  | 6.1.1 Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for   | <input checked="" type="checkbox"/>  |
| BASIC   | 6.1.2 Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking   | <input type="checkbox"/>   |
| BASIC   | 6.1.3 Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly (see <i>Zoning By-law Section 104</i> )   | <input type="checkbox"/>   |
| BETTER  | 6.1.4 Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking (see <i>Zoning By-law Section 111</i> ) | <input type="checkbox"/>   |
| <b>6.2 Separate long-term &amp; short-term parking areas</b>                        |  |  |
| BETTER  | 6.2.1 Provide separate areas for short-term and long-term parking (using signage or physical barriers) to permit access controls and simplify enforcement (i.e. to discourage residents from parking in visitor spaces, and vice versa)  | <input type="checkbox"/>   |