

Revised Final Report

Transportation Impact Study – 7085 Goreway Drive, Mississauga



Prepared for Redwood Properties
by IBI Group
March 8, 2023

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1 Introduction

IBI Group was retained by Redwood Properties to undertake a transportation impact study for a proposed residential development, located at 7085 Goreway Drive in the City of Mississauga, Ontario. The proposed development site is located on the northeast corner of the Goreway Drive and Dorcas Street intersection, and currently contains a vacant commercial building.

The proposed development consists of a mixed-use residential apartment building of 14 storeys with 228 dwelling units and 388 m² (4,175 ft²) commercial usage GFA. In addition, 18 townhouse units are proposed, resulting in an overall total of 246 residential dwelling units. Existing structures on the site are proposed to be removed. The following changes, in comparison to the May 2020 iteration of the development concept, are noted:

- Only one apartment building is being proposed instead of two buildings linked by a common podium;
- The residential unit count has decreased from 271 dwellings to 246 dwellings. While the development now has a small commercial component, the trip generation and resulting traffic operations are expected to be lower or comparable to previous estimates;
- The proposed vehicle parking supply is now expected to comply with the zoning by-law requirements; and
- The proposed development will only have one site access (at the location of the South Site Access) instead of two site accesses.

The purpose of this report is to analyze the impact that the proposed development may have on the surrounding transportation network, and to take into account the impacts of the background traffic growth in the area. The study also consists of a parking study, a transportation demand management (TDM) options memorandum, a site access conceptual design review, and an assessment of functional circulation for vehicular traffic.

This report is outlined as follows:

- Sections 2 to 4 discuss the transportation impact study;
- Section 5 discusses the parking study;
- Section 6 examines the options for TDM;
- Section 7 outlines the site access conceptual design review;
- Section 8 discusses the vehicle swept path analysis; and
- Section 9 summarizes the conclusions made based on the preceding sections.

This report adheres to the scope of investigation developed by IBI Group, which was presented to and confirmed by the City of Mississauga (City) staff on January 24, 2020. This correspondence is presented in **Appendix A**. As well, this report addresses City of Mississauga comments dated June 2022 and October 2022 and on earlier submissions.

1.1 Study Area

As discussed, the proposed development is located on the northeast corner of the Goreway Drive and Dorcas Street intersection, as illustrated in **Exhibit 1-1**.

Exhibit 1-1: Development Study Area



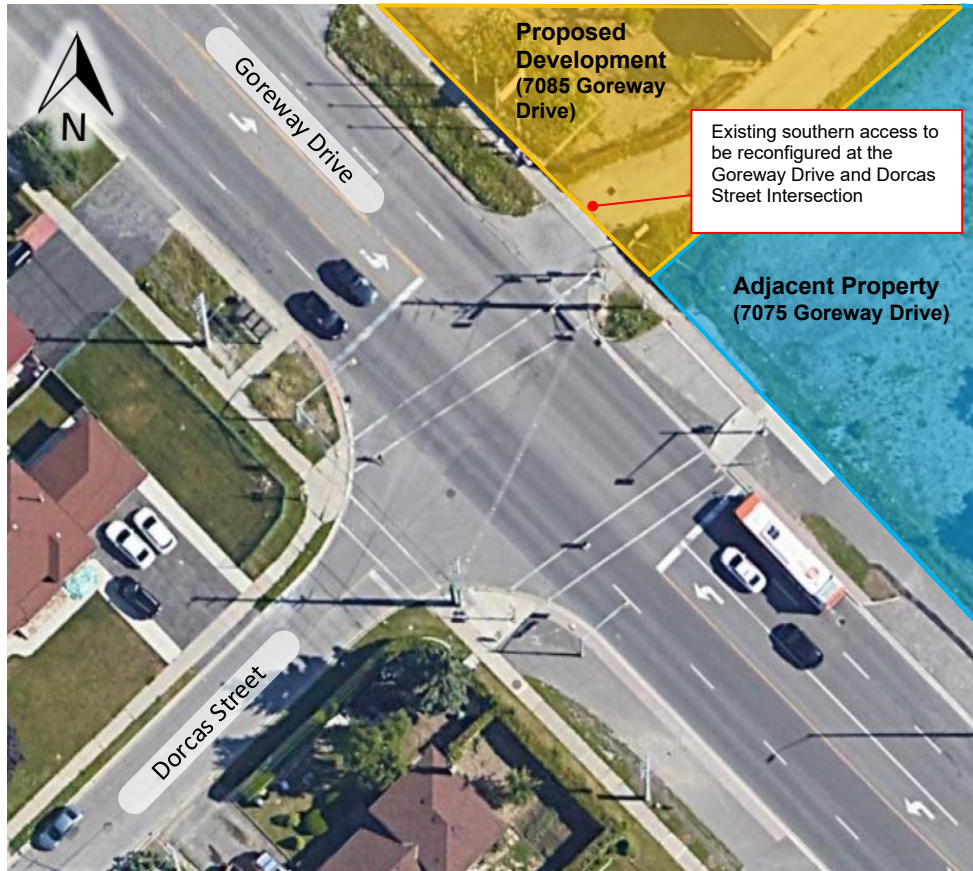
Base Map Source: City of Mississauga. Retrieved April 2, 2020 from <http://www6.mississauga.ca/missmaps/maps.aspx#map=17/-8864795.24/5421497.5/0>

The study area intersections which will be most impacted by the proposed development site traffic consist of the following locations, as shown in **Exhibit 1-1**:

1. Goreway Drive and Derry Road East (Regional Road 5) (signalized);
2. Goreway Drive and Dorcas Street (signalized); and
3. Goreway Drive and Etude Drive (signalized).

Presently, the south access to 7085 Goreway Drive is located in between the southbound stop bar and the northern pedestrian crosswalk, approximately 10 metres to the north of the Dorcas Street centreline, as illustrated in **Exhibit 1-2**.

Exhibit 1-2: Existing Goreway Drive and Dorcas Street Intersection Configuration



Base Map Source: Google Earth. Retrieved April 21, 2020 from <https://goo.gl/maps/gDPR3VhrMeeDBxeA9>

The access to 7075 Goreway Drive, the property immediately adjacent to the south, is located within the Goreway Drive and Dorcas Street intersection, offset approximately 6 metres to the south of the Dorcas Street centreline. Both the site southern access and 7075 Goreway access are barricaded, with no traffic volumes observed under existing conditions. The proposed access configuration is further discussed in **Section 7**.

For the purposes of analysis, the intersection of Goreway Drive was modeled as a four-legged intersection with no east-leg volumes under existing and future background conditions.

The area surrounding the proposed development is primarily residential to the west, with retail uses located to the north and south. The Malton Greenway, a multi-use trail, is located to the east of the proposed development site. A context plan of the proposed development site is provided in **Exhibit 1-3**.

Exhibit 1-3: Proposed Development Context Plan



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PROJECT :



REDWOOD ON GOREWAY

7085 Goreway Drive,
 Mississauga, Ontario

TITLE : Site Views

DATE : 2019-11-12

SCALE : N.T.S.

DRAWN : PQZ/DVBL

CHECKED : DH

PROJ. NO. : 120212

A-002



1.2 Analysis Periods

Based on the proposed development's residential land uses, the following analysis periods were used in this study:

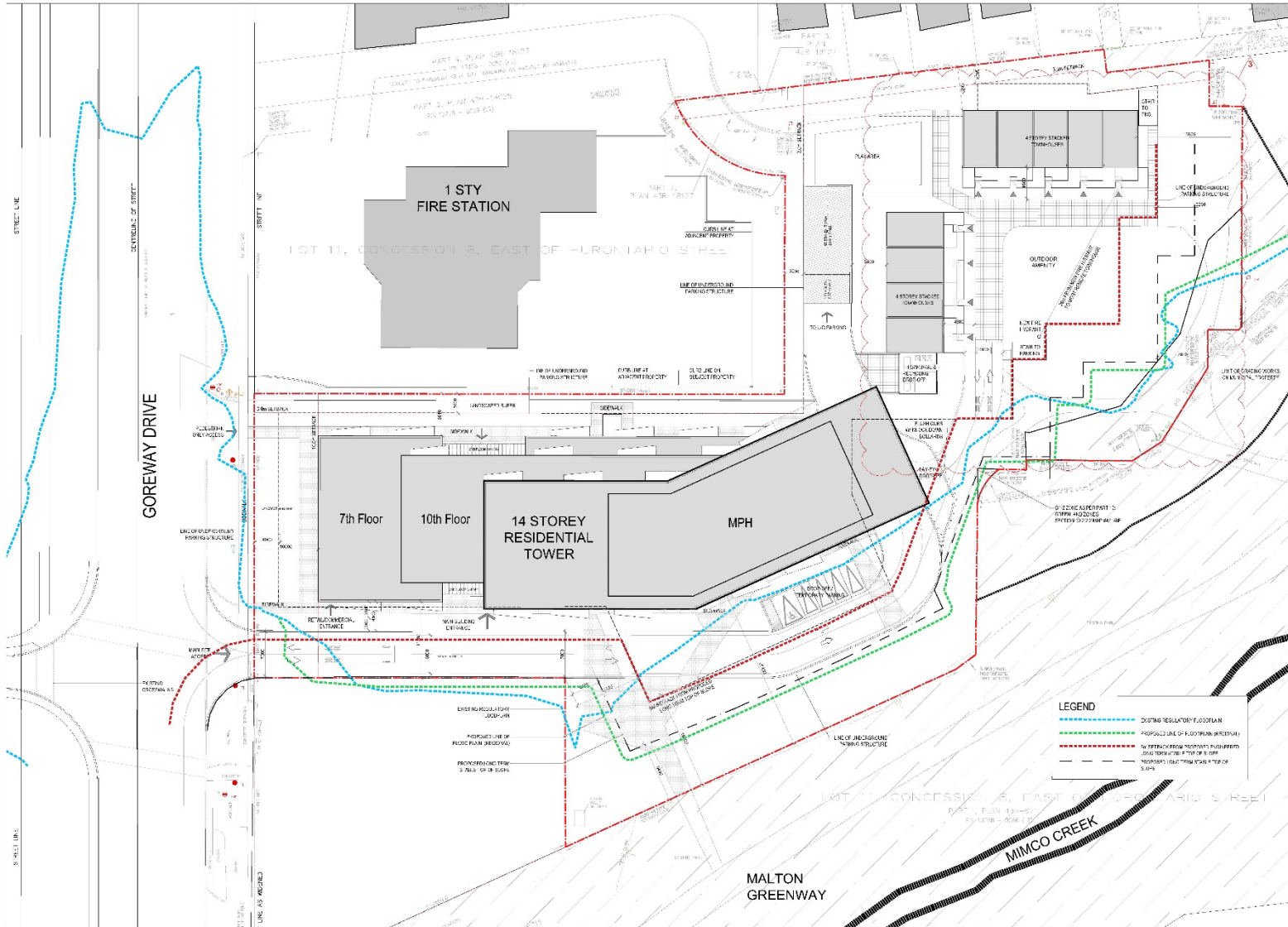
- AM Peak Period – 7:00 a.m. to 9:00 a.m. on a typical weekday; and
- PM Peak Period – 4:00 p.m. to 6:00 p.m. on a typical weekday.

1.3 Proposed Development

Redwood Properties is proposing to construct a mixed-use apartment building of 14 storeys with 228 dwelling units and 388 m² (4,175 ft²) commercial usage GFA. Also, 18 townhouse units are being proposed too – resulting in an overall development total of 246 residential dwelling units. Parking is to be provided primarily in a three-level, 359-space underground garage. A single full-movement access will be provided on Goreway Drive. This proposed access will be a reconfiguration of the existing access opposite to Dorcas Street – to better align with the existing traffic control signal, as mentioned in **Section 1.1** and discussed further in **Section 4.1.1 and Section 7**.

The proposed site plan is illustrated in **Exhibit 1-4**. It must be noted that small changes in building sizes may occur as this development moves through the approval process. However, the assumptions in this report are conservative, and differences in traffic operations from these changes are expected to be negligible.

Exhibit 1-4: Proposed Site Plan



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| | | |
|-----|------------|-------------------------|
| NO. | DATE | DESCRIPTION |
| 1 | 2022-02-02 | ISSUED FOR REVIEW |
| 2 | 2022-02-02 | ISSUED FOR CONSTRUCTION |



SEAL:



PROJECT:



REDWOOD ON GOREWAY
 7085 Goreway Drive,
 Mississauga, Ontario

TITLE: Site Plan - Proposed

DATE: 2022-02-02

SCALE: 1:250

DRAWN: SUDWEK

CHECKED: DHI

PROJ. NO. 120212

A-101b

2 2020 Existing Conditions

This section documents the transportation network in the study area in 2020, including existing roadways, traffic control measures, intersection performance, and transit operations.

2.1 Existing Road Network

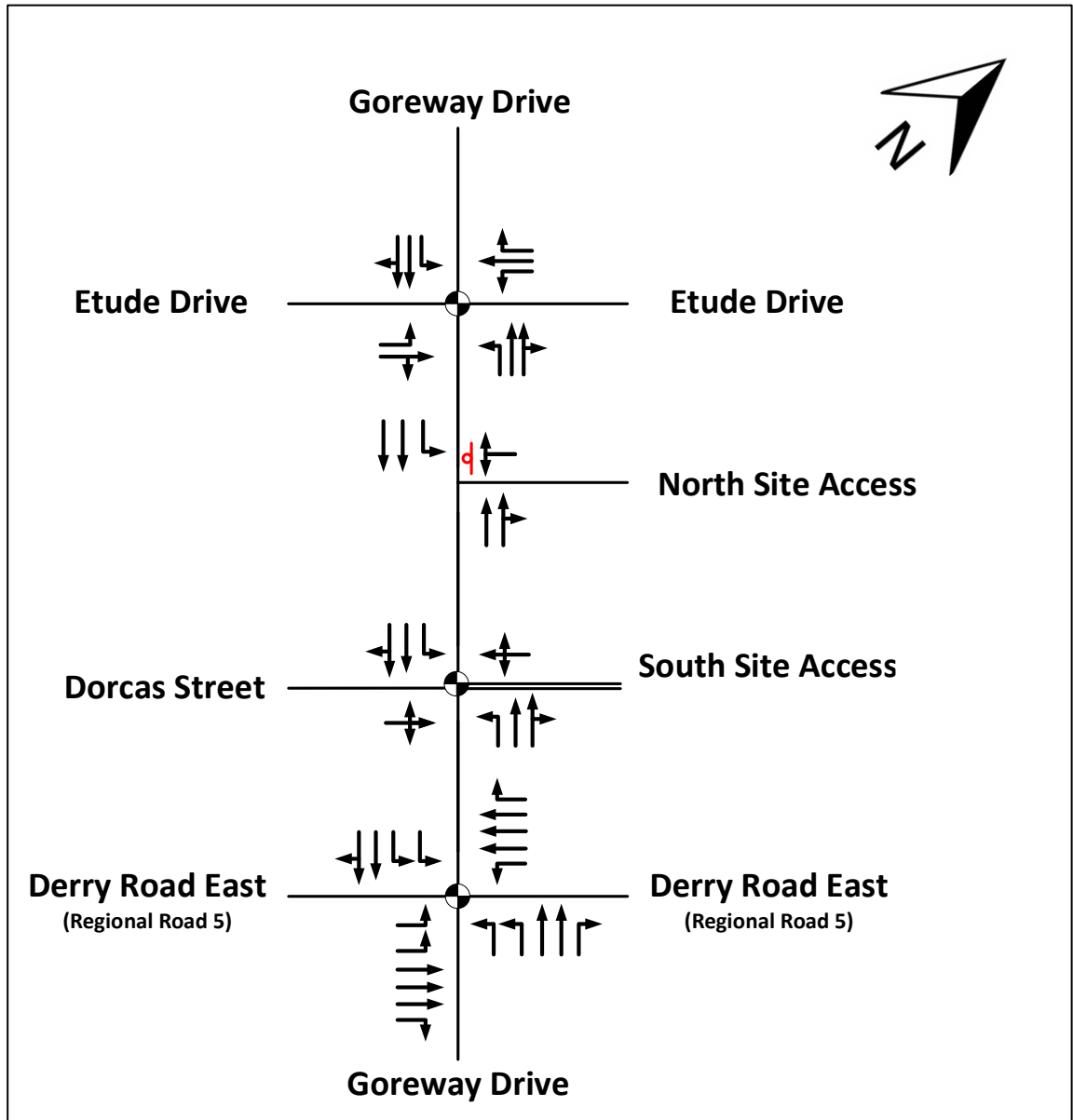
The existing study area roadways are illustrated in **Exhibit 2-1**.

Exhibit 2-1: Study Area Existing Road Network

| Street Name | Class. | Orientation | Road Width (Lanes) | Traffic Direction | From | To | On-Street Parking | Speed Limit |
|-----------------------------------|-----------------|---------------|--------------------|-------------------|-------------------------------|---|-------------------|--|
| Goreway Drive | Major Collector | North / South | 4 | Two-way | North City Limit | Highway 427 (East City Limit) | Prohibited | 60 km/h |
| Derry Road East (Regional Road 5) | Regional | East / West | 6 | Two-way | Highway 427 (East City Limit) | Highway 407 (West City Limit) | Prohibited | 60 km/h |
| Dorcas Street | Local | East / West | 2 | Two-way | Goreway Drive | Minotola Avenue / Justine Drive | Permitted | 40 km/h |
| Etude Drive | Minor Collector | East / West | 2 | Two-way | Darcel Avenue | 100 metres west of west of Lancaster Avenue | Prohibited | 40 km/h west of Goreway Drive, 50 km/h east of Goreway Drive |

Lane configurations for the study area intersections are illustrated in **Exhibit 2-2**.

Exhibit 2-2: Existing Study Area Lane Configurations



In **Exhibit 2-2**, the currently barricaded subject site south access is illustrated as the east leg of the existing Goreway Drive and Dorcas Street intersection. Access to the driveway is currently controlled by the existing traffic signal. As previously mentioned, the barricaded access contains no traffic volumes observed under existing conditions. The proponent proposes to adjust the placement of this access to improve intersection and crosswalk alignment, as discussed in **Section 4.1.1**.

For the purposes of analysis, the intersection of Goreway Drive was modeled as a four-legged intersection with no east-leg volumes under existing and future background conditions.

2.2 Existing Transit Network

The proposed development site is directly served by several surface transit routes provided by MiWay and Brampton Transit. Transit services within an approximate 800 metre radius of the proposed development site are illustrated in **Exhibit 2-3**, while service patterns and destinations of the routes operating in close proximity are presented in **Exhibit 2-4**.

Exhibit 2-3: Existing Transit Network

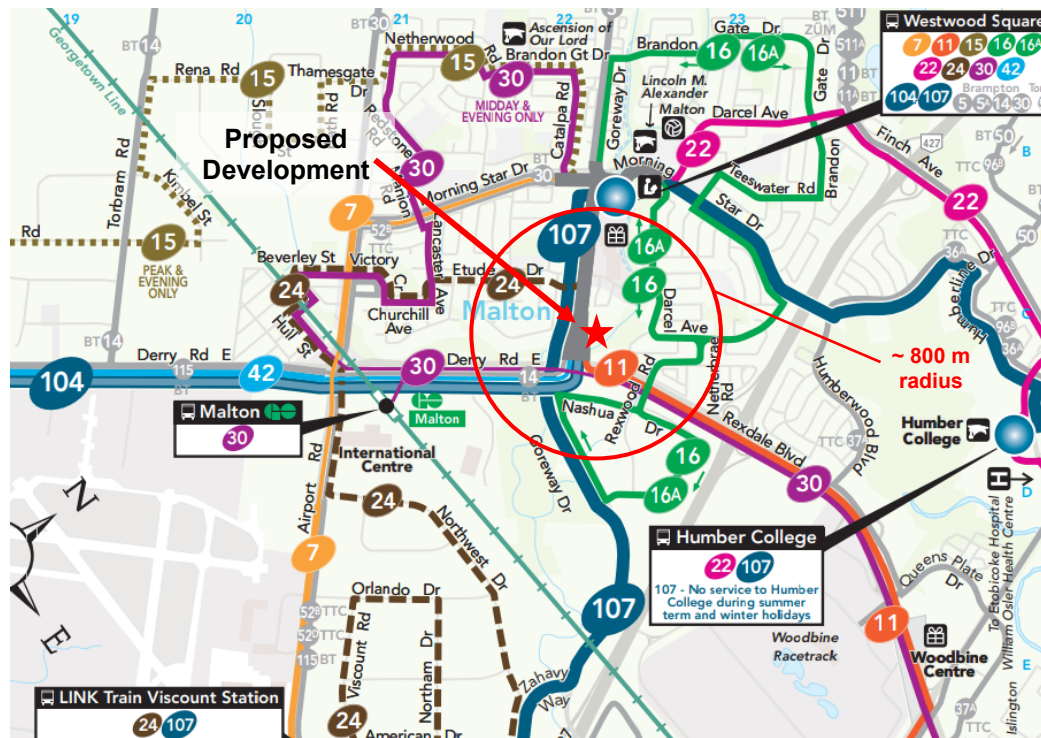


Image Source: MiWay. Retrieved April 7, 2020 from https://web.mississauga.ca/wp-content/uploads/sites/6/2020/02/19143559/SystemMap_Weekday.pdf

Exhibit 2-4: Existing Transit Service Patterns

| Service Provider | Route | Onward Transit Connections | Walking Distance to Nearest Stop ¹ | Average Peak Hour Frequency |
|------------------|----------------------|---|---|-----------------------------|
| MiWay | 11 – Westwood | Westwood Square Bus Terminal, Woodbine Centre, Islington Subway Station (TTC Subway Line 2) | < 60 m (< 1 minute) | 10 minutes |
| | 24 – Northwest | Westwood Square Bus Terminal, Viscount Station (Toronto Pearson Airport LINK Train) | 350 m (< 5 minutes) | 30 minutes |
| | 42 – Derry | Westwood Square Bus Terminal, Meadowvale Town Centre Bus Terminal | < 60 m (< 1 minute) | 13 minutes |
| | 104 – Derry Express | Westwood Square Bus Terminal, Meadowvale Town Centre Bus Terminal | 130 m (< 2 minutes) | 15 minutes |
| | 107 – Malton Express | Westwood Square Bus Terminal, City Centre Transit Terminal (Square One), Humber College North Campus, Viscount Station (Toronto Pearson Airport LINK Train) | 130 m (< 2 minutes) | 10 minutes |
| Brampton Transit | 14 – Torbram | Westwood Square Bus Terminal | < 60 m (< 1 minute) | 10 minutes |

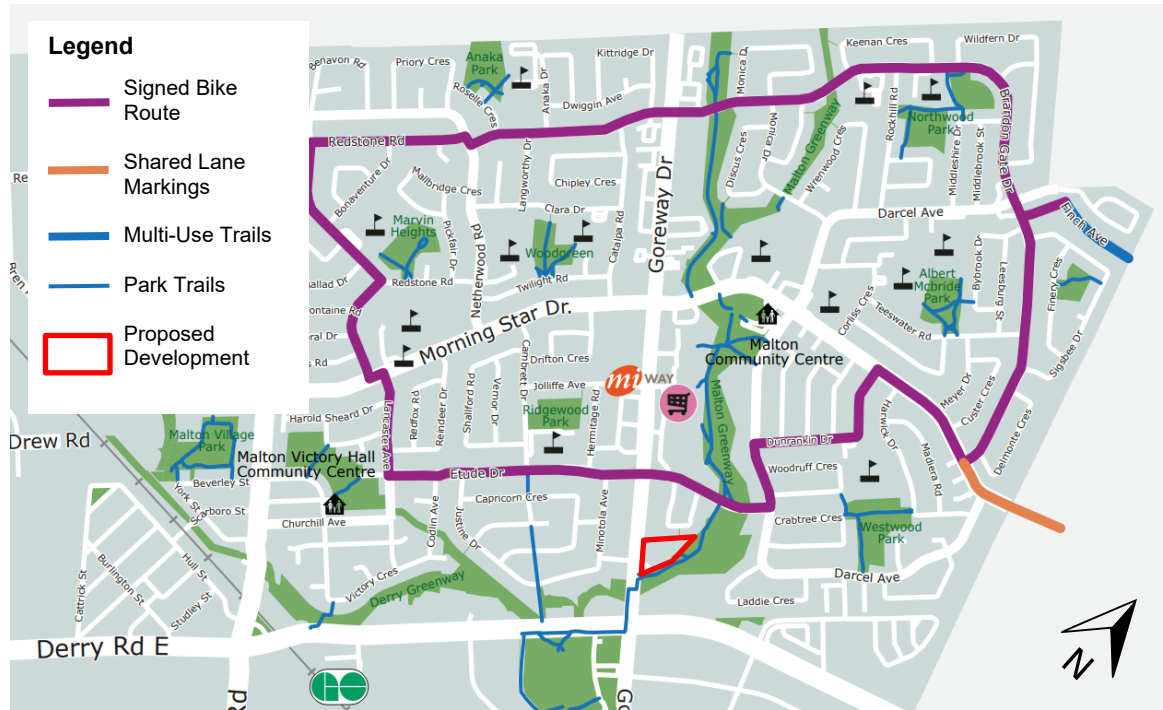
As shown in **Exhibit 2-3** and **Exhibit 2-4**, the proposed development site is located within 800 metres of multiple bus routes operated by MiWay. All of the identified transit routes connect to the Westwood Square Bus Terminal, located approximately 1.0 kilometre north of the proposed development site. Further connections to other major transit hubs from the Westwood Square Bus Terminal are provided, such as the Mississauga City Centre Transit Terminal (Square One) and the Malton GO Station (located along the Kitchener GO Line).

2.3 Existing Cycling Network

The proposed development site is located in close proximity to a circuitous signed bicycle route that primarily runs along Etude Drive and Redstone Road. This signed bicycle route also connects to the West Humber Multi-Use Trail within the City of Toronto. The proposed development site is also located adjacent to the Malton Greenway Trail, which consists of park trails that connect to the Malton Community Centre. This is illustrated in **Exhibit 2-5**.

¹ Walking times are based on a walking speed of 1.2 m/s, as per the City’s Traffic Impact Study Guidelines.

Exhibit 2-5: Study Area Cycle Routes

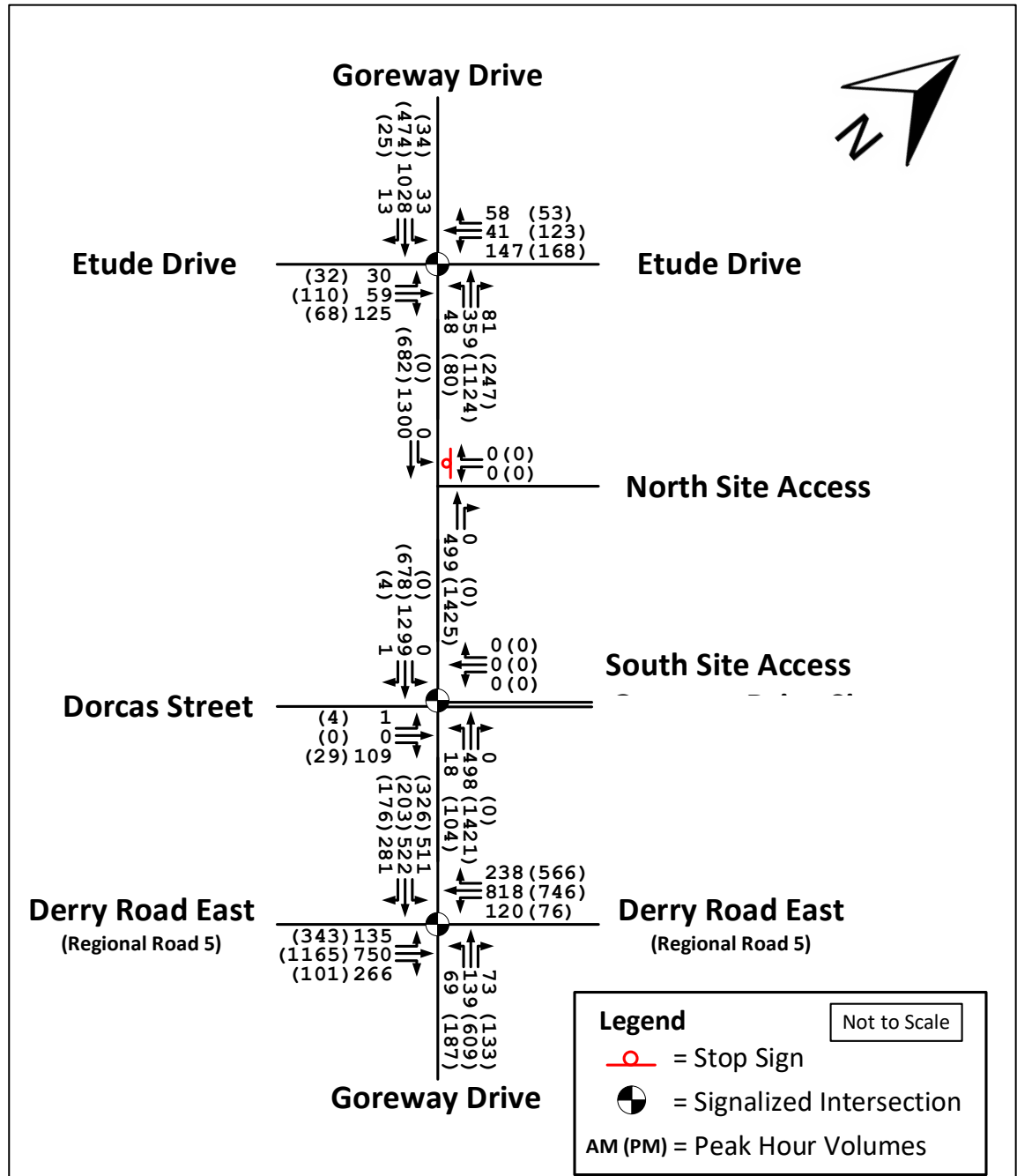


Base Map Source: City of Mississauga. Retrieved April 7, 2020 from <https://www.mississaugabikes.ca/wp-content/uploads/2018/07/Mississauga-Cycling-Map-2018-web-with-panels.pdf>

2.4 Turning Movement Counts

Horizon Data Services Ltd. (HDSL) was retained by IBI Group to conduct intersection turning movement counts. Data was collected on Tuesday, February 25, 2020 at the study area intersections. A summary of the balanced 2020 existing conditions traffic volumes is presented in **Exhibit 2-6**, with full turning movement count data presented in **Appendix B**.

Exhibit 2-6: 2020 Existing Conditions Traffic Volumes



Note: The arrows in this diagram do not represent the lane configuration and are meant to represent turning movements.

2.5 2020 Existing Conditions Analysis

Using the turning movement counts described in **Section 2.4**, and signal timing plans obtained from the City and the Region of Peel (Region) staff (See **Appendix C**), the study area intersections were analyzed using the Synchro software package, which is based on the **Highway Capacity Manual** methodology.

Based on the Region's **Traffic Impact Study Guidelines**, the following criteria were used in identifying critical operations at signalized intersections under the jurisdiction of the Region:

- Volume to capacity ratio (v/c ratio) reaches or exceeds 0.90 for overall intersection operations, through movements, or shared through/turning movements;
- v/c ratio for exclusive movements exceed 1.00; and
- 95th percentile queue lengths for an individual movement exceed available storage.

Furthermore, based on the City's **Traffic Impact Study Guidelines**, the following criteria were used in identifying critical operations at signalized intersections under the jurisdiction of the City:

- v/c ratio increases to 0.85 or above for overall intersection operations, through movements, or shared through/turning movements;
- v/c ratios for exclusive movements exceed 0.90; and
- 95th percentile queue lengths for an individual movements exceed available storage.

With regards to unsignalized intersections under the jurisdiction of the City, the following criteria were referenced:

- Level of service (LOS), based on average delay per vehicle, on individual movements exceeds LOS "E" ; and
- 95th percentile queue lengths for an individual movement exceed available storage.

It should be noted that the intersection of Goreway Drive and Derry Road East and its associated movements have been analyzed considering the Region's guidelines, given the regional road designation of Derry Road East.

It should also be noted that peak hour factors, which represent the ratio of the peak flow rate to the peak hour volume, are based on observed values.

The results of the 2020 existing conditions traffic operations analysis for the weekday AM and PM peak hours at the study area signalized intersections are presented in **Exhibit 2-7**.

Exhibit 2-7: 2020 Existing Condition Traffic Operations – Signalized Intersection Summary

| Intersection | Intersection Summary | | | Individual Movement | | | | | |
|--|----------------------|-------|-----------|---------------------|-----|-----------|-----------|---------------------------------------|----------------------|
| | LOS | Delay | v/c Ratio | Movement | LOS | Delay (s) | v/c Ratio | 95 th Percentile Queue (m) | Storage Capacity (m) |
| Weekday AM Peak Hour | | | | | | | | | |
| Goreway Drive and Derry Road East | D | 47.7 | 0.63 | EBL | E | 73.4 | 0.51 | 33 | 120 |
| | | | | EBT | D | 40.2 | 0.47 | 83 | - |
| | | | | EBR | D | 35.6 | 0.19 | 20 | 100 |
| | | | | WBL | C | 34.6 | 0.44 | 36 | 78 |
| | | | | WBT | D | 44.6 | 0.52 | 95 | - |
| | | | | WBR | D | 39.2 | 0.18 | 21 | 90 |
| | | | | NBL | E | 73.2 | 0.36 | 19 | 82 |
| | | | | NBT | D | 48.7 | 0.17 | 29 | - |
| | | | | NBR | D | 47.4 | 0.06 | - | 73 |
| | | | | SBL | E | 68.9 | 0.79 | 99 | 101 |
| Goreway Drive and Dorcas Street / South Site Access / 7075 Goreway Drive Site Access | A | 8.5 | 0.54 | EBLR | D | 53.2 | 0.56 | 31 | - |
| | | | | NBL | A | 3.7 | 0.09 | 4 | 60 |
| | | | | NBT | A | 3.1 | 0.21 | 24 | - |
| | | | | SBTR | A | 6.1 | 0.54 | 108 | - |
| Goreway Drive and Etude Drive | C | 22.5 | 0.61 | EBL | D | 38.0 | 0.12 | 14 | 70 |
| | | | | EBTR | D | 38.8 | 0.35 | 39 | - |
| | | | | WBL | F | 92.0 | 0.93 | 57 | 37 |
| | | | | WBT | D | 36.2 | 0.11 | 16 | - |
| | | | | WBR | D | 37.2 | 0.05 | 9 | 33 |
| | | | | NBL | A | 8.9 | 0.17 | 8 | 53 |
| | | | | NBTR | A | 7.2 | 0.20 | 30 | - |
| | | | | SBL | A | 10.0 | 0.07 | 10 | 30 |
| SBTR | B | 14.4 | 0.56 | 119 | - | | | | |

| Intersection | Intersection Summary | | | Individual Movement | | | | | |
|--|----------------------|-------|-----------|---------------------|-----|-----------|-----------|---------------------------------------|----------------------|
| | LOS | Delay | v/c Ratio | Movement | LOS | Delay (s) | v/c Ratio | 95 th Percentile Queue (m) | Storage Capacity (m) |
| Weekday PM Peak Hour | | | | | | | | | |
| Goreway Drive and Derry Road East | E | 55.8 | 0.72 | EBL | F | 136 | 1.05 | 94 | 120 |
| | | | | EBT | D | 42.8 | 0.63 | 133 | - |
| | | | | EBR | C | 32.6 | 0.08 | 9 | 100 |
| | | | | WBL | C | 33.9 | 0.40 | 23 | 78 |
| | | | | WBT | D | 43.6 | 0.48 | 85 | - |
| | | | | WBR | D | 53.2 | 0.67 | 117 | 90 |
| | | | | NBL | E | 72.8 | 0.58 | 43 | 82 |
| | | | | NBT | E | 56.4 | 0.69 | 125 | - |
| | | | | NBR | D | 44.5 | 0.12 | 21 | 73 |
| | | | | SBL | E | 70.7 | 0.69 | 66 | 101 |
| | | | | SBTR | D | 44.9 | 0.41 | 64 | - |
| Goreway Drive and Dorcas Street / South Site Access / 7075 Goreway Drive Site Access | A | 3.8 | 0.47 | EBLR | D | 53.3 | 0.12 | 6 | 120 |
| | | | | NBL | A | 2.8 | 0.23 | 10 | - |
| | | | | NBT | A | 2.9 | 0.50 | 55 | 100 |
| | | | | SBTR | A | 1.3 | 0.28 | 11 | 78 |
| Goreway Drive and Etude Drive | C | 21.1 | 0.72 | EBL | D | 37.3 | 0.21 | 16 | 70 |
| | | | | EBTR | D | 38.5 | 0.45 | 46 | - |
| | | | | WBL | F | 94.6 | 0.95 | 76 | 37 |
| | | | | WBT | D | 36.5 | 0.29 | 41 | - |
| | | | | WBR | D | 35.4 | 0.04 | 9 | 33 |
| | | | | NBL | A | 6.0 | 0.17 | 8 | 53 |
| | | | | NBTR | B | 11.1 | 0.65 | 136 | - |
| | | | | SBL | B | 17.0 | 0.28 | 13 | 30 |
| | | | | SBTR | B | 12.8 | 0.33 | 51 | - |

Red text indicates a movement which exceeds critical thresholds.

As shown in **Exhibit 2-7**, the signalized study area intersections are observed to operate within capacity overall during the weekday AM and PM peak hours.

With regards to specific movements during the weekday AM peak hour, the following is noted:

- The westbound left-turn movement at the Goreway Drive and Etude Drive intersection is operating above critical capacity thresholds (v/c ratio of 0.93), with a queue storage spillover of up to three car lengths.

During the weekday PM peak hour, the following observations are noted:

- The eastbound left-turn movement at the Goreway Drive and Derry Road East intersection is operating above capacity (v/c ratio of 1.05);
- The westbound right-turn movement at the Goreway Drive and Derry Road East intersection is exceeding storage capacity by up to four car lengths; and
- The westbound left movement at the Goreway Drive and Etude Drive intersection is operating above critical capacity thresholds (v/c ratio of 0.95), with a queue storage spillover of up to six car lengths.

It should be noted that, as the site accesses are presently unused, no vehicle volumes were observed. Full Highway Capacity Manual analysis for the 2020 existing conditions scenario is presented in **Appendix D**.

3 2025 Future Background Conditions

This section discusses the development horizon year, the future transportation network, other developments impacting the study area, and future traffic conditions without the proposed development.

3.1 Horizon Year

As per the City’s **Traffic Impact Study Guidelines**, and as confirmed by City staff, a horizon year of 2025 was considered, which represents 5 years from the date of this transportation impact study.

3.2 Growth Rate

Through correspondence with City and Region staff, compounded annual traffic growth rates along Goreway Drive and Derry Road East were identified for the time period between 2020 and 2025. **Exhibit 3-1** summarizes the identified traffic growth rates.

Exhibit 3-1: Summary of Compounded Annual Traffic Growth Rates

| Street Name | Peak Hour | Direction | Compounded Annual Traffic Growth Rate |
|-----------------|-------------------|-----------|--|
| Goreway Drive | Weekday AM | NB | 1.5% |
| | | SB | 0.0% |
| | Weekday PM | NB | 0.0% |
| | | SB | 0.0% |
| Derry Road East | Weekday AM and PM | EB and WB | 1.5% (2020 to 2021) 1.0% (2021 to 2025) |

The compounded annual growth rates were applied to respective through movements along Goreway Drive and Derry Road East. These rates result in absolute increases in traffic volumes along Goreway Drive (only for northbound traffic during the weekday AM peak hour) and Derry Road East (eastbound through and westbound through traffic during the weekday AM and PM peak hours) of approximately 7.7% and 5.6% from 2020 to 2025, respectively.

3.3 Future Transportation Network

Based on a review of the City of Mississauga’s Roads and Stormwater Capital Plan (April 2019), various transportation plans and strategies, and other documents, no significant road network improvements in the study area are anticipated by 2025. Incremental transit service improvements to surface transit routes in the study area are likely by 2025, but no significant changes to services (e.g. dedicated transit lanes, grade separation, etc.) are anticipated.

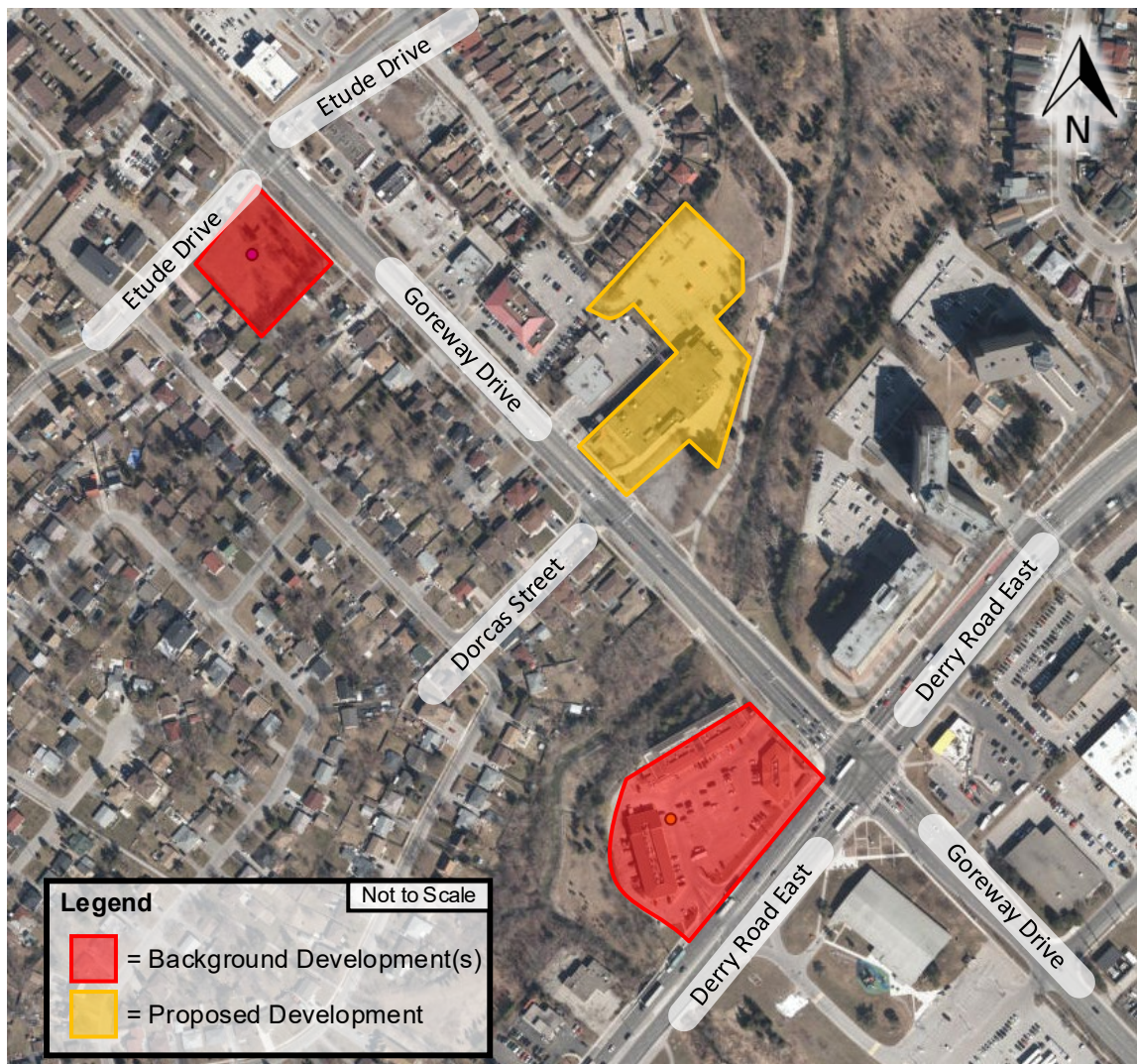
3.4 Background Developments

A review of the City of Mississauga development applications online map indicated that there are two developments in the vicinity of the study area which are likely to generate notable numbers of new automobile trips. Details of the two background developments are summarized in **Exhibit 3-2**, and are illustrated geographically in **Exhibit 3-3**.

Exhibit 3-2: Summary of Background Developments

| # | Address | Size and Nature of Development | Status |
|---|----------------------|--|----------|
| 1 | 3427 Derry Road East | 389.1 m ² , commercial uses | Withheld |
| 2 | 7170 Goreway Drive | 14 dwelling units, residential uses | Withheld |

Exhibit 3-3: Background Developments



Base Map Source: City of Mississauga. Retrieved April 2, 2020 from <http://www6.mississauga.ca/missmaps/maps.aspx#map=171-8864795.24/5421497.5/0>

In lieu of any transportation impact studies for the two background developments shown in **Exhibit 3-3**, background development site trips were estimated using trip generation rates from the

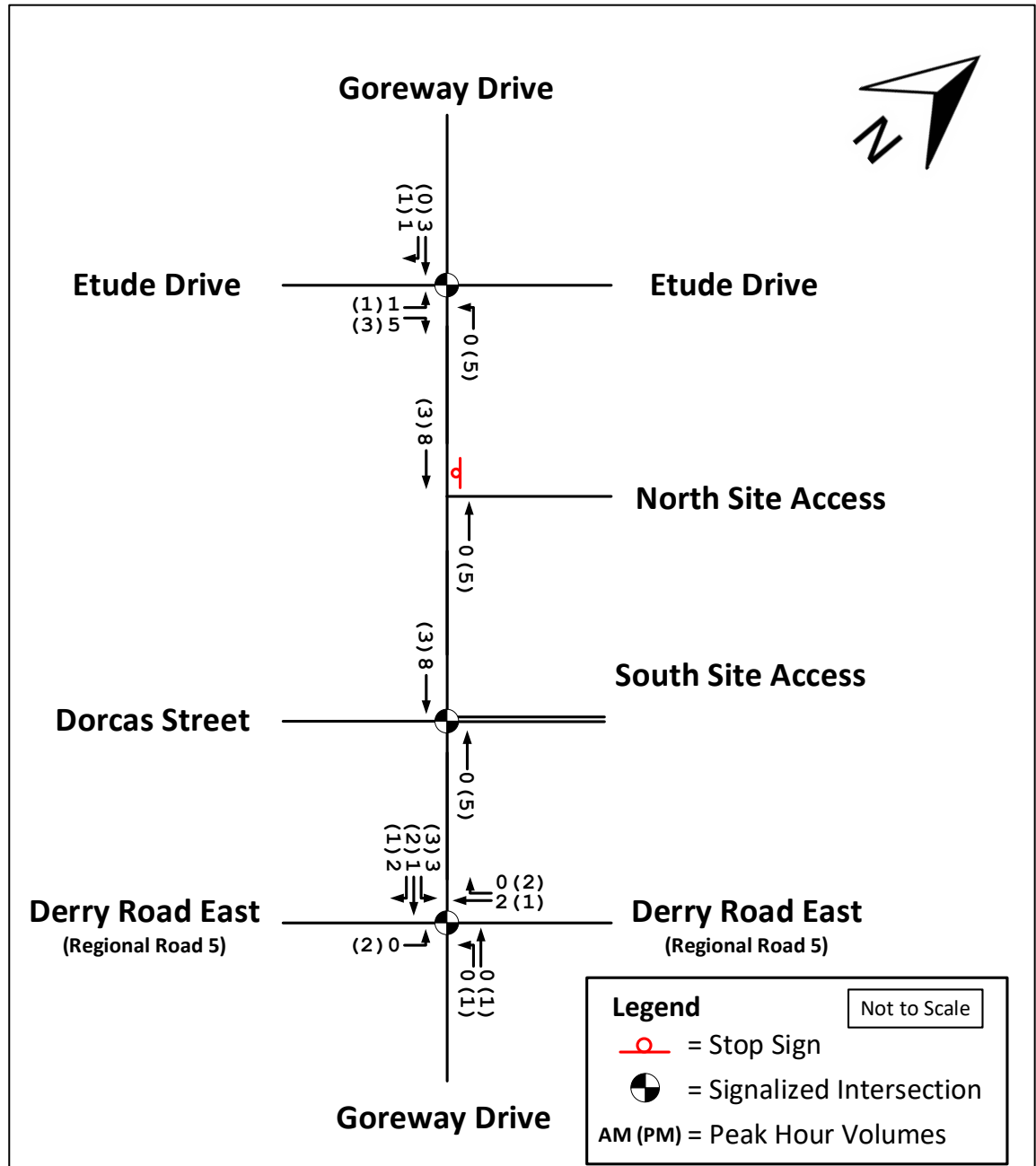
Institute of Transportation Engineers **Trip Generation Manual, 10th Edition** (September 2017) publication and assigned to the road network based on logical travel patterns. For the 3427 Derry Road East development, vehicles were assumed to access the site via existing commercial accesses. For the 7170 Goreway Drive development, access was assumed to be via Etude Drive. The trip distribution for background development site trips was based on the travel patterns of existing traffic at the study area intersections, and is presented in **Exhibit 3-4.**

Exhibit 3-4: Background Development Site Trip Distribution

| Inbound Trips | | | Outbound Trips | | |
|------------------------|----------------------|----------------------|------------------------|----------------------|----------------------|
| From | Weekday AM Peak Hour | Weekday PM Peak Hour | To | Weekday AM Peak Hour | Weekday PM Peak Hour |
| Goreway Drive (north) | 35% | 15% | Goreway Drive (north) | 15% | 30% |
| Goreway Drive (south) | 5% | 20% | Goreway Drive (south) | 20% | 10% |
| Derry Road East (east) | 30% | 30% | Derry Road East (east) | 35% | 35% |
| Derry Road East (west) | 30% | 35% | Derry Road East (west) | 30% | 25% |
| Total | 100% | 100% | Total | 100% | 100% |

Based on the above analysis, net new automobile trips added to the study area from background developments are illustrated in **Exhibit 3-5.**

Exhibit 3-5: Background Development Site Trips

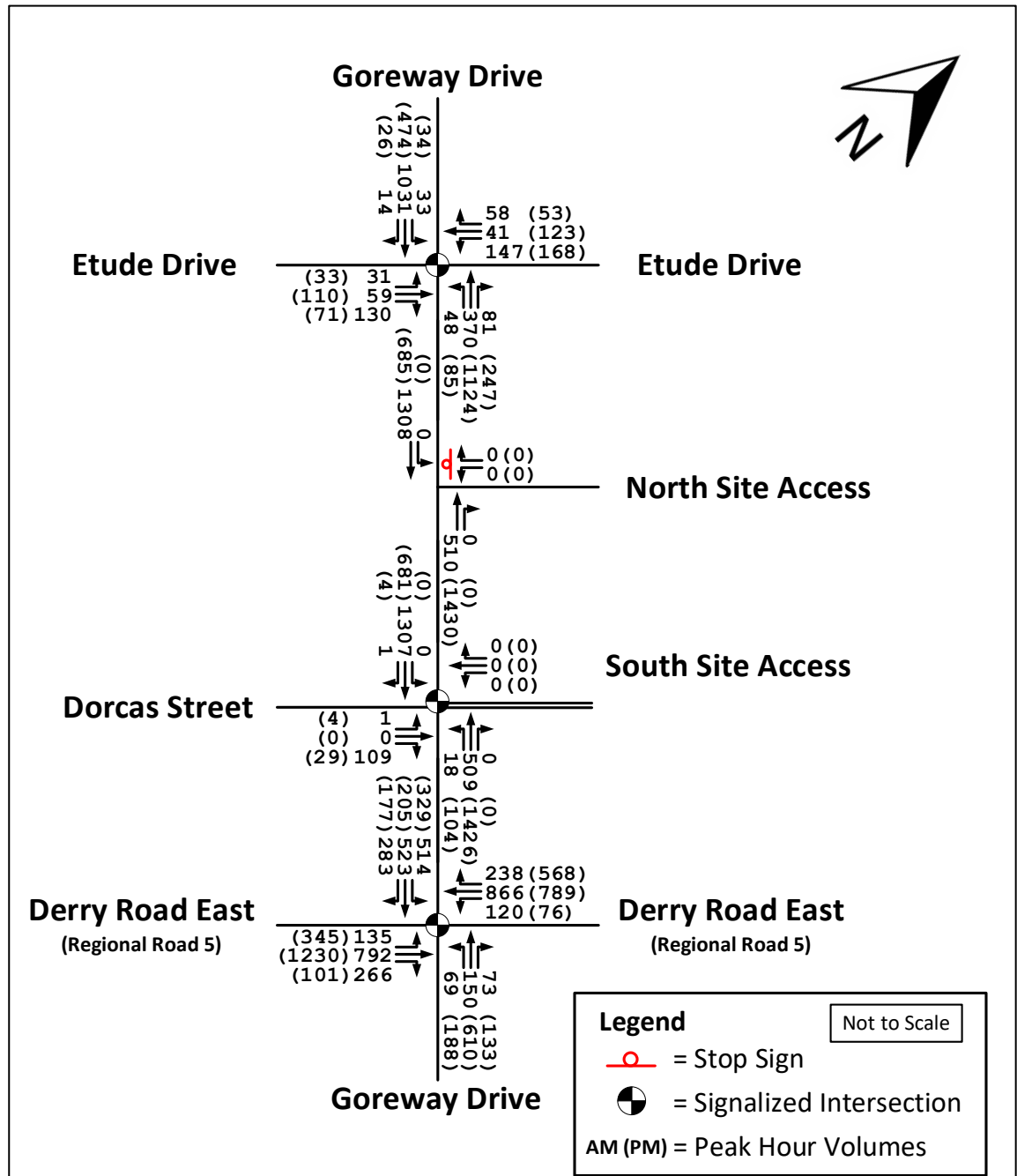


Note: The arrows in this diagram do not represent the lane configuration and are meant to represent turning movements.

3.5 2025 Future Background Analysis

New trips resulting from background growth were added to the existing conditions scenario, producing the 2025 future background traffic volumes illustrated in **Exhibit 3-6**.

Exhibit 3-6: 2025 Future Background Conditions Traffic Volumes



Note: The arrows in this diagram do not represent the lane configuration and are meant to represent turning movements.

Using the 2025 Future Background traffic volumes illustrated in **Exhibit 3-6**, traffic operations analysis was conducted to determine future intersection performance without the impact of the proposed development for the 2025 Future Background Conditions. The results of the signalized intersection traffic operations analysis is presented in **Exhibit 3-7**.

Exhibit 3-7: 2025 Future Background Conditions Traffic Operations – Signalized Intersection Summary

| Intersection | Intersection Summary | | | Individual Movement | | | | | |
|--|----------------------|-------|-----------|---------------------|-----|-----------|-----------|---------------------------------------|----------------------|
| | LOS | Delay | v/c Ratio | Movement | LOS | Delay (s) | v/c Ratio | 95 th Percentile Queue (m) | Storage Capacity (m) |
| Weekday AM Peak Hour | | | | | | | | | |
| Goreway Drive and Derry Road East | D | 47.9 | 0.65 | EBL | E | 73.4 | 0.51 | 33 | 120 |
| | | | | EBT | D | 40.8 | 0.50 | 88 | - |
| | | | | EBR | D | 35.6 | 0.19 | 20 | 100 |
| | | | | WBL | D | 35.0 | 0.46 | 36 | 78 |
| | | | | WBT | D | 45.3 | 0.55 | 101 | - |
| | | | | WBR | D | 39.2 | 0.18 | 21 | 90 |
| | | | | NBL | E | 73.2 | 0.36 | 19 | 82 |
| | | | | NBT | D | 48.9 | 0.18 | 31 | - |
| | | | | NBR | D | 47.4 | 0.06 | - | 73 |
| | | | | SBL | E | 69.2 | 0.79 | 99 | 101 |
| Goreway Drive and Dorcas Street / South Site Access / 7075 Goreway Drive Site Access | A | 8.5 | 0.54 | EBLR | D | 53.1 | 0.56 | 31 | - |
| | | | | NBL | A | 3.8 | 0.09 | 4 | 60 |
| | | | | NBT | A | 3.2 | 0.21 | 24 | - |
| | | | | SBTR | A | 6.1 | 0.54 | 109 | - |
| Goreway Drive and Etude Drive | C | 22.8 | 0.62 | EBL | D | 37.8 | 0.13 | 14 | 70 |
| | | | | EBTR | D | 38.8 | 0.35 | 40 | - |
| | | | | WBL | F | 94.9 | 0.94 | 58 | 37 |
| | | | | WBT | D | 36.1 | 0.11 | 16 | - |
| | | | | WBR | D | 37.0 | 0.05 | 9 | 33 |
| | | | | NBL | A | 9.0 | 0.18 | 8 | 53 |
| | | | | NBTR | A | 7.3 | 0.20 | 31 | - |
| | | | | SBL | B | 10.1 | 0.07 | 10 | 30 |
| SBTR | B | 14.6 | 0.56 | 120 | - | | | | |

| Intersection | Intersection Summary | | | Individual Movement | | | | | |
|--|----------------------|-------|-----------|---------------------|-----|-----------|-----------|---------------------------------------|----------------------|
| | LOS | Delay | v/c Ratio | Movement | LOS | Delay (s) | v/c Ratio | 95 th Percentile Queue (m) | Storage Capacity (m) |
| Weekday PM Peak Hour | | | | | | | | | |
| Goreway Drive and Derry Road East | E | 55.8 | 0.72 | EBL | F | 138 | 1.06 | 94 | 120 |
| | | | | EBT | D | 43.9 | 0.67 | 143 | - |
| | | | | EBR | C | 32.6 | 0.08 | 9 | 100 |
| | | | | WBL | C | 34.8 | 0.42 | 23 | 78 |
| | | | | WBT | D | 44.2 | 0.51 | 90 | - |
| | | | | WBR | D | 53.4 | 0.67 | 117 | 90 |
| | | | | NBL | E | 72.7 | 0.58 | 43 | 82 |
| | | | | NBT | D | 54.6 | 0.64 | 114 | - |
| | | | | NBR | D | 44.3 | 0.10 | 18 | 73 |
| | | | | SBL | E | 70.5 | 0.69 | 67 | 101 |
| SBTR | D | 43.0 | 0.31 | 46 | - | | | | |
| Goreway Drive and Dorcas Street / South Site Access / 7075 Goreway Drive Site Access | A | 3.4 | 0.46 | EBLR | D | 53.2 | 0.10 | 6 | 120 |
| | | | | NBL | A | 2.5 | 0.19 | 8 | - |
| | | | | NBT | A | 2.8 | 0.49 | 50 | 100 |
| | | | | SBTR | A | 1.2 | 0.26 | 10 | 78 |
| Goreway Drive and Etude Drive | C | 21.7 | 0.72 | EBL | D | 36.2 | 0.17 | 14 | 70 |
| | | | | EBTR | D | 38.3 | 0.47 | 50 | - |
| | | | | WBL | F | 97.3 | 0.96 | 78 | 37 |
| | | | | WBT | D | 35.7 | 0.27 | 39 | - |
| | | | | WBR | C | 34.8 | 0.04 | 10 | 33 |
| | | | | NBL | A | 6.2 | 0.17 | 8 | 53 |
| | | | | NBTR | B | 11.5 | 0.65 | 134 | - |
| | | | | SBL | B | 17.9 | 0.28 | 13 | 30 |
| SBTR | B | 13.7 | 0.33 | 49 | - | | | | |

Red text indicates a movement which exceeds critical thresholds.

As shown in **Exhibit 3-7**, the signalized study area intersections are anticipated to operate within capacity overall during the weekday AM and PM peak hours during the 2025 Future Background Traffic Conditions.

With regards to specific movements during the weekday AM peak hour, the following is noted:

- The westbound left-turn movement at the Goreway Drive and Etude Drive intersection is expected to continue operating above critical capacity thresholds (v/c ratio of 0.94), with a queue storage spillover of up to three car lengths.

During the weekday PM peak hour, the following observations are noted:

- The eastbound left-turn movement at the Goreway Drive and Derry Road East intersection is anticipated to continue operating above capacity (v/c ratio of 1.06);
- The westbound right-turn movement at the Goreway Drive and Derry Road East intersection is expected to continue experiencing queue storage spillovers (of up to four car lengths), similar to the 2020 existing conditions scenario; and
- The westbound left-turn movement at the Goreway Drive and Etude Drive intersection is anticipated to operate above critical capacity thresholds (v/c ratio of

0.96), with similar queue storage spillovers (up to six car lengths) as to those observed under existing conditions.

Possible measures to mitigate these constraints include signal timing adjustments and lane conversions. Measures to mitigate constraints anticipated under 2025 Future Background Traffic Conditions are discussed further with the addition of site traffic under 2025 Future Total Conditions in **Section 4.4**.

It should be noted that, as the site accesses would remain unused under future background conditions, no vehicle volumes would be observed. Full Highway Capacity Manual analysis for the 2025 future background conditions scenario is presented in **Appendix E**.

4 2025 Future Total Conditions

This section of the report analyzes the impact of the proposed development on the 2025 future transportation network.

4.1 Site Access and Lane Configuration

As discussed in **Section 1.3**, vehicular traffic is proposed to access the proposed development via a single full-movement access on Goreway Drive opposite to Dorcas Street. The existing North Site Access is proposed to be removed.

4.1.1 Goreway Drive and Dorcas Street / Site South Access Intersection Geometric Reconfiguration

As per discussions with City staff, the Goreway Drive and Dorcas Street / South Site Access intersection is proposed to be reconfigured to address various vehicle and pedestrian safety concerns.

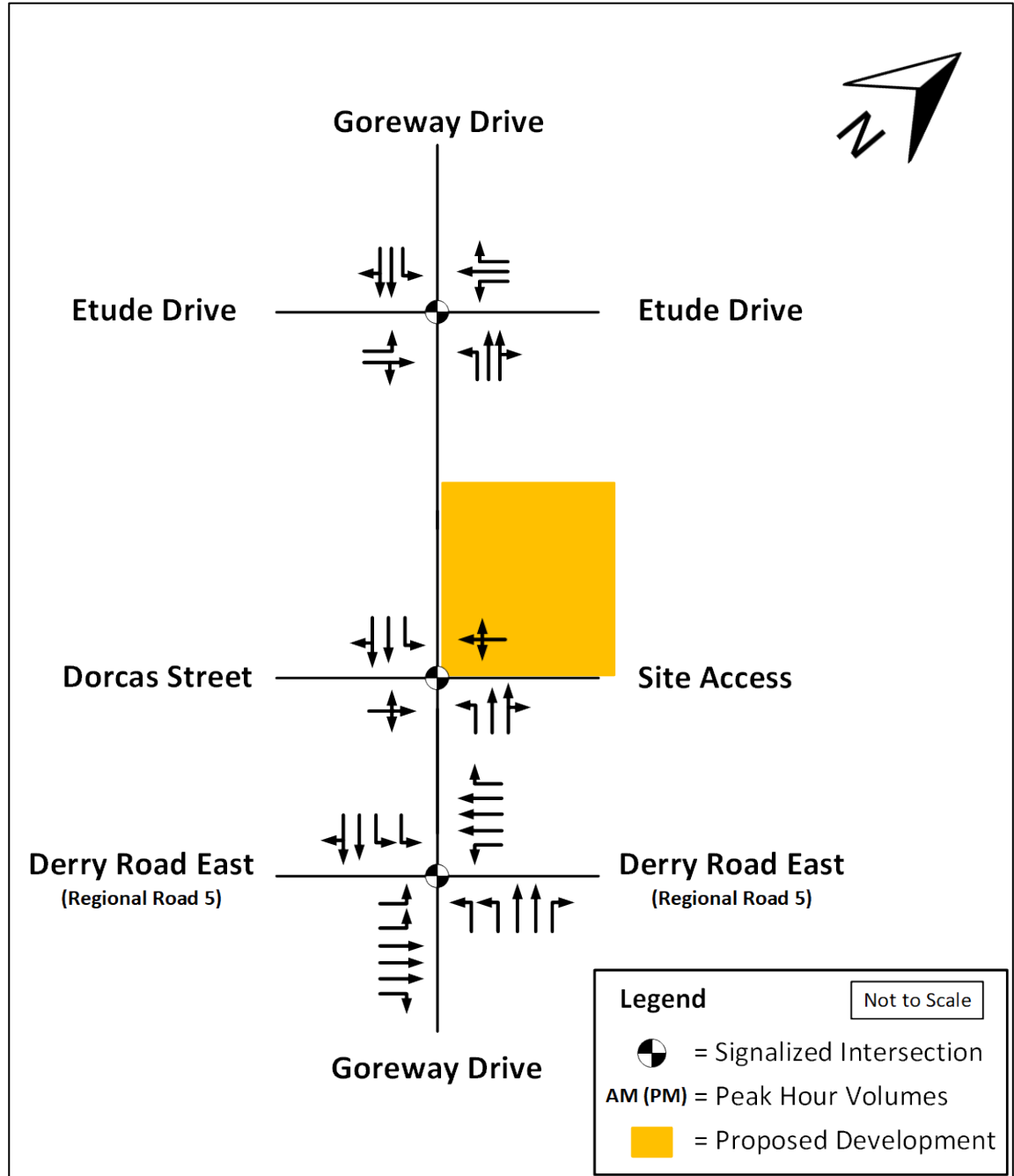
Part of the proposed intersection reconfiguration involves the east leg (i.e. removing the northern access in favour of keeping the southern access) to provide better alignment with the Dorcas Street west leg, subject to property constraints. This proposed adjustment also requires that the north approach's stop bar and crosswalk to be re-aligned, due to a longer vehicle crossing distance and to reduce pedestrian-vehicle conflict points.

This reconfiguration will subsequently result in an increase of the northbound/southbound all-red interval by 1.0 second, as per clearance interval guidance provided in **Ontario Traffic Manual Book 12: Traffic Signals**. It should be noted that the northbound/southbound amber times remain unchanged. The 2025 future total traffic conditions scenario incorporates the proposed 1.0 second all-red interval adjustment.

The proposed study area lane configurations are illustrated in **Exhibit 4-1**. It should be noted that as the North Site Access is proposed to be removed, the remaining access will be referred to as the 'Site Access' in the Future Total Conditions scenario.

The specific geometric changes to the Goreway Drive and Dorcas Street / Site Access intersection are discussed in further detail in **Section 7.1**.

Exhibit 4-1: Proposed Study Area Lane Configurations



4.2 Trip Generation

The vehicle trips expected to be generated by the proposed development are examined in this section. These trips were then assigned and distributed to the study area road network.

4.2.1 Gross Trip Generation

Trip generation rates from the Institute of Transportation Engineers *Trip Generation Manual, 10th Edition* (September 2017) publication were used to estimate future automobile trips associated with the proposed development. Based on the nature of the proposed development and its location context, fitted curve data for Land Use Codes (LUCs) 220: Multifamily Housing (Low-Rise), General Urban / Suburban and 222: Multifamily Housing (High-Rise), General Urban / Suburban were used.

It should be noted that the following trip generation estimates and subsequent traffic analysis are based on an earlier development concept which had consisted of 245 apartment dwelling units and 16 townhouse units (17 more apartment dwelling units and two less townhouse units when compared to the current concept). In addition, this earlier iteration did not contain a commercial component. Given that the overall unit count has decreased, and that the commercial component is expected to primarily serve residents of the development and other dwellings within walking distance, the total number of net new vehicle trips – and the resulting traffic operations – is expected to be comparable to or lower than the estimates presented in this report.

4.2.2 Trip Generation Summary

The estimated automobile trips, and the net new inbound and outbound vehicle trips for the proposed development are presented in **Exhibit 4-2**.

Exhibit 4-2: Trip Generation Summary

| 7085 Goreway Drive | | | | | |
|---|----------------------|-------------------------------|-----|-------------------------------|-----|
| LUC 220: Multifamily Housing (Low-Rise) – General Urban / Suburban – 16 Dwelling Units | | | | | |
| Term | Unit | Weekday AM Peak Hour | | Weekday PM Peak Hour | |
| Trip Generation Equation | - | $\ln(T) = 0.95 \ln(X) - 0.51$ | | $\ln(T) = 0.89 \ln(X) - 0.02$ | |
| Trip Generation Rate | vehicle trips / unit | 0.50 | | 0.75 | |
| Total Trips | vehicle trips / hour | 8 | | 12 | |
| New Inbound Trips | vehicles / hour | 2 | 23% | 7 | 63% |
| New Outbound Trips | vehicles / hour | 6 | 77% | 5 | 37% |
| LUC 222 Multifamily Housing (High-Rise) – General Urban / Suburban – 245 Dwelling Units | | | | | |
| Term | Unit | Weekday AM Peak Hour | | Weekday PM Peak Hour | |
| Trip Generation Equation | - | $T = 0.28(X) + 12.86$ | | $T = 0.34(X) + 8.56$ | |
| Trip Generation Rate | vehicle trips / unit | 0.33 | | 0.37 | |
| Total Trips | vehicle trips / hour | 81 | | 92 | |
| New Inbound Trips | vehicles / hour | 19 | 24% | 56 | 61% |
| New Outbound Trips | vehicles / hour | 62 | 76% | 36 | 39% |
| Net New Trips | | | | | |
| Term | Unit | Weekday AM Peak Hour | | Weekday PM Peak Hour | |
| Total Net New Trips | vehicle trips / hour | 89 | | 104 | |
| Net New Inbound Trips | vehicles / hour | 21 | | 63 | |
| Net New Outbound Trips | vehicles / hour | 68 | | 41 | |

Based on 245 apartment dwelling units and 16 townhouse units, the proposed development site is expected to produce up to 89 net new vehicle trips during the weekday AM peak hour (21 inbound trips and 68 outbound trips) and up to 104 net new vehicle trips during the weekday PM peak hour (63 inbound trips and 41 outbound trips).

4.2.3 Trip Distribution and Assignment

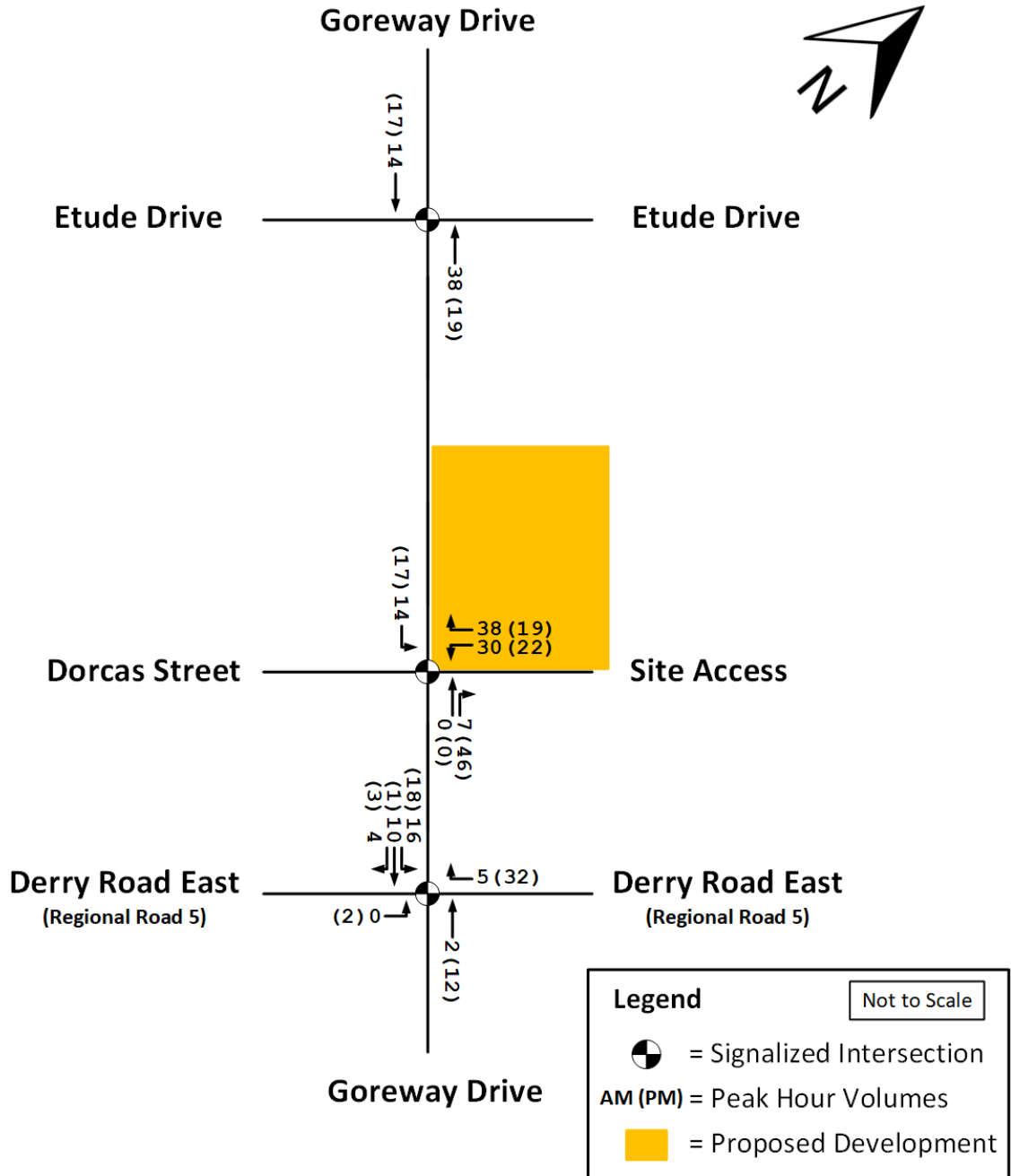
The trip distribution for site trips was based on the 2016 Transportation Tomorrow Survey (TTS) data and is presented in **Exhibit 4-3**.

Exhibit 4-3: Site Trip Distribution

| Inbound Trips | | | Outbound Trips | | |
|------------------------|----------------------|----------------------|------------------------|----------------------|----------------------|
| From | Weekday AM Peak Hour | Weekday PM Peak Hour | To | Weekday AM Peak Hour | Weekday PM Peak Hour |
| Goreway Drive (north) | 68% | 28% | Goreway Drive (north) | 56% | 49% |
| Goreway Drive (south) | 6% | 19% | Goreway Drive (south) | 15% | 0% |
| Derry Road East (east) | 26% | 50% | Derry Road East (east) | 23% | 44% |
| Derry Road East (west) | 0% | 3% | Derry Road East (west) | 6% | 7% |
| Total | 100% | 100% | Total | 100% | 100% |

Site trips were assigned to the study area roadways based on the 2016 TTS data, as illustrated in **Exhibit 4-4**.

Exhibit 4-4: Net New Site Traffic Volumes

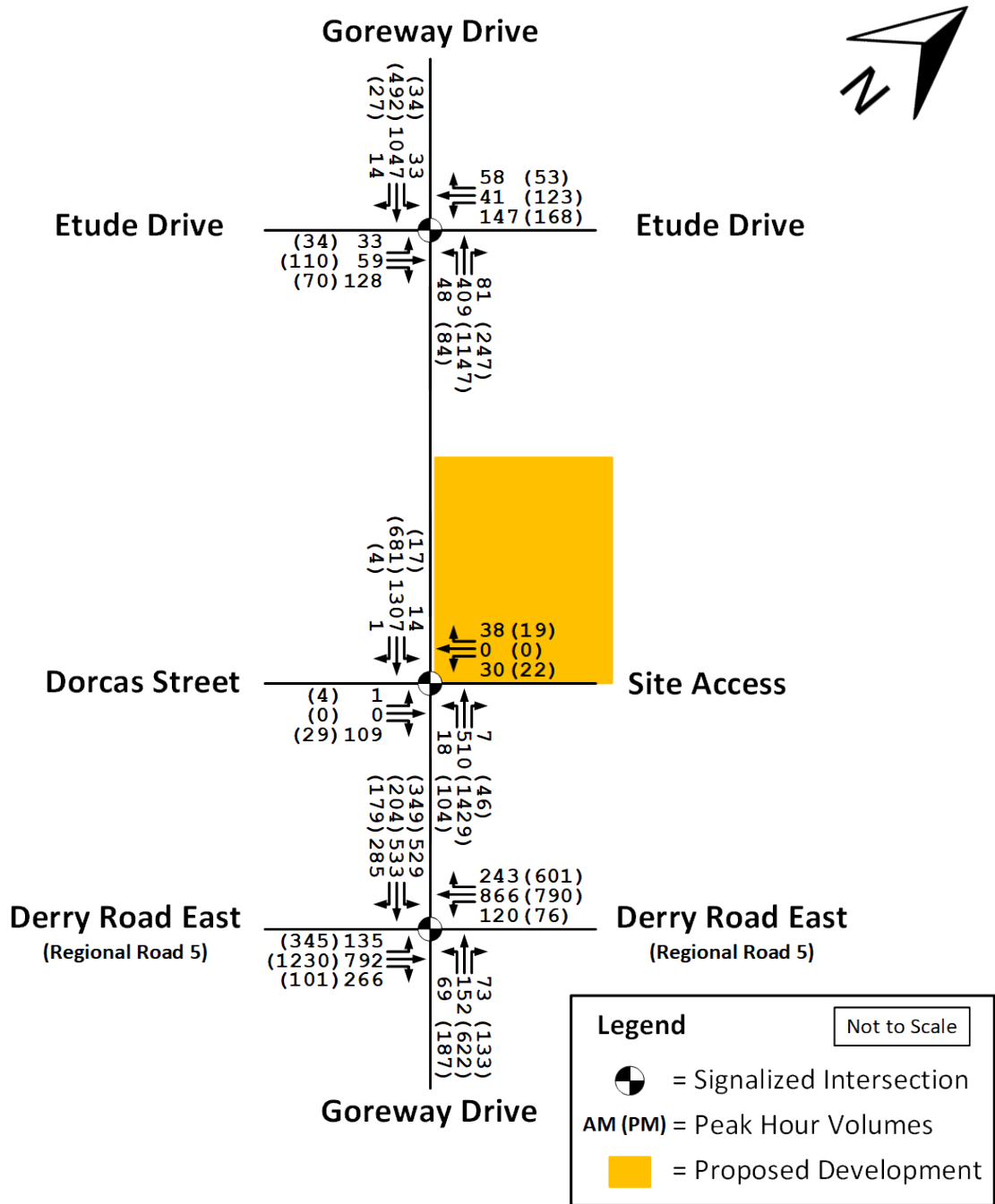


Note: The arrows in this diagram do not represent the lane configuration and are meant to represent turning movements.

4.3 2025 Future Total Conditions Analysis

New trips resulting from the construction of the proposed development were added to the 2025 future background conditions scenario, producing the 2025 future total traffic volumes illustrated in **Exhibit 4-5**.

Exhibit 4-5: 2025 Future Total Conditions Traffic Volumes



Note: The arrows in this diagram do not represent the lane configuration and are meant to represent turning movements.

Using the 2025 Future Total traffic volumes illustrated in **Exhibit 4-5**, traffic operations analysis was conducted to determine future intersection performance with the impact of the proposed development for the 2025 Future Total Conditions. The results of the signalized intersection traffic operations analysis is presented in **Exhibit 4-6**. It should be noted that the trip generation estimates for the proposed development are based on an earlier development concept with a higher dwelling unit count (as discussed in **Section 4.2.2**). Therefore, conditions experienced by road users are expected to be better than reported below in **Exhibit 4-6**.

Exhibit 4-6: 2025 Future Total Condition Traffic Operations – Signalized Intersection Summary

| Intersection | Intersection Summary | | | Individual Movement | | | | | |
|---|----------------------|-------|-----------|---------------------|-----|-----------|-----------|---------------------------------------|----------------------|
| | LOS | Delay | v/c Ratio | Movement | LOS | Delay (s) | v/c Ratio | 95 th Percentile Queue (m) | Storage Capacity (m) |
| Weekday AM Peak Hour | | | | | | | | | |
| Goreway Drive and Derry Road East | D | 48.2 | 0.65 | EBL | E | 73.4 | 0.51 | 33 | 120 |
| | | | | EBT | D | 41.0 | 0.50 | 88 | - |
| | | | | EBR | D | 35.8 | 0.19 | 20 | 100 |
| | | | | WBL | D | 35.3 | 0.47 | 36 | 78 |
| | | | | WBT | D | 45.6 | 0.55 | 101 | - |
| | | | | WBR | D | 39.4 | 0.18 | 21 | 90 |
| | | | | NBL | E | 73.2 | 0.36 | 19 | 82 |
| | | | | NBT | D | 49.2 | 0.19 | 31 | - |
| | | | | NBR | D | 47.6 | 0.06 | - | 73 |
| | | | | SBL | E | 69.1 | 0.80 | 102 | 101 |
| SBT | D | 46.4 | 0.68 | 132 | - | | | | |
| Goreway Drive and Dorcas Street / Site Access | A | 9.8 | 0.54 | EBT | D | 53.1 | 0.56 | 31 | - |
| | | | | WBT | D | 50.2 | 0.34 | 22 | - |
| | | | | NBL | A | 4.0 | 0.09 | 4 | 60 |
| | | | | NBT | A | 3.2 | 0.22 | 25 | - |
| | | | | SBL | A | 1.3 | 0.03 | 1 | 34 |
| SBT | A | 6.1 | 0.54 | 104 | - | | | | |
| Goreway Drive and Etude Drive | C | 22.5 | 0.62 | EBL | D | 38.0 | 0.14 | 15 | 70 |
| | | | | EBT | D | 38.8 | 0.35 | 40 | - |
| | | | | WBL | F | 95.0 | 0.94 | 58 | 37 |
| | | | | WBT | D | 36.1 | 0.11 | 16 | - |
| | | | | WBR | D | 37.1 | 0.05 | 9 | 33 |
| | | | | NBL | A | 8.6 | 0.18 | 8 | 53 |
| | | | | NBT | A | 7.1 | 0.22 | 32 | - |
| | | | | SBL | B | 10.1 | 0.07 | 10 | 30 |
| SBT | B | 14.7 | 0.57 | 122 | - | | | | |

| Intersection | Intersection Summary | | | Individual Movement | | | | | |
|---|----------------------|-------|-----------|---------------------|-----|-----------|-----------|---------------------------------------|----------------------|
| | LOS | Delay | v/c Ratio | Movement | LOS | Delay (s) | v/c Ratio | 95 th Percentile Queue (m) | Storage Capacity (m) |
| Weekday PM Peak Hour | | | | | | | | | |
| Goreway Drive and Derry Road East | E | 56.5 | 0.75 | EBL | F | 138.0 | 1.06 | 94 | 120 |
| | | | | EBT | D | 43.8 | 0.67 | 143 | - |
| | | | | EBR | C | 32.6 | 0.08 | 9 | 100 |
| | | | | WBL | C | 34.7 | 0.42 | 23 | 78 |
| | | | | WBT | D | 44.2 | 0.51 | 90 | - |
| | | | | WBR | E | 57.3 | 0.74 | 143 | 90 |
| | | | | NBL | E | 72.8 | 0.58 | 43 | 82 |
| | | | | NBT | E | 56.4 | 0.67 | 118 | - |
| | | | | NBR | D | 45.2 | 0.11 | 19 | 73 |
| | | | | SBL | E | 70.2 | 0.70 | 70 | 101 |
| Goreway Drive and Dorcas Street / Site Access | A | 4.4 | 0.48 | EBT | D | 53.2 | 0.10 | 6 | - |
| | | | | WBT | D | 53.4 | 0.12 | 13 | - |
| | | | | NBL | A | 2.7 | 0.19 | 9 | 60 |
| | | | | NBT | A | 2.9 | 0.51 | 53 | - |
| | | | | SBL | A | 1.7 | 0.08 | 1 | 34 |
| | | | | SBT | A | 1.2 | 0.26 | 10 | - |
| Goreway Drive and Etude Drive | C | 21.7 | 0.73 | EBL | D | 36.4 | 0.18 | 14 | 70 |
| | | | | EBT | D | 38.3 | 0.47 | 50 | - |
| | | | | WBL | F | 97.3 | 0.96 | 78 | 37 |
| | | | | WBT | D | 35.8 | 0.27 | 39 | - |
| | | | | WBR | C | 34.9 | 0.04 | 10 | 33 |
| | | | | NBL | A | 6.2 | 0.17 | 9 | 53 |
| | | | | NBT | B | 11.7 | 0.66 | 139 | - |
| | | | | SBL | B | 18.2 | 0.29 | 13 | 30 |
| SBT | B | 13.8 | 0.34 | 51 | - | | | | |

Red text indicates a movement which exceeds critical thresholds.

As shown in **Exhibit 4-6**, the signalized study area intersections are expected to operate within capacity overall during the weekday AM and PM peak hours for the 2025 Future Total Conditions.

- With regards to specific movements during the weekday AM peak hour, the following is noted:
 - The southbound left-turn movement at the Goreway Drive and Derry Road East is anticipated to experience a queue storage spillover of up to one car length.
 - The westbound left-turn movement at the Goreway Drive and Etude Drive intersection is anticipated to continue operating above critical capacity thresholds (v/c ratio of 0.94), with similar queue storage spillovers (up to three car lengths) as anticipated under 2025 future background conditions.

- During the weekday PM peak hour, the following observations are noted:
 - The eastbound left-turn movement at the Goreway Drive and Derry Road East intersection is anticipated to operate above critical capacity thresholds (v/c ratio of 1.06), however the lane storage is not exceeded.
 - The westbound right-turn movement at the Goreway Drive and Derry Road East intersection is anticipated to continue experiencing queue storage spillovers (up to eight car lengths), as is already anticipated under 2025 future background conditions.
 - The westbound left-turn movement at the Goreway Drive and Etude Drive intersection is anticipated to continue operating above critical capacity thresholds (v/c ratio of 0.96), with similar queue storage spillovers (up to six car lengths) as anticipated under 2025 future background conditions.

Full Highway Capacity Manual analysis for the future total conditions scenario is presented in **Appendix F**.

4.4 Mitigation Measures

In the previous section, several critical movements at the signalized study area intersections were noted under future total traffic conditions. This section discusses measures to mitigate these critical movements, where feasible.

4.4.1 Goreway Drive and Derry Road East

Under 2025 future total conditions, the southbound left-turn movement at the Goreway Drive and Derry Road East intersection is expected to experience a queue storage spillover of up to one car length during the weekday AM peak hour (as noted in **Exhibit 4-6**). This estimated queue storage spillover is based on 95th percentile queue lengths, and is statistically unlikely to be experienced by motorists on average.

It should also be noted that under 2025 Future Background Conditions (i.e. without the proposed development), queues at the southbound left-turn movement during the weekday AM peak hour are expected to occupy all the available storage capacity, despite not surpassing critical thresholds. Furthermore, the impact of one additional vehicle within the available storage lanes is expected to be minimal on traffic operations. Therefore, as this queuing constraint is expected under future background conditions, no mitigation measures specific to the Goreway Drive and Derry Road East intersection's southbound left-turn movement during the weekday AM peak hour are recommended.

During the weekday PM peak hour, this intersection's eastbound left-turn movement was found to operate above capacity during existing, future background, and future total traffic conditions (v/c ratios of 1.05, 1.06, and 1.06, respectively). To mitigate this capacity constraint, 3.0 seconds of green time from the westbound through movement have been transferred to the eastbound left-turn movement during the weekday PM peak hour. Mitigated future background and future total traffic operations at the Goreway Drive and Derry Road East intersection resulting from this signal timing adjustment are summarized in **Exhibit 4-7**.

Exhibit 4-7: 2025 Future Background and Future Total Conditions Traffic Operations (Weekday PM Peak Hour, Mitigated) – Goreway Drive and Derry Road East

| Intersection | Intersection Summary | | | Individual Movement | | | | | |
|--|----------------------|-------|-----------|---------------------|-----|-----------|-----------|---------------------------------------|----------------------|
| | LOS | Delay | v/c Ratio | Movement | LOS | Delay (s) | v/c Ratio | 95 th Percentile Queue (m) | Storage Capacity (m) |
| Weekday PM Peak Hour (2025 Future Background) | | | | | | | | | |
| Goreway Drive and Derry Road East | D | 53.5 | 0.71 | EBL | F | 92.5 | 0.89 | 84 | 120 |
| | | | | EBS | D | 43.9 | 0.67 | 143 | - |
| | | | | EBR | C | 32.6 | 0.08 | 9 | 100 |
| | | | | WBL | D | 36.3 | 0.42 | 23 | 78 |
| | | | | WBT | D | 46.9 | 0.54 | 93 | - |
| | | | | WBR | E | 57.9 | 0.71 | 126 | 90 |
| | | | | NBL | E | 72.7 | 0.58 | 43 | 82 |
| | | | | NBT | D | 54.6 | 0.64 | 114 | - |
| | | | | NBR | D | 44.2 | 0.09 | 12 | 73 |
| | | | | SBL | E | 70.5 | 0.69 | 67 | 101 |
| SBTR | D | 43.0 | 0.31 | 46 | - | | | | |
| Weekday PM Peak Hour (2025 Future Total) | | | | | | | | | |
| Goreway Drive and Derry Road East | E | 54.5 | 0.75 | EBL | F | 92.5 | 0.89 | 84 | 120 |
| | | | | EBS | D | 43.8 | 0.67 | 143 | - |
| | | | | EBR | C | 32.6 | 0.08 | 9 | 100 |
| | | | | WBL | D | 36.2 | 0.42 | 23 | 78 |
| | | | | WBT | D | 46.9 | 0.54 | 93 | - |
| | | | | WBR | E | 63.1 | 0.79 | 160 | 90 |
| | | | | NBL | E | 72.8 | 0.58 | 43 | 82 |
| | | | | NBT | E | 56.4 | 0.67 | 118 | - |
| | | | | NBR | D | 45.0 | 0.09 | 12 | 73 |
| | | | | SBL | E | 70.2 | 0.70 | 70 | 101 |
| SBTR | D | 43.0 | 0.31 | 45 | - | | | | |

Red text indicates a movement which exceeds critical thresholds.

When compared to unmitigated traffic operations, the v/c ratio for the Goreway Drive and Derry Road East intersection’s eastbound left-turn movement under the signal timing adjustment is anticipated to decrease from 1.06 to 0.89 for future background conditions and future total conditions. Overall, the transfer of 3.0 seconds of green time from the westbound through movement split to the eastbound left-turn movement split during the weekday PM peak hour is expected to result in all movements at this intersection operating within capacity.

It should be noted that, due to the aforementioned signal timing adjustment for the eastbound left-turn movement, the queue storage spillover associated with the westbound right-turn movement is anticipated to increase from up to eight car lengths (before signal timing adjustments) to up to ten car lengths (after signal timing adjustments) during the weekday PM peak hour, under future total traffic conditions. Notwithstanding, these queue storage spillovers are observed under existing conditions and are expected to continue under future conditions regardless of the proposed development, as illustrated in **Exhibit 4-8**.

Exhibit 4-8: Goreway Drive and Derry Road East Intersection Queue Comparison

| Intersection | Peak Hour | Movement | 2020 Existing Conditions | | | 2025 Future Background Conditions <i>(with recommended signal timing adjustment)</i> | | | 2025 Future Total Conditions <i>(with recommended signal timing adjustment)</i> | | | Storage Capacity (m) |
|-----------------------------------|-----------|----------|--------------------------|-----------|--|---|-----------|--|--|-----------|--|----------------------|
| | | | Delay | v/c Ratio | 95 th Percentile Queue Length (m) | Delay | v/c Ratio | 95 th Percentile Queue Length (m) | Delay | v/c Ratio | 95 th Percentile Queue Length (m) | |
| Goreway Drive and Derry Road East | AM | WBR | 39.2 | 0.18 | 21 | 39.2 | 0.18 | 21 | 39.7 | 0.18 | 21 | 90 |
| | PM | | 53.2 | 0.67 | 117 | 57.9 | 0.71 | 126 | 63.1 | 0.79 | 160 | |

Red text indicates a movement which exceeds critical thresholds.

As shown in **Exhibit 4-8**, the impact of the proposed development on the westbound right-turn queue lengths is expected to be between three and five car lengths, depending on the implementation of signal timing adjustments. This increase is unlikely to be perceived by the average road user, especially because it would only be apparent under 95th percentile volume conditions, which are statistically unlikely to occur. Furthermore, there are sufficient westbound through lanes along Derry Road East such that infrequent blockage of the westbound curbside through lane due to queue spillovers from the westbound right-turn lane will likely have minor impacts on overall intersection operations.

When comparing traffic operations of the eastbound left-turn and westbound right-turn movements, a trade-off can be observed. As the eastbound left-turn movement is expected to operate over capacity under future background conditions, the decision of mitigating the eastbound left-turn movement’s capacity constraints at the cost of a minimal queue length increase of the westbound right-turn movement is sensible.

Full Highway Capacity Manual analysis for the mitigated 2025 future background and future total conditions scenarios is presented in **Appendix G**.

4.4.2 Goreway Drive and Etude Drive

For the Goreway Drive and Etude Drive intersection, capacity and queuing constraints were observed for the westbound left-turn movement during the weekday AM and PM peak hours under 2020 Existing Conditions. These constraints are anticipated to continue under 2025 Future Background conditions. It should be noted that there are no development site trips assigned to the constrained movement, resulting in minimal impacts as a result of the proposed development. This is illustrated in **Exhibit 4-9**.

Exhibit 4-9: Goreway Drive and Etude Drive Intersection Traffic Operations Comparison

| Intersection | Peak Hour | Movement | 2020 Existing Conditions | | | 2025 Future Background Conditions | | | 2025 Future Total Conditions | | | Storage Capacity (m) |
|-------------------------------|-----------|----------|--------------------------|-----------|--|-----------------------------------|-----------|--|------------------------------|-----------|--|----------------------|
| | | | Delay | v/c Ratio | 95 th Percentile Queue Length (m) | Delay | v/c Ratio | 95 th Percentile Queue Length (m) | Delay | v/c Ratio | 95 th Percentile Queue Length (m) | |
| Goreway Drive and Etude Drive | AM | WBL | 92.0 | 0.93 | 57 | 94.9 | 0.94 | 58 | 95.0 | 0.94 | 58 | 37 |
| | PM | | 94.6 | 0.95 | 76 | 97.3 | 0.96 | 78 | 97.3 | 0.96 | 78 | |

Red text indicates a movement which exceeds critical thresholds.

As shown in **Exhibit 4-9**, the 95th percentile queue at the westbound left-turn lane is anticipated to increase by up to 2 metres (less than one vehicle) between 2020 Existing Conditions and 2025

Future Background Conditions. Furthermore, since no site trips are anticipated to be added to this approach, no increase in queuing is anticipated under 2025 Future Total Conditions with the proposed development in place. Similarly, the v/c ratio at the westbound left-turn lane is anticipated to remain the same between future background and future total conditions in 2025. Consequently, the proposed development is not anticipated to impact the future traffic operations at this lane.

It should be noted that the westbound left-turn lane capacity constraints may be mitigated by the implementation of a protected westbound left-turn phase. However, given that the existing signal head for the westbound approach does not consist of a left-turn arrow display, it is recommended that further analysis to investigate the feasibility of this mitigation measure be undertaken.

4.5 Traffic Analysis Summary

The traffic operations analysis indicates that the addition of development site traffic to the study area is expected to have a minimal impact on the study area roadways. In comparison to 2025 future background traffic conditions, the only new critical movement detected under future total conditions is the southbound left-turn movement at the Goreway Drive and Derry Road East intersection during the weekday AM peak hour. This movement is expected to experience a queue storage spillover of up to one car length. However, the impact of one additional vehicle within the available storage lanes is expected to be minimal on traffic operations.

The eastbound left-turn movement at the Goreway Drive and Derry Road East intersection was observed to operate above capacity during the weekday PM peak hour (v/c ratio of 1.05), and is expected to continue doing so under future traffic conditions (v/c ratio of 1.06 under future background and future total conditions). To mitigate this capacity constraint, 3.0 seconds of green time from the westbound through movement split have been transferred to the eastbound left-turn movement. This results in all movements at this intersection expected to operate within capacity during the weekday PM peak hour.

Due to the above noted signal timing adjustment at the Goreway Drive and Derry Road East intersection, queues associated with the westbound right-turn movement are anticipated to increase from up to eight car lengths to up to ten car lengths during the weekday PM peak hour. Notwithstanding, these queue storage spillovers are observed under existing conditions and are expected to continue under future conditions regardless of the proposed development. When comparing traffic operations of the eastbound left-turn and westbound right-turn movements, a trade-off can be observed as a result of the aforementioned signal timing adjustment. As the eastbound left-turn movement is expected to operate over capacity under future background conditions, the decision of mitigating the eastbound left-turn movement's capacity constraints at the cost of a relatively minor queue length increase of the westbound right-turn movement is sensible.

Capacity and queuing constraints during the weekday AM and PM peak hours were noted for the westbound left-turn movement at the Goreway Drive and Etude Drive intersection under existing and future traffic conditions. As no development site trips have been assigned to the westbound left-turn movement at the Goreway Drive and Etude Drive intersection, further analyses to assess the feasibility of these mitigation measures is recommended.

5 Parking Study

As discussed in **Section 1.3**, the development proposes to provide 359 parking spaces for 246 dwelling units. The suitability of this parking supply, based on zoning by-law requirements and the regulations in other municipalities is discussed in this section.

5.1 Zoning By-law Requirements

The development site is presently governed by the City of Mississauga Zoning By-law 0225-2007 (ZBL), and would be classified as having 228 apartment dwelling units and 18 townhouse dwelling units in Parking Precinct 3. The following **Exhibit 5-1** assesses vehicular parking requirements for this development. For the purposes of analysis, tenure was assumed to be condominium, as rental units have lower parking requirements.

Exhibit 5-1: ZBL 0225-2007 Development Parking Space Requirements

| Land Use | Proposed Units/GFA | Parking Rate Requirement | Required Spaces |
|--|---|-----------------------------------|-----------------|
| Residential and Commercial Parking Requirements | | | |
| Condominium Apartment | | | |
| Apartment | 228 | 1.0 spaces per dwelling units | 228 |
| Condominium Townhouse | | | |
| Townhouse | 18 | 2.0 spaces per dwelling units | 36 |
| Commercial | | | |
| Commercial GFA | 388 m ² (4,175 ft ²) | 4.0 spaces per 100 m ² | 16 |
| Visitor Parking Requirements | | | |
| Condominium Apartment | | | |
| Visitor parking requirement | 228 | 0.20 spaces per dwelling units | 46 |
| Condominium Townhouse | | | |
| Visitor parking requirement | 18 | 0.25 spaces per dwelling units | 5 |
| Total Parking Spaces Required | | | |
| Residential and Commercial Parking Spaces Required | | | 280 |
| Visitor Parking Spaces Required | | | 51 |
| Total Parking Spaces Required | | | 331 |
| Proposed Parking Space Supply | | | 359 |
| Surplus/Deficiency | | | +28 |

As shown in **Exhibit 5-1**, a ZBL surplus of 28 spaces is anticipated. This indicates that the proposed development is expected to comply with the ZBL requirements for condominium tenure, as well as the lower requirements for rental tenure.

6 Transportation Demand Management Options

Transportation Demand Management (TDM) refers to policies, design features, and incentives which encourage sustainable transportation choices. TDM can reduce the intensity of peak hour trips by encouraging deferred travel, can reduce general automobile trips by encouraging the use of non-automobile transportation modes, and can reduce the demand for parking by reducing the need to own and operate a personal vehicle.

A Transportation Demand Management Options memorandum in support of the 7085 Goreway Drive development is presented in **Appendix H**. The memorandum notes that the development proposes to provide approximately 292 secure bicycle parking spaces and excellent pedestrian connections to nearby amenities. In addition, the development is well served by transit, which provides for an easy connection to the existing GO Transit rail station at Malton, and to the future Finch West LRT station at Humber College. Together, these features encourage sustainable transportation choice by residents, and can reduce parking demand by making an auto-free lifestyle viable.

It should be noted that the Transportation Demand Management Options report considers an earlier iteration of the proposed development concept. While there may be minor differences between this document and the broader transportation impact study, the impact of the TDM measures on travel choices is expected to remain unchanged.

7 Site Access Conceptual Design

As discussed in **Section 1**, the development site presently contains a vacant commercial building whose south access is offset approximately 10 metres to the north of Dorcas Street. In addition, a vacant commercial property (7075 Goreway Drive) immediately south of the development site has an access offset approximately 6 metres to the south of Dorcas Street. This configuration is illustrated in **Exhibit 7-1** and **Exhibit 7-2**.

Exhibit 7-1: Existing Site Plan

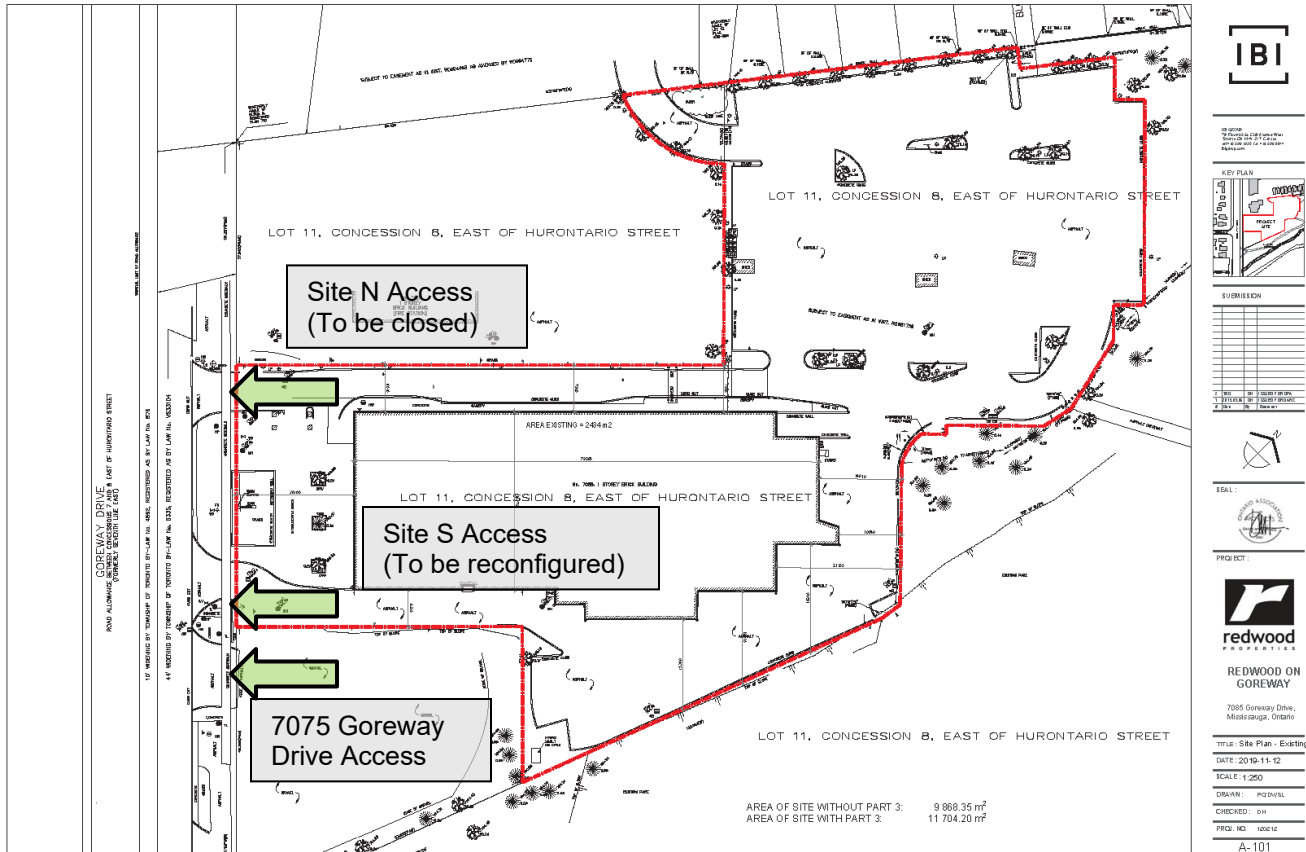
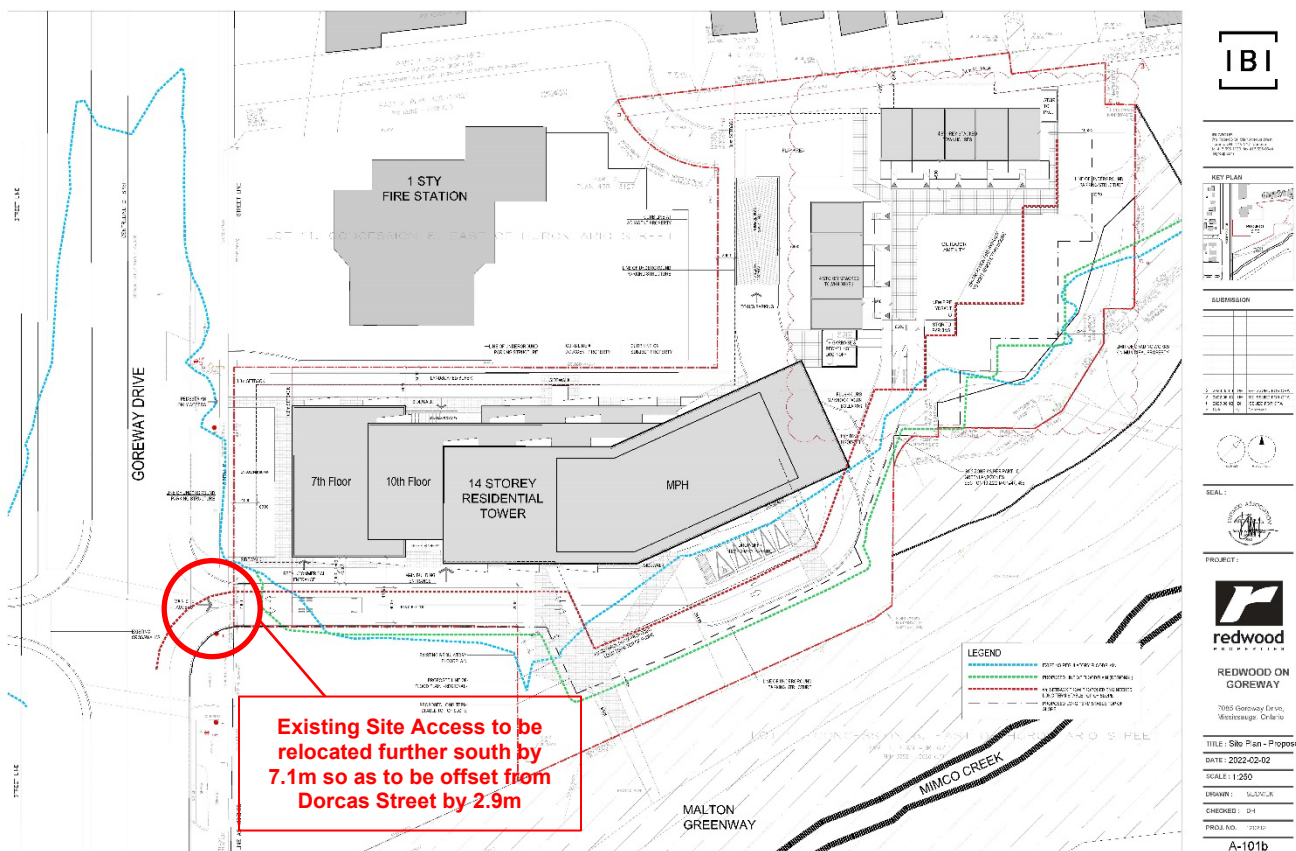


Exhibit 7-2: Existing Site Access Configuration



In order to rationalize the configuration of the Goreway Drive and Dorcas Street intersection, the development site access is proposed to be relocated to the south by 7.1m. Future conditions at the intersection are anticipated to consist of a signalized site access, which is offset from Dorcas Street by approximately 2.9 metres, as illustrated in **Exhibit 7-3**.

Exhibit 7-3: Proposed Site Plan



The operational implications of this configurations, as well as related changes to the intersection and configuration and pavement markings, are discussed in this section.

7.1 Offset Intersection

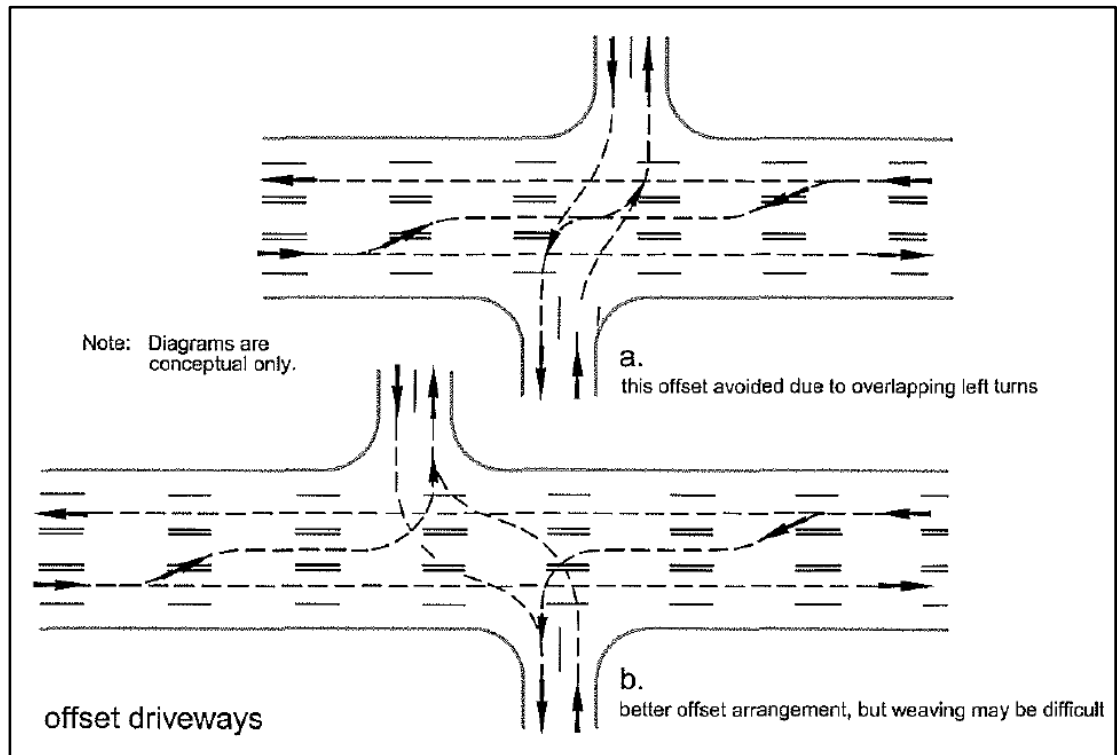
Signalized, offset intersections are not uncommon in redevelopment areas with pre-existing road alignments. Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (June 2017) indicates that offset intersection and offset access design must have regard for several factors:

- TAC chapter 8.9.9 states that “for low volume roadways, such as locals and most collectors, the spatial relationship between driveways on opposite sides of the road is not a necessary design consideration. Similarly, if one or both of the driveways are low volume, this relationship does not impact traffic operations.”
 - As the development’s 246 units² are only estimated to produce up to 89 new inbound and outbound weekday AM peak hour trips and 104 new inbound and outbound weekday PM peak hour trips [less than 2 new trips per minute, as per Institute of Transportation Engineers Trip Generation Manual, 10th Edition (September 2017)], volumes are such that impacts to traffic operations are expected to be low.

² As noted in **Section 4.2.2**, the trip generation estimates presented in this report are based on an earlier development concept which had consisted of 17 more condominium units and two fewer townhouses. The total number of trips generated under the current development concept is expected to be lower than what is reported.

- TAC chapter 8.9.9 states that “when the roadway has a moderate to high volume, and the driveway volumes are moderate to high... the examination of the relative location of opposite driveways constitutes good design practice. The key traffic movements in the analysis are the accommodation of left-turns into the opposite developments, and the inter-development traffic flow.”
 - Offset intersections, compared to aligned intersections, can introduce additional conflict points due to overlapping turning paths and “straight through” moves which involve weaving. These potential conflicts are illustrated in **Exhibit 7-4**, which provides guidance on offset intersection design. The proposed offset at the site access is consistent with option “b”, which eliminates overlapping left-turn conflicts from the major roadway;
 - With respect to inter-development traffic flow (i.e. straight through movements from Dorcas Street into the development), these volumes – and associated conflicts – are expected to be very low;
 - Potential conflicts could be further reduced by signal timing plans which separate Dorcas Street movements from development movements. This is commonly known as “split phasing”, and is typically used at offset intersections with significant offsets. However, transportation impact analysis is necessary to determine the appropriateness of this measure.

Exhibit 7-4: TAC Figure 8.9.3: Spacing Considerations for Opposing Driveways

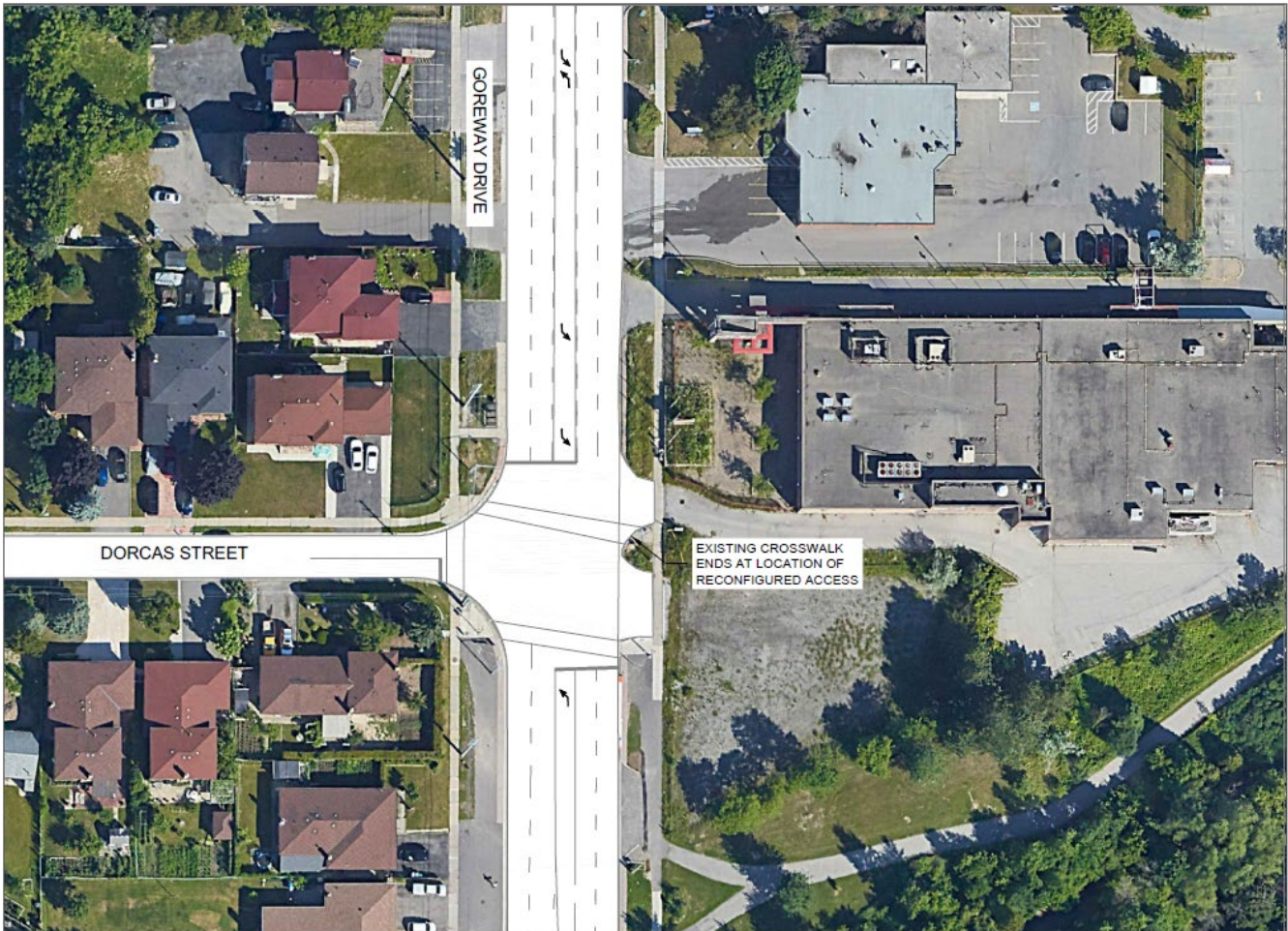


Based on the above factors, the proposed offset of 2.9 metres is preferable to maintaining the existing configuration. Volumes, particularly development site to Dorcas Street volumes, are expected to be low, and the proposed design eliminates overlapping main street left-turns.

7.2 Pavement Markings

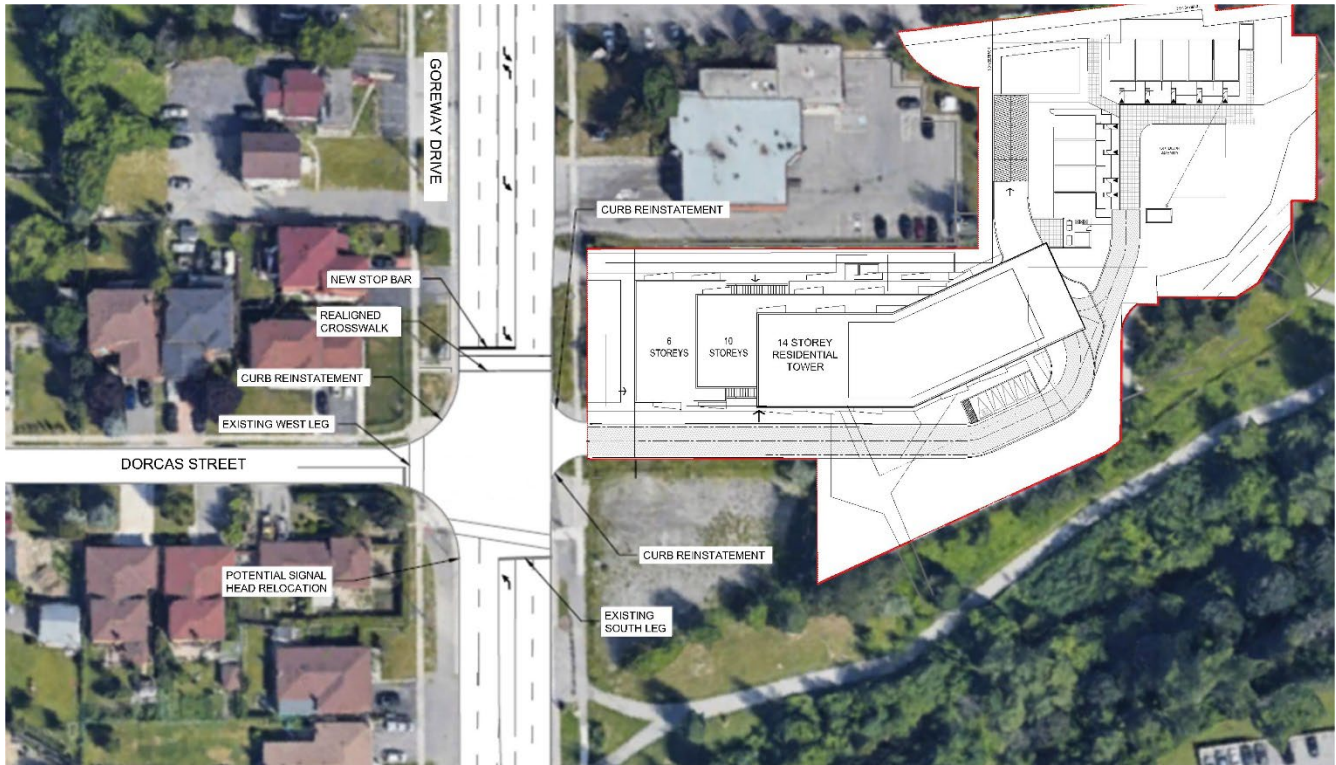
As illustrated in **Exhibit 7-5**, the existing north approach pavement markings are incompatible with the location of the proposed development access.

Exhibit 7-5: Goreway Drive and Dorcas Street Existing Lane Markings



As shown in **Exhibit 7-5**, the existing eastern pedestrian landing for the north approach crosswalk coincides with the location of the relocated access. In order to accommodate the development, and to allow for a more conventional intersection configuration, a conceptual design illustrating development opening day conditions is presented in **Exhibit 7-6**.

Exhibit 7-6: Goreway Drive and Dorcas Street Conceptual Lane Markings



As shown in **Exhibit 7-6**, modifications to pavement markings which accommodate the development site access include a re-aligned northern pedestrian crosswalk, and a relocated southbound stop bar.

For pedestrians, this configuration provides for a more familiar configuration, and reduces the crossing distance from approximately 23 metres to approximately 18 metres – though it should be noted that the existing pedestrian clearance time was maintained in the analysis presented in **Section 4**. In addition, the proposed alignment increases connectivity to the southbound transit stop on the west side of Goreway Drive.

For motorists, this configuration is expected to result in an approximate 1.0 second increase to the northbound and southbound all-red interval. This is expected to have a minimal impact on perceived traffic operations, and was taken into consideration in the analysis in this report.

8 Vehicle Swept Path Analysis

A vehicle swept path analysis was conducted using AutoTurn to demonstrate that waste collection, delivery, and emergency response vehicles can enter and exit the site in a forward motion, and that access to loading and waste collection areas are functional. In addition, AutoTURN confirmed that the underground parking ramps and stalls located near corners / walls and/or at the end of aisles are functional. The vehicle swept path analysis is presented in **Appendix I**.

In order to reduce conflicts between passenger vehicles entering and exiting the underground parking garage, the following measures are recommended:

- A convex mirror be installed at the top and bottom of the ramp to the underground parking garage, and at the top and bottom of the ramps connecting the various levels of the underground parking garage.

9 Conclusions

This section summarizes the key findings of this transportation impact study.

9.1 Traffic Operations Analysis

- Under existing traffic conditions, several signalized movements within the study area intersections were observed to operate above critical capacity and/or queuing thresholds during the weekday AM and PM peak hours, including the eastbound left-turn and westbound right-turn movements at the Goreway Drive and Derry Road East intersection during the weekday PM peak hour, and the westbound left-turn movement at the Goreway Drive and Etude Drive intersection during both the weekday AM and PM peak hours.
- Under 2025 future background conditions, the identified operational constraints under existing conditions are expected to be exacerbated due to background traffic growth. No new critical movements are expected under future background conditions.
- Trip generation estimates and the corresponding future total traffic analysis are based from an earlier development concept, which consisted of 17 fewer condominium dwelling units and two less townhouse units over the current development concept of 228 apartment dwelling units and 18 townhouse units). Based on 245 apartment dwelling units and 16 townhouse units (259 total dwellings), the proposed development is anticipated to produce up to 89 new vehicle trips during the weekday AM peak hour (21 inbound trips and 68 outbound trips) and up to 104 new vehicle trips during the weekday PM peak hour (63 inbound trips and 41 outbound trips). The current 246-dwelling development concept is expected to produce less vehicle trips and a therefore more conservative analysis.
- Under 2025 future total conditions, the identified operational constraints under existing and future background conditions are expected to continue. The only new critical movement identified is the southbound left-turn movement at the Goreway Drive and Derry Road East intersection during the weekday AM peak hour. This movement is expected to experience a queue storage spillover of up to one car length. However, the impact of one additional vehicle within the available storage lanes is expected to be minimal on traffic operations.

- The eastbound left-turn capacity constraint at the Goreway Drive and Derry Road East intersection during the weekday PM peak hour may be mitigated by transferring 3.0 seconds of green time from the westbound through movement to the eastbound left-turn movement. This would result in all movements at this intersection expected to operate within capacity.
- Due to the above noted signal timing adjustment, queues associated with the westbound right-turn movement are anticipated to increase from up to eight car lengths to up to ten car lengths during the weekday PM peak hour. Notwithstanding, these queue storage spillovers are observed under existing conditions and are expected to continue under future conditions regardless of the proposed development.
- Capacity and queuing constraints at the Goreway Drive and Etude Drive intersection's westbound left-turn movement during the weekday AM and PM peak hours were noted under existing and future traffic conditions. These capacity constraints may be mitigated by the implementation of a protected westbound left-turn phase. As no development site trips have been assigned to the westbound left-turn movement at the Goreway Drive and Etude Drive intersection, further analyses to assess the feasibility of these mitigation measures is recommended.

9.2 Parking Study

- Based on the ZBL parking space requirement, the proposed parking supply of 359 parking spaces is expected to translate to a ZBL surplus of 28 parking spaces.

9.3 Transportation Demand Management Options

- A Transportation Demand Management Options memorandum in support of the development is presented in **Appendix H**. It notes that the secure bicycle parking, excellent pedestrian connectivity, and proximity to transit will encourage sustainable transportation choices and can reduce parking demand from future residents.

9.4 Site Access Conceptual Design

- In order to rationalize the configuration of the Goreway Drive and Dorcas Street / Site Access intersection, the development site access is proposed to be relocated approximately 7.1 metres to the south. This would result in a single east leg of the intersection with an offset of approximately 2.9 metres to the north of the Dorcas Street centreline. Signalized, offset intersections are not uncommon in redevelopment areas with pre-existing road alignments, and the proposed configuration is consistent with guidance provided in TAC Geometric Design Guide for Canadian Roads (June 2017).
- Modifications to pavement markings which accommodate the reconfigured intersection include a re-aligned northern pedestrian crosswalk, and a relocated southbound stop bar. For pedestrians, this configuration provides for a more familiar intersection configuration, and reduces the crossing distance. For motorists, this configuration is expected to result in an approximate 1.0 second increase to the northbound and southbound all-red interval and a minimal impact on perceived traffic operations.

9.5 Vehicle Swept Path Analysis

- A vehicle swept path analysis was conducted using AutoTurn to demonstrate that vehicles can enter and exit the site in a forward motion, and that access to loading and waste collection areas are functional. In addition, AutoTURN confirmed that the underground parking ramps and stalls located near corners / walls and/or at the end of aisles are functional. In order to reduce conflicts between passenger vehicles entering and exiting the underground parking garage, the following measures are recommended:
 - A convex mirror be installed at the top and bottom of the ramp to the underground parking garage, and at the top and bottom of the ramps connecting the various levels of the underground parking garage.

10 Recommendations

The following measures are recommended to mitigate the capacity and queuing constraints identified in the traffic operations analysis:

- At the Goreway Drive and Derry Road East intersection, transfer 3.0 seconds of green time from the westbound through movement to the eastbound left-turn movement during the weekday PM peak hour. This would result in all movements at this intersection anticipated to operate within capacity under future conditions.
- At the intersection of Goreway Drive and Etude Drive, investigate the feasibility of implementing an advanced westbound left-turn phase during the weekday AM and PM peak hours. This would improve traffic operations for the westbound left-turn movement to levels below critical capacity thresholds. Further analysis to assess the feasibility of this measure is recommended.

Appendix A

Scope of Investigation

From: [Andrae Griffith](#)
To: [Greg Borys](#)
Cc: [Fadi Madi](#)
Subject: RE: DARC 19-266 - Transportation Impact Study Scope of Work at 7085 Goreway Drive
Date: Wednesday, January 29, 2020 11:37:00 AM
Attachments: [image001.png](#)

Hi Greg,

Thank you for your comments. With regards to the Goreway Drive & Dorcas Street intersection, we understand that the City has noted that, due to the offset, a feasibility design for intersection improvements to improve vehicle and pedestrian safety should be provided with the transportation study. With respect to mentioned safety analysis, we propose to conduct a qualitative assessment based on on-site observations, and a review of the proposed development concept (which is likely to evolve as it approaches submission).

Thank you again for reviewing our terms of reference and providing comments.

Sincerely,

Andrae Griffith

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From: Fadi Madi <fadi.madi@ibigroup.com>
Sent: Friday, January 24, 2020 12:21 PM
To: Greg Borys <Gregory.Borys@mississauga.ca>; Andrae Griffith <andrae.griffith@ibigroup.com>
Subject: RE: DARC 19-266 - Transportation Impact Study Scope of Work at 7085 Goreway Drive

Thanks Greg! We truly appreciate your time and consideration.

Can you please provide some information on your expectations for the safety and operations analysis? Would this be a qualitative assessment identifying the potential issues?

Fadi

From: Greg Borys [<mailto:Gregory.Borys@mississauga.ca>]
Sent: Friday, January 24, 2020 10:27 AM
To: Fadi Madi <fadi.madi@ibigroup.com>; Andrae Griffith <andrae.griffith@ibigroup.com>
Subject: RE: DARC 19-266 - Transportation Impact Study Scope of Work at 7085 Goreway Drive

Good morning Fadi,

Thank you for your patience, traffic planning has reviewed the proposed Terms of Reference for

7085 Goreway Drive and have the following comments:

- Based on the concept plan shown in DARC, the proposed site access at Goreway Drive and Dorcas Street will be offset with the pedestrian crosswalk leading into the access. Traffic Impact Study required to analyze the safety and operations of that intersection and prepare a feasibility design for improvements to the intersection to improve vehicle and pedestrian safety due to the new access.

Regards,



Gregory Borys, C.E.T.

Transportation Planning Technologist, Transportation & Works

T 905-615-3200 ext.3597

gregory.borys@mississauga.ca

[City of Mississauga](#) | Transportation & Works Department

Transportation and Infrastructure Planning Division

Please consider the environment before printing.

From: Fadi Madi <fadi.madi@ibigroup.com>

Sent: Thursday, January 23, 2020 4:16 PM

To: Andrae Griffith <andrae.griffith@ibigroup.com>; Greg Borys <Gregory.Borys@mississauga.ca>

Subject: RE: DARC 19-266 - Transportation Impact Study Scope of Work at 7085 Goreway Drive

Hi Greg,

Just a friendly follow-up regarding our proposed scope of work, below.

We are hoping to get started as soon as possible and would really appreciate your comment at your earliest convenience.

Warm Regards,

Fadi

Fadi Madi P. ENG.

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From: Andrae Griffith
Sent: Friday, January 17, 2020 5:33 PM
To: Greg Borys <Gregory.Borys@mississauga.ca>
Cc: Fadi Madi <fadi.madi@ibigroup.com>
Subject: DARC 19-266 - Transportation Impact Study Scope of Work at 7085 Goreway Drive

Dear Mr. Borys,

IBI Group is working with a client who wishes to construct a residential development at 7085 Goreway Drive. The development would be located on the east side of Goreway Drive, opposite Dorcas Street, and would consist of two residential towers (18 and 16-storeys; 261 units) and 16 at-grade townhouses. Existing uses on the site are proposed to be removed.

As per discussions with the City of Mississauga during the DARC process, a transportation impact study has been requested to accompany this planning application. Below is our proposed scope of investigation for your review and acceptance, and we are happy to discuss this matter further if required.

Work Plan – Transportation Impact Study

The tasks that will be completed for the transportation impact study are as follows:

1. **Analysis Time Periods and Intersections:** Based on the proposed development's residential land uses and size, we plan to analyze the development peak hours, which will occur during the weekday AM peak period (between 7:00 a.m. and 9:00 a.m.) and the weekday PM peak period (between 4:00 p.m. and 6:00 p.m.).

The following intersections will be included in this analysis:

- a. Goreway Drive & Etude Drive (signalized);
 - b. Goreway Drive & Proposed North Site Access (unsignalized);
 - c. Goreway Drive & Dorcas Street / Proposed South Site Access (unsignalized);
and
 - d. Goreway Drive & Derry Road (Regional Road 5) (signalized).
2. **2020 Existing Conditions:** The 2020 existing traffic operations will be analyzed using the software program Synchro (version 9) for the weekday AM and weekday PM peak periods, for the intersections listed above. Traffic counts at the study area intersections will be obtained from the City of Mississauga and / Region of Peel, if available. If the City is unable to provide updated turning movement counts for these intersections, new turning movement counts will be collected.
 3. **2025 Background Traffic Conditions:** The 2025 background traffic volumes will be determined for the study area intersections, which coincides with 5 years after the 2020 date of the transportation impact study. We will identify an applicable background traffic growth rate and other area developments which may introduce traffic into the

study area, based on a discussion with City of Mississauga staff. Any future road network or intersection changes proposed by the City, or outlined in the capital works program, will be taken into consideration.

The 2025 background traffic analysis will identify and determine the impacts of the adjacent developments without the proposed site traffic under existing and future roadway conditions.

- 4. Site Traffic Generation and Trip Distribution:** The trip generation for the proposed development will be based the information presented in the Institute of Transportation Engineers (“ITE”) publication, *Trip Generation, 10th Edition*. A review of the modal split will also be undertaken to account for the trips being made by non-auto modes of travel. The City’s Transportation Master Plan will be used as tools for this review.

The trip distribution for the proposed site will be based on a review of existing travel patterns, the 2016 Transportation Tomorrow Survey (TTS), and the available road network. The forecast site traffic for the development will be added to the road network based on the trip distribution, and assigned to the network based on logical travel routes and available traffic capacity.

- 5. 2025 Total Traffic Conditions:** The estimated site traffic volumes will be combined with the 2025 background traffic volumes to determine the 2025 total traffic volumes for the study area intersections.

Intersection operations analysis will be undertaken for the weekday peak periods. Any necessary road improvements required to accommodate total traffic volumes will be identified if necessary, such as additional turning lanes, storage length modifications, or traffic control measures.

- 6. Vehicle Swept Path Analysis:** Using AutoTurn, we will confirm that SU-9 garbage truck traffic can enter/exit the site, and that access to the loading areas are functional. We will illustrate truck turning movements with one continuous path with AutoTurn on separate plans, and insert the design vehicles on the plan.

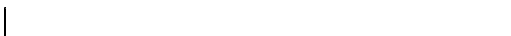
If you have any questions regarding the proposed scope of work for the 7085 Goreway Drive development, please do not hesitate to contact me. Please note that, as the city has requested a parking justification as well, we propose to submit a combined transportation, parking, and TDM report.

Sincerely,

Andrae Griffith

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Appendix B

Turning Movement Counts

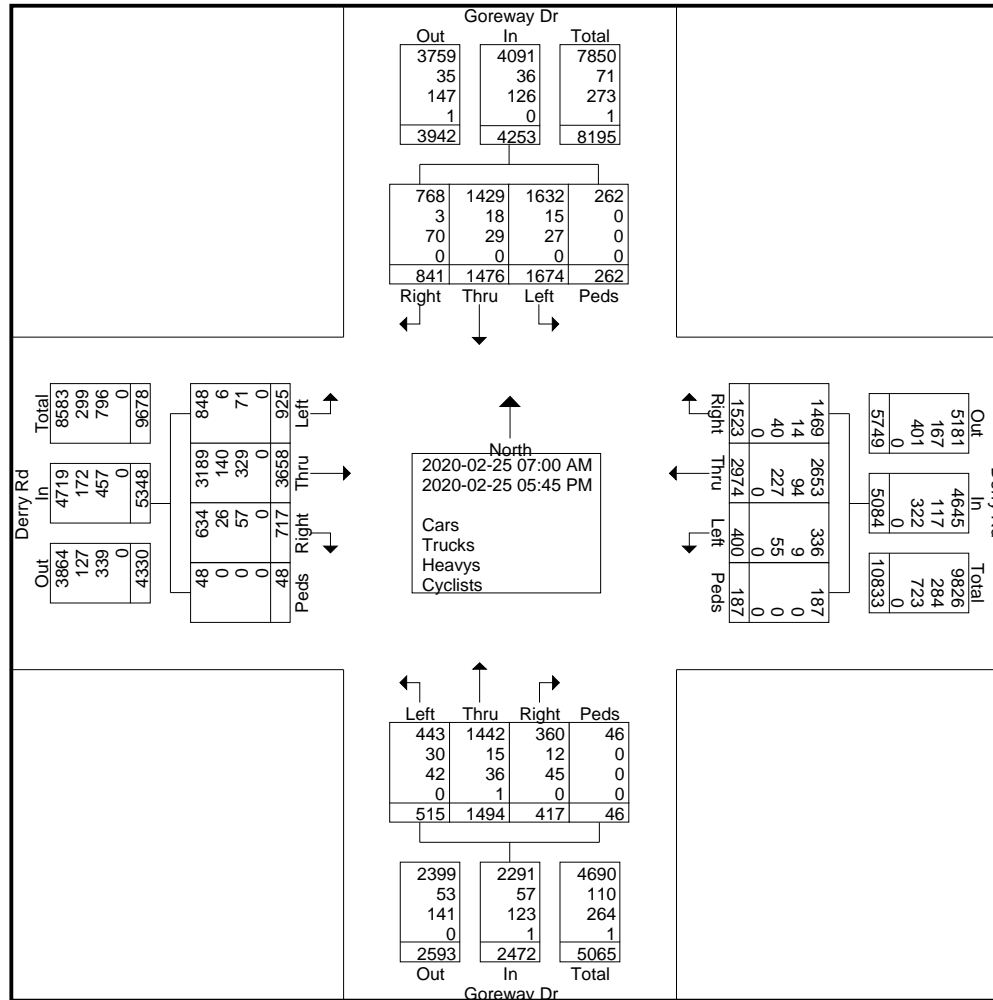


Horizon Data Services Ltd

318 Simonston Boulevard
 Thornhill ON L3T 4T5
 (416) 840-6619

"We do not estimate...we count"

File Name : Derry Road at Goreway Drive
 Site Code : 00000000
 Start Date : 2020-02-25
 Page No : 2



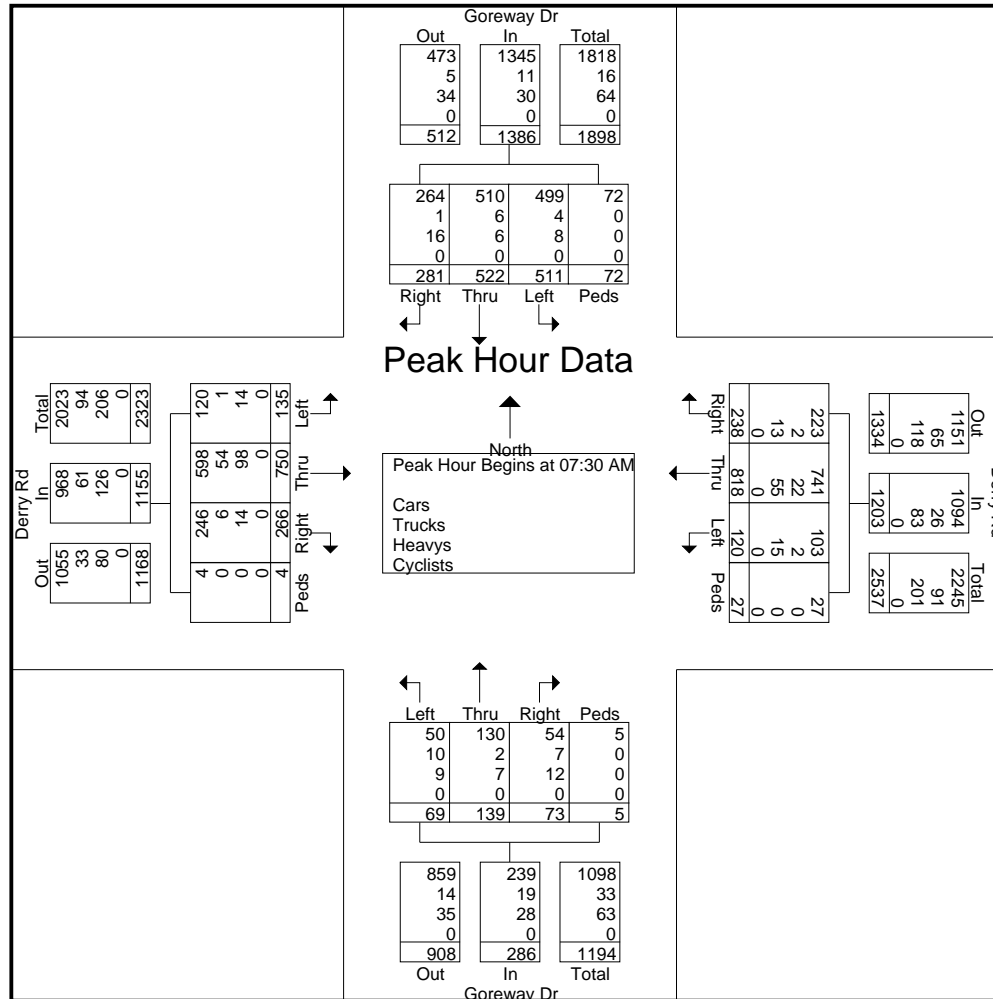


Horizon Data Services Ltd

318 Simonston Boulevard
 Thornhill ON L3T 4T5
 (416) 840-6619

"We do not estimate...we count"

File Name : Derry Road at Goreway Drive
 Site Code : 00000000
 Start Date : 2020-02-25
 Page No : 4



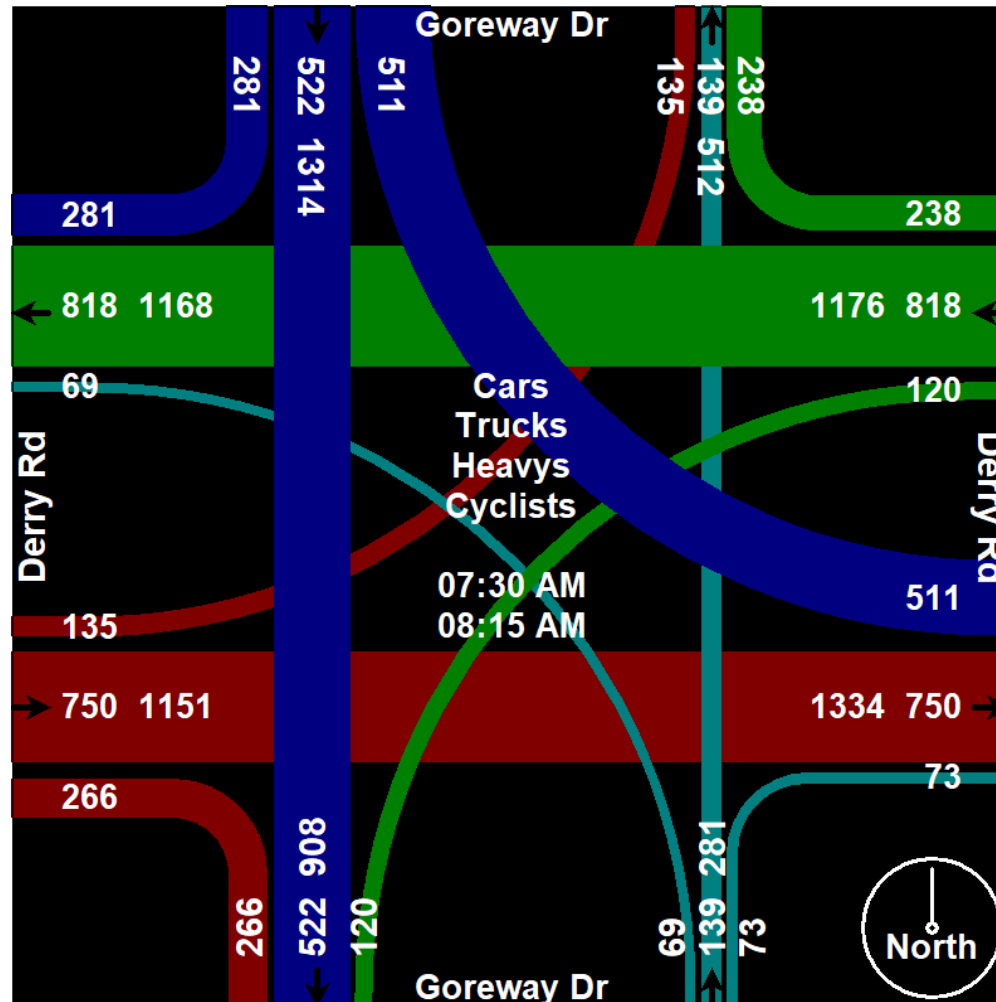


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(416) 840-6619

"We do not estimate...we count"

File Name : Derry Road at Goreway Drive
Site Code : 00000000
Start Date : 2020-02-25
Page No : 5





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"We do not estimate...we count"

File Name : Derry Road at Goreway Drive
 Site Code : 00000000
 Start Date : 2020-02-25
 Page No : 6

| Start Time | Goreway Dr Southbound | | | | | Derry Rd Westbound | | | | | Goreway Dr Northbound | | | | | Derry Rd Eastbound | | | | | Int. Total |
|--|-----------------------|------|------|------|------------|--------------------|------|------|------|------------|-----------------------|------|------|------|------------|--------------------|------|------|------|------------|------------|
| | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | |
| Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:15 PM | | | | | | | | | | | | | | | | | | | | | |
| 04:15 PM | 42 | 33 | 81 | 20 | 176 | 154 | 194 | 20 | 13 | 381 | 31 | 109 | 36 | 7 | 183 | 25 | 319 | 94 | 6 | 444 | 1184 |
| 04:30 PM | 43 | 51 | 86 | 13 | 193 | 129 | 175 | 24 | 14 | 342 | 35 | 183 | 57 | 6 | 281 | 30 | 259 | 85 | 4 | 378 | 1194 |
| 04:45 PM | 43 | 53 | 75 | 11 | 182 | 160 | 180 | 18 | 12 | 370 | 34 | 151 | 47 | 8 | 240 | 27 | 309 | 69 | 8 | 413 | 1205 |
| 05:00 PM | 48 | 66 | 84 | 18 | 216 | 123 | 197 | 14 | 22 | 356 | 33 | 167 | 47 | 7 | 254 | 19 | 278 | 95 | 5 | 397 | 1223 |
| Total Volume | 176 | 203 | 326 | 62 | 767 | 566 | 746 | 76 | 61 | 1449 | 133 | 610 | 187 | 28 | 958 | 101 | 1165 | 343 | 23 | 1632 | 4806 |
| % App. Total | 22.9 | 26.5 | 42.5 | 8.1 | | 39.1 | 51.5 | 5.2 | 4.2 | | 13.9 | 63.7 | 19.5 | 2.9 | | 6.2 | 71.4 | 21 | 1.4 | | |
| PHF | .917 | .769 | .948 | .775 | .888 | .884 | .947 | .792 | .693 | .951 | .950 | .833 | .820 | .875 | .852 | .842 | .913 | .903 | .719 | .919 | .982 |
| Cars | 159 | 192 | 318 | 62 | 731 | 554 | 647 | 63 | 61 | 1325 | 129 | 593 | 170 | 28 | 920 | 84 | 1078 | 323 | 23 | 1508 | 4484 |
| % Cars | 90.3 | 94.6 | 97.5 | 100 | 95.3 | 97.9 | 86.7 | 82.9 | 100 | 91.4 | 97.0 | 97.2 | 90.9 | 100 | 96.0 | 83.2 | 92.5 | 94.2 | 100 | 92.4 | 93.3 |
| Trucks | 1 | 3 | 2 | 0 | 6 | 4 | 30 | 3 | 0 | 37 | 0 | 7 | 5 | 0 | 12 | 2 | 19 | 3 | 0 | 24 | 79 |
| % Trucks | 0.6 | 1.5 | 0.6 | 0 | 0.8 | 0.7 | 4.0 | 3.9 | 0 | 2.6 | 0 | 1.1 | 2.7 | 0 | 1.3 | 2.0 | 1.6 | 0.9 | 0 | 1.5 | 1.6 |
| Heavys | 16 | 8 | 6 | 0 | 30 | 8 | 69 | 10 | 0 | 87 | 4 | 9 | 12 | 0 | 25 | 15 | 68 | 17 | 0 | 100 | 242 |
| % Heavys | 9.1 | 3.9 | 1.8 | 0 | 3.9 | 1.4 | 9.2 | 13.2 | 0 | 6.0 | 3.0 | 1.5 | 6.4 | 0 | 2.6 | 14.9 | 5.8 | 5.0 | 0 | 6.1 | 5.0 |
| Cyclists | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| % Cyclists | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0 | 0 | 0.1 | 0 | 0 | 0 | 0 | 0 | 0.0 |

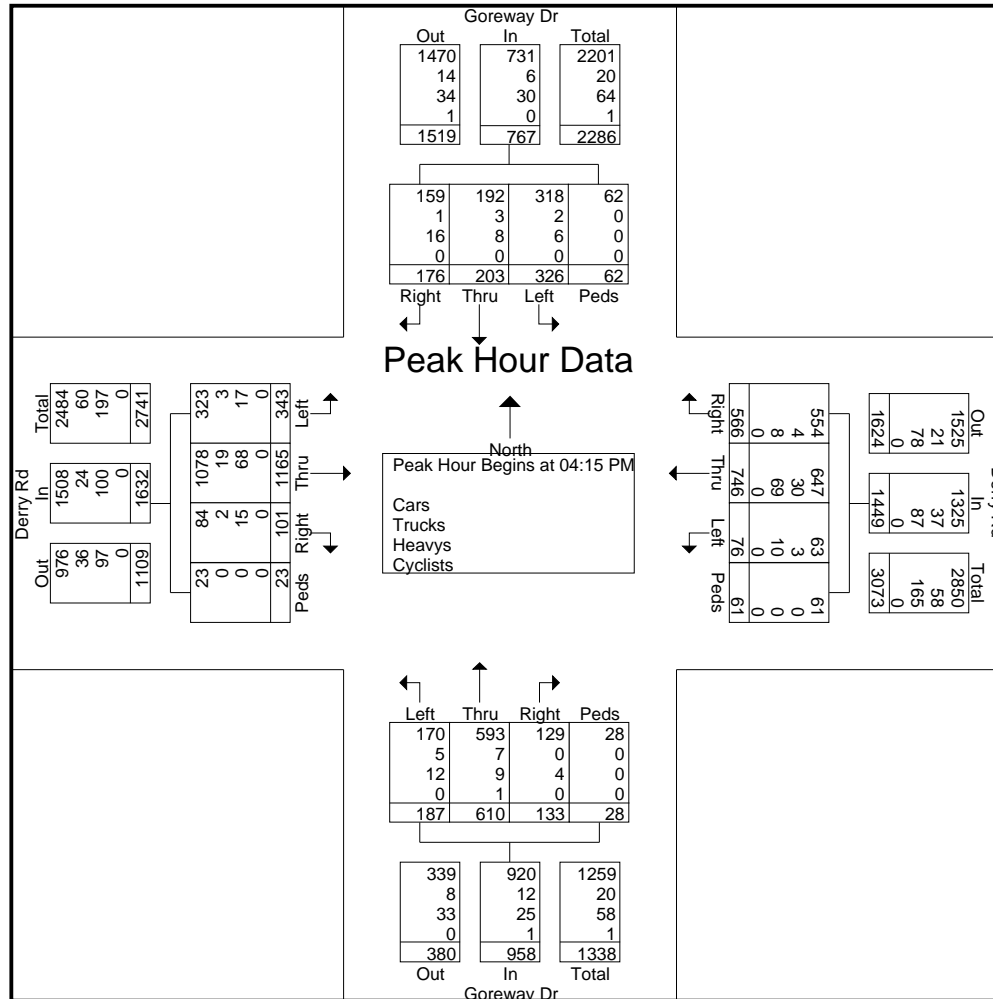


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"We do not estimate...we count"

File Name : Derry Road at Goreway Drive
 Site Code : 00000000
 Start Date : 2020-02-25
 Page No : 7



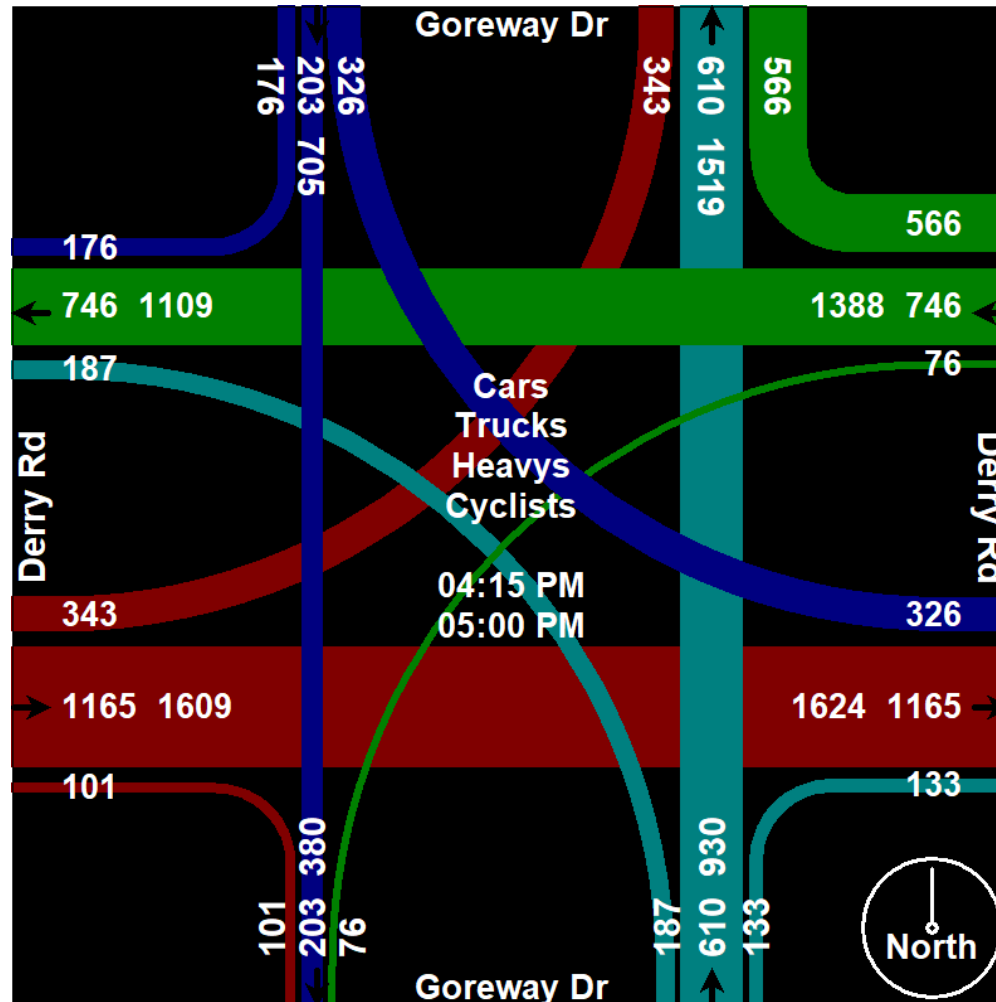


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(416) 840-6619

"We do not estimate...we count"

File Name : Derry Road at Goreway Drive
Site Code : 00000000
Start Date : 2020-02-25
Page No : 8



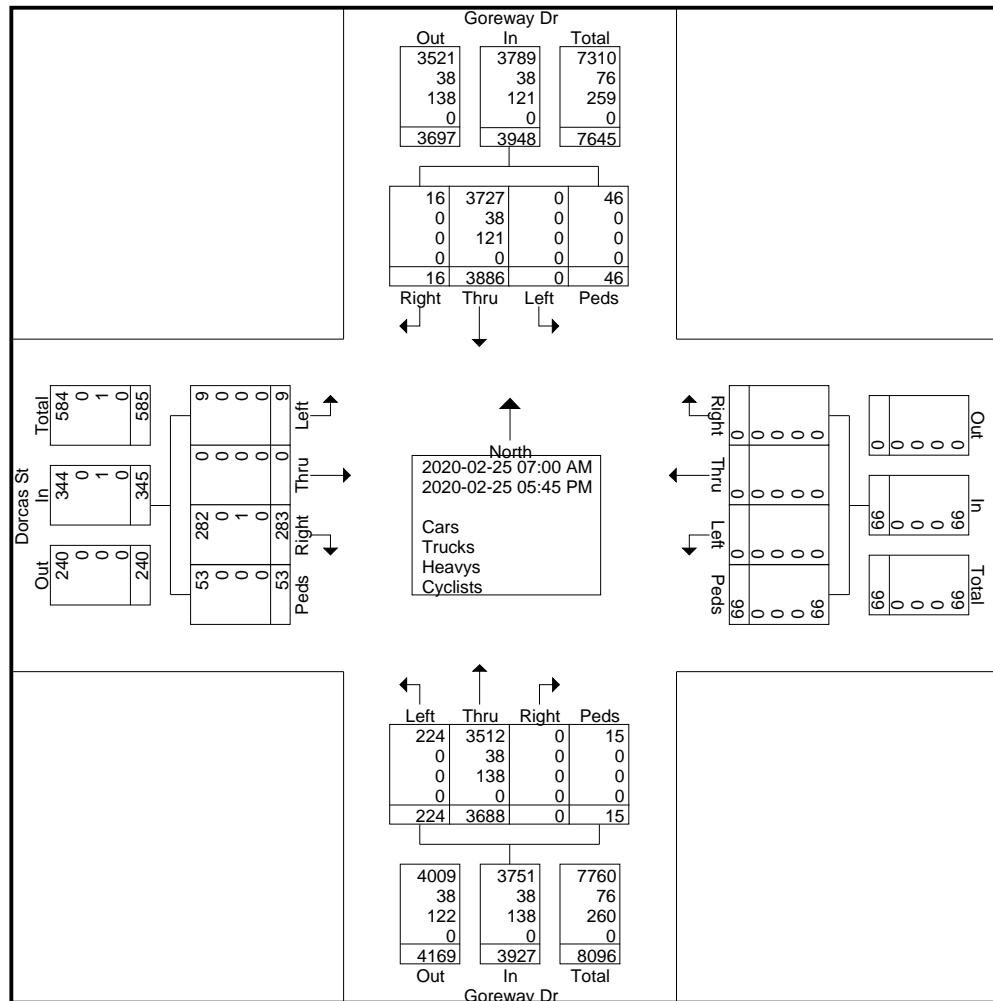


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"We do not estimate...we count"

File Name : dorcas st at goreway dr
 Site Code : 00000000
 Start Date : 2020-02-25
 Page No : 2



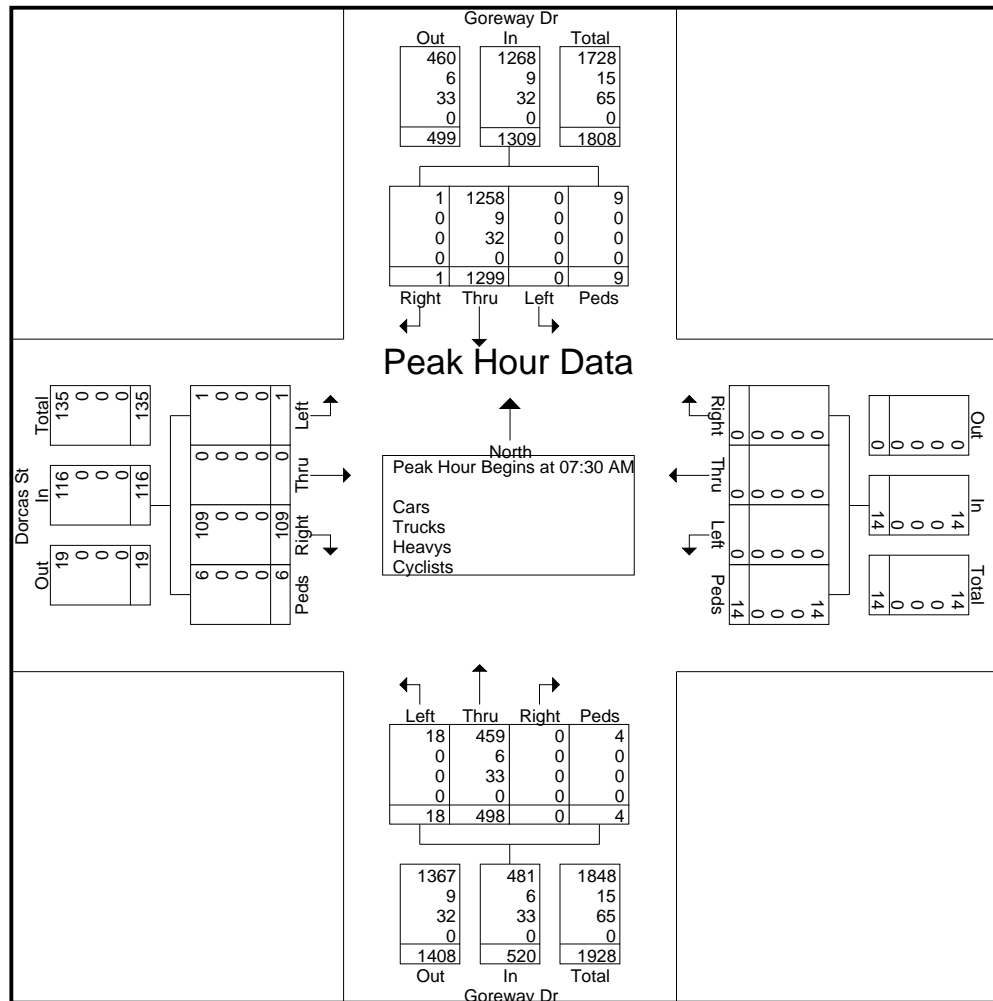


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"We do not estimate...we count"

File Name : dorcas st at goreway dr
 Site Code : 00000000
 Start Date : 2020-02-25
 Page No : 4



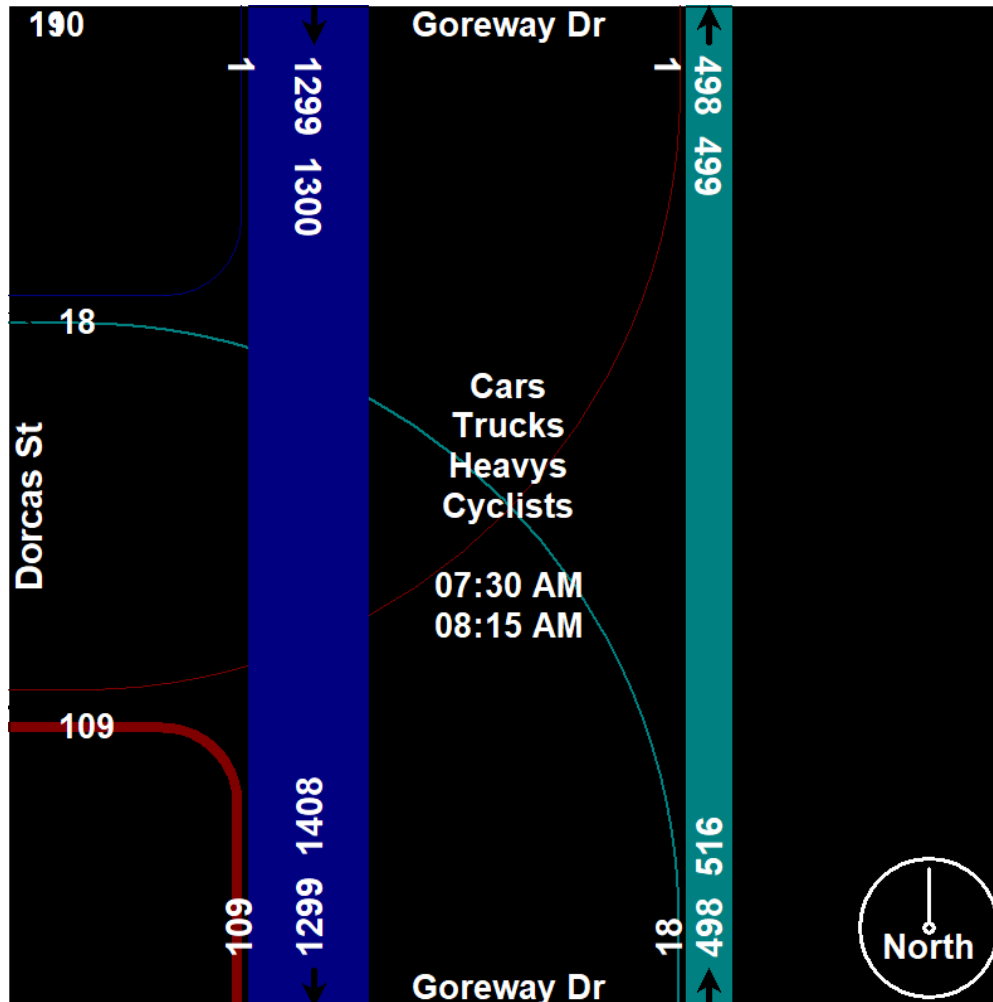


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"We do not estimate...we count"

File Name : dorcas st at goreway dr
Site Code : 00000000
Start Date : 2020-02-25
Page No : 5



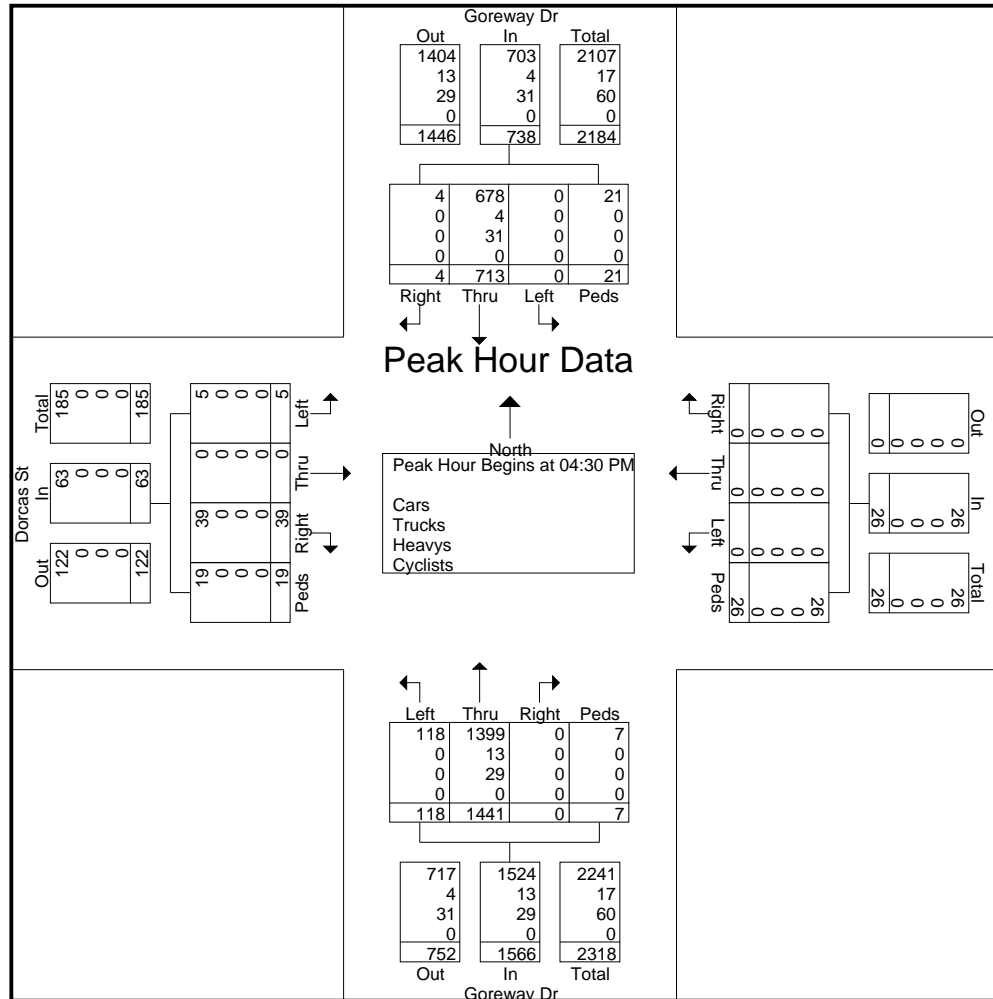


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"We do not estimate...we count"

File Name : dorcas st at goreway dr
 Site Code : 00000000
 Start Date : 2020-02-25
 Page No : 7



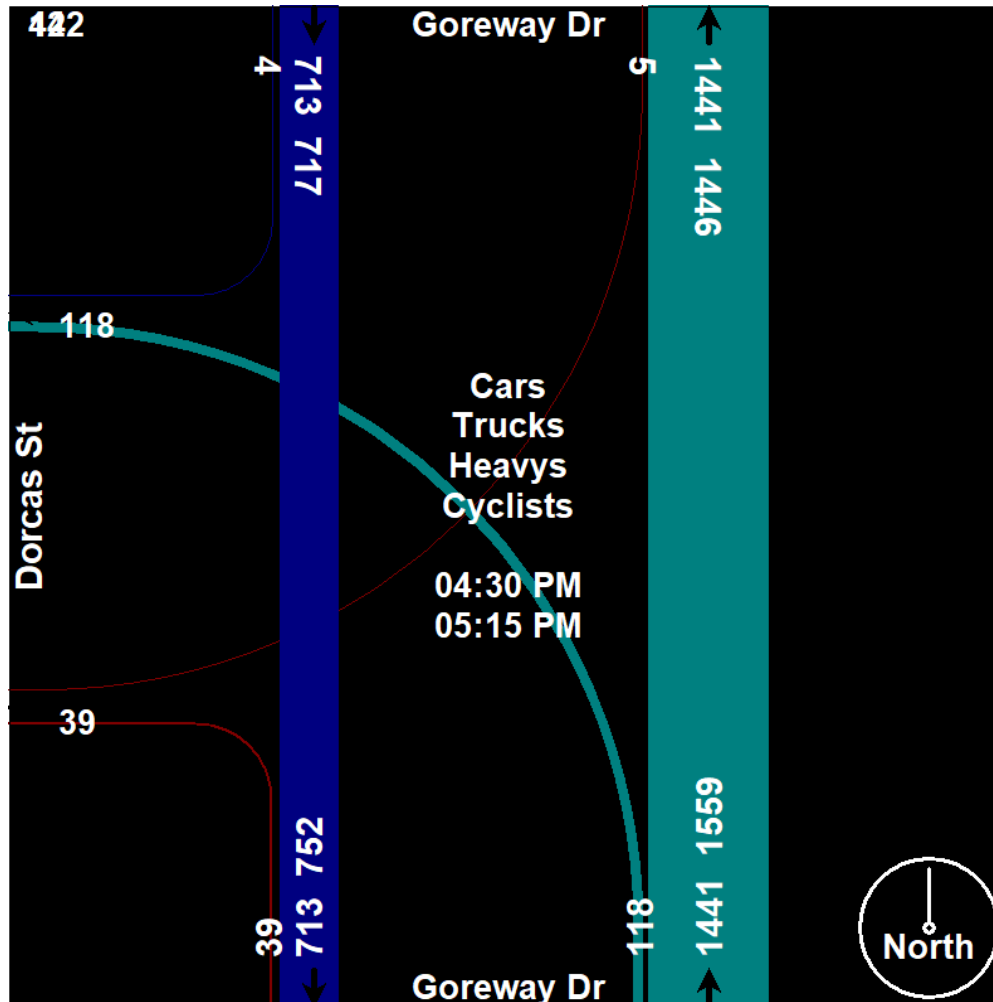


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"We do not estimate...we count"

File Name : dorcas st at goreway dr
Site Code : 00000000
Start Date : 2020-02-25
Page No : 8





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"We do not estimate...we count"

File Name : Etude St at Goreway Dr
 Site Code : 00000000
 Start Date : 2020-02-25
 Page No : 1

Groups Printed- Cars - Trucks - Heavys - Cyclists

| Start Time | Goreway Dr Southbound | | | | | Etude St Westbound | | | | | Goreway Dr Northbound | | | | | Etude St Eastbound | | | | | Int. Total |
|-------------|-----------------------|------|------|------|------------|--------------------|------|------|------|------------|-----------------------|------|------|------|------------|--------------------|------|------|------|------------|------------|
| | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | |
| 07:00 AM | 1 | 217 | 5 | 9 | 232 | 4 | 5 | 30 | 1 | 40 | 22 | 77 | 4 | 2 | 105 | 22 | 9 | 6 | 1 | 38 | 415 |
| 07:15 AM | 6 | 214 | 7 | 4 | 231 | 4 | 9 | 27 | 2 | 42 | 20 | 96 | 7 | 1 | 124 | 31 | 11 | 8 | 1 | 51 | 448 |
| 07:30 AM | 2 | 310 | 4 | 11 | 327 | 17 | 7 | 40 | 3 | 67 | 12 | 65 | 9 | 2 | 88 | 33 | 15 | 3 | 1 | 52 | 534 |
| 07:45 AM | 2 | 293 | 11 | 10 | 316 | 11 | 9 | 47 | 6 | 73 | 26 | 97 | 9 | 4 | 136 | 36 | 10 | 7 | 5 | 58 | 583 |
| Total | 11 | 1034 | 27 | 34 | 1106 | 36 | 30 | 144 | 12 | 222 | 80 | 335 | 29 | 9 | 453 | 122 | 45 | 24 | 8 | 199 | 1980 |
| 08:00 AM | 1 | 228 | 9 | 7 | 245 | 19 | 10 | 32 | 9 | 70 | 17 | 103 | 15 | 0 | 135 | 29 | 23 | 7 | 3 | 62 | 512 |
| 08:15 AM | 8 | 197 | 9 | 7 | 221 | 11 | 15 | 28 | 6 | 60 | 26 | 94 | 15 | 0 | 135 | 27 | 11 | 13 | 1 | 52 | 468 |
| 08:30 AM | 2 | 275 | 15 | 11 | 303 | 12 | 23 | 44 | 2 | 81 | 25 | 84 | 13 | 1 | 123 | 36 | 21 | 7 | 0 | 64 | 571 |
| 08:45 AM | 6 | 228 | 4 | 12 | 250 | 9 | 22 | 42 | 8 | 81 | 20 | 91 | 12 | 4 | 127 | 43 | 23 | 11 | 1 | 78 | 536 |
| Total | 17 | 928 | 37 | 37 | 1019 | 51 | 70 | 146 | 25 | 292 | 88 | 372 | 55 | 5 | 520 | 135 | 78 | 38 | 5 | 256 | 2087 |
| 04:00 PM | 7 | 145 | 9 | 12 | 173 | 16 | 31 | 51 | 18 | 116 | 73 | 240 | 15 | 4 | 332 | 12 | 35 | 4 | 2 | 53 | 674 |
| 04:15 PM | 4 | 100 | 10 | 19 | 133 | 17 | 29 | 41 | 20 | 107 | 60 | 267 | 22 | 6 | 355 | 17 | 35 | 9 | 2 | 63 | 658 |
| 04:30 PM | 9 | 115 | 8 | 18 | 150 | 16 | 26 | 48 | 22 | 112 | 56 | 295 | 16 | 8 | 375 | 14 | 19 | 8 | 9 | 50 | 687 |
| 04:45 PM | 7 | 98 | 6 | 20 | 131 | 8 | 41 | 46 | 25 | 120 | 58 | 280 | 19 | 6 | 363 | 23 | 36 | 10 | 2 | 71 | 685 |
| Total | 27 | 458 | 33 | 69 | 587 | 57 | 127 | 186 | 85 | 455 | 247 | 1082 | 72 | 24 | 1425 | 66 | 125 | 31 | 15 | 237 | 2704 |
| 05:00 PM | 5 | 161 | 10 | 15 | 191 | 12 | 27 | 33 | 14 | 86 | 73 | 282 | 23 | 4 | 382 | 14 | 21 | 5 | 6 | 46 | 705 |
| 05:15 PM | 2 | 119 | 11 | 18 | 150 | 16 | 36 | 41 | 18 | 111 | 78 | 257 | 24 | 7 | 366 | 26 | 18 | 15 | 2 | 61 | 688 |
| 05:30 PM | 13 | 127 | 10 | 13 | 163 | 10 | 34 | 40 | 18 | 102 | 56 | 268 | 20 | 7 | 351 | 12 | 27 | 7 | 3 | 49 | 665 |
| 05:45 PM | 8 | 109 | 18 | 14 | 149 | 21 | 31 | 55 | 16 | 123 | 55 | 233 | 27 | 6 | 321 | 20 | 27 | 15 | 4 | 66 | 659 |
| Total | 28 | 516 | 49 | 60 | 653 | 59 | 128 | 169 | 66 | 422 | 262 | 1040 | 94 | 24 | 1420 | 72 | 93 | 42 | 15 | 222 | 2717 |
| Grand Total | 83 | 2936 | 146 | 200 | 3365 | 203 | 355 | 645 | 188 | 1391 | 677 | 2829 | 250 | 62 | 3818 | 395 | 341 | 135 | 43 | 914 | 9488 |
| Apprch % | 2.5 | 87.3 | 4.3 | 5.9 | | 14.6 | 25.5 | 46.4 | 13.5 | | 17.7 | 74.1 | 6.5 | 1.6 | | 43.2 | 37.3 | 14.8 | 4.7 | | |
| Total % | 0.9 | 30.9 | 1.5 | 2.1 | 35.5 | 2.1 | 3.7 | 6.8 | 2 | 14.7 | 7.1 | 29.8 | 2.6 | 0.7 | 40.2 | 4.2 | 3.6 | 1.4 | 0.5 | 9.6 | |
| Cars | 73 | 2788 | 141 | 200 | 3202 | 197 | 352 | 637 | 188 | 1374 | 664 | 2676 | 240 | 62 | 3642 | 391 | 332 | 126 | 43 | 892 | 9110 |
| % Cars | 88 | 95 | 96.6 | 100 | 95.2 | 97 | 99.2 | 98.8 | 100 | 98.8 | 98.1 | 94.6 | 96 | 100 | 95.4 | 99 | 97.4 | 93.3 | 100 | 97.6 | 96 |
| Trucks | 2 | 28 | 4 | 0 | 34 | 4 | 1 | 7 | 0 | 12 | 8 | 23 | 3 | 0 | 34 | 4 | 0 | 1 | 0 | 5 | 85 |
| % Trucks | 2.4 | 1 | 2.7 | 0 | 1 | 2 | 0.3 | 1.1 | 0 | 0.9 | 1.2 | 0.8 | 1.2 | 0 | 0.9 | 1 | 0 | 0.7 | 0 | 0.5 | 0.9 |
| Heavys | 8 | 120 | 1 | 0 | 129 | 1 | 2 | 1 | 0 | 4 | 5 | 130 | 7 | 0 | 142 | 0 | 8 | 8 | 0 | 16 | 291 |
| % Heavys | 9.6 | 4.1 | 0.7 | 0 | 3.8 | 0.5 | 0.6 | 0.2 | 0 | 0.3 | 0.7 | 4.6 | 2.8 | 0 | 3.7 | 0 | 2.3 | 5.9 | 0 | 1.8 | 3.1 |
| Cyclists | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 |
| % Cyclists | 0 | 0 | 0 | 0 | 0 | 0.5 | 0 | 0 | 0 | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | 0 | 0.1 | 0 |

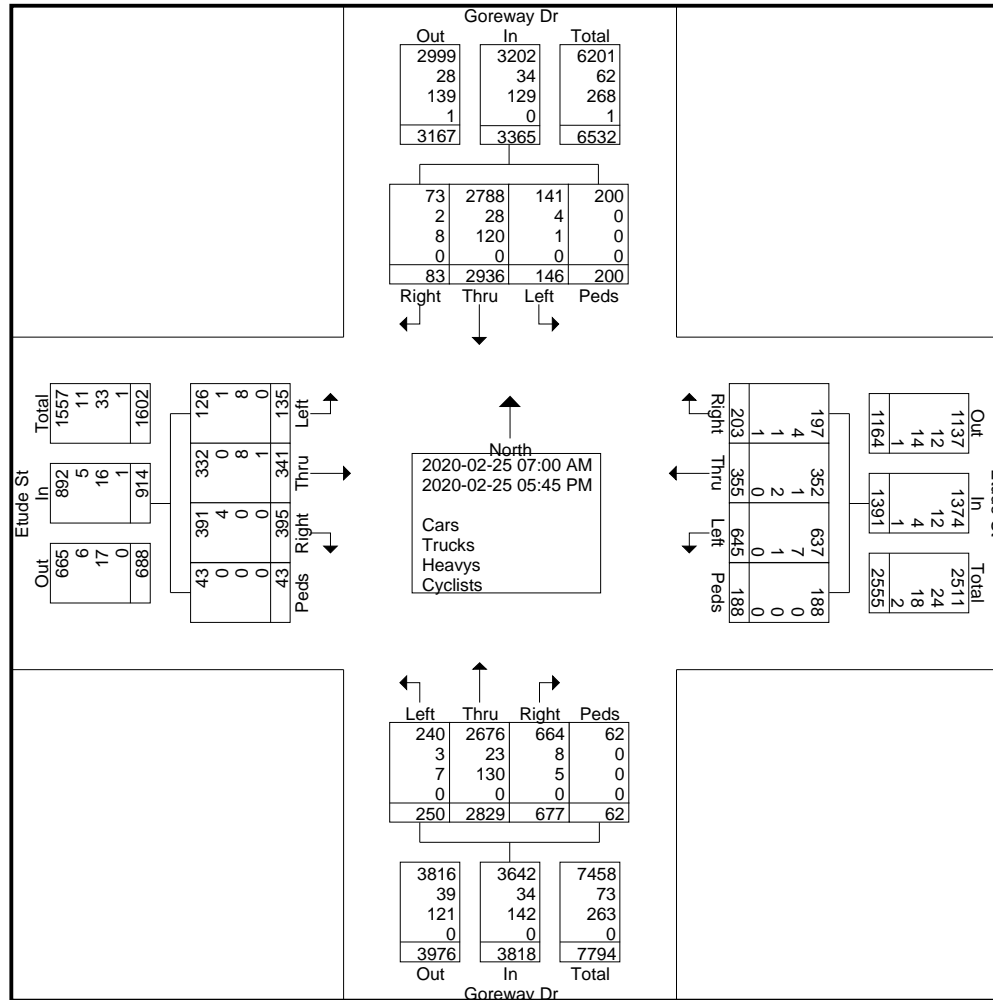


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"We do not estimate...we count"

File Name : Etude St at Goreway Dr
 Site Code : 00000000
 Start Date : 2020-02-25
 Page No : 2



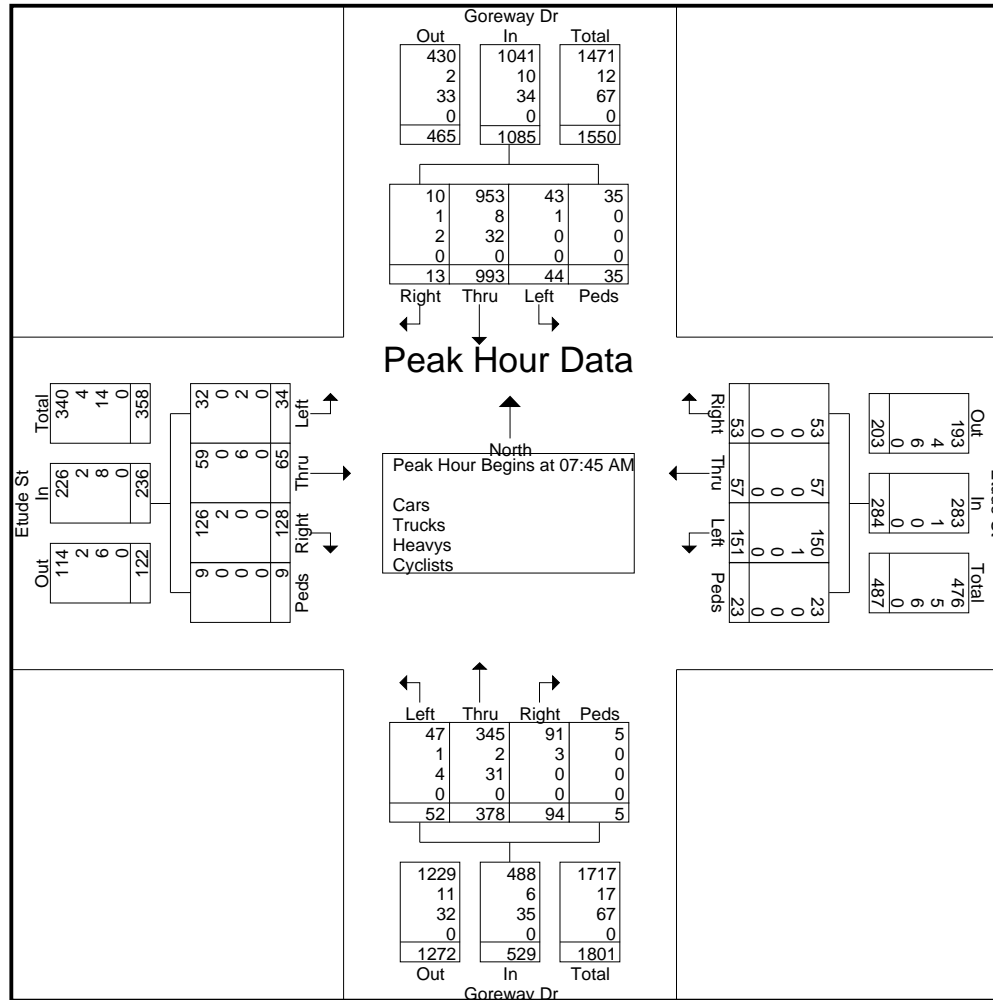


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"We do not estimate...we count"

File Name : Etude St at Goreway Dr
 Site Code : 00000000
 Start Date : 2020-02-25
 Page No : 4



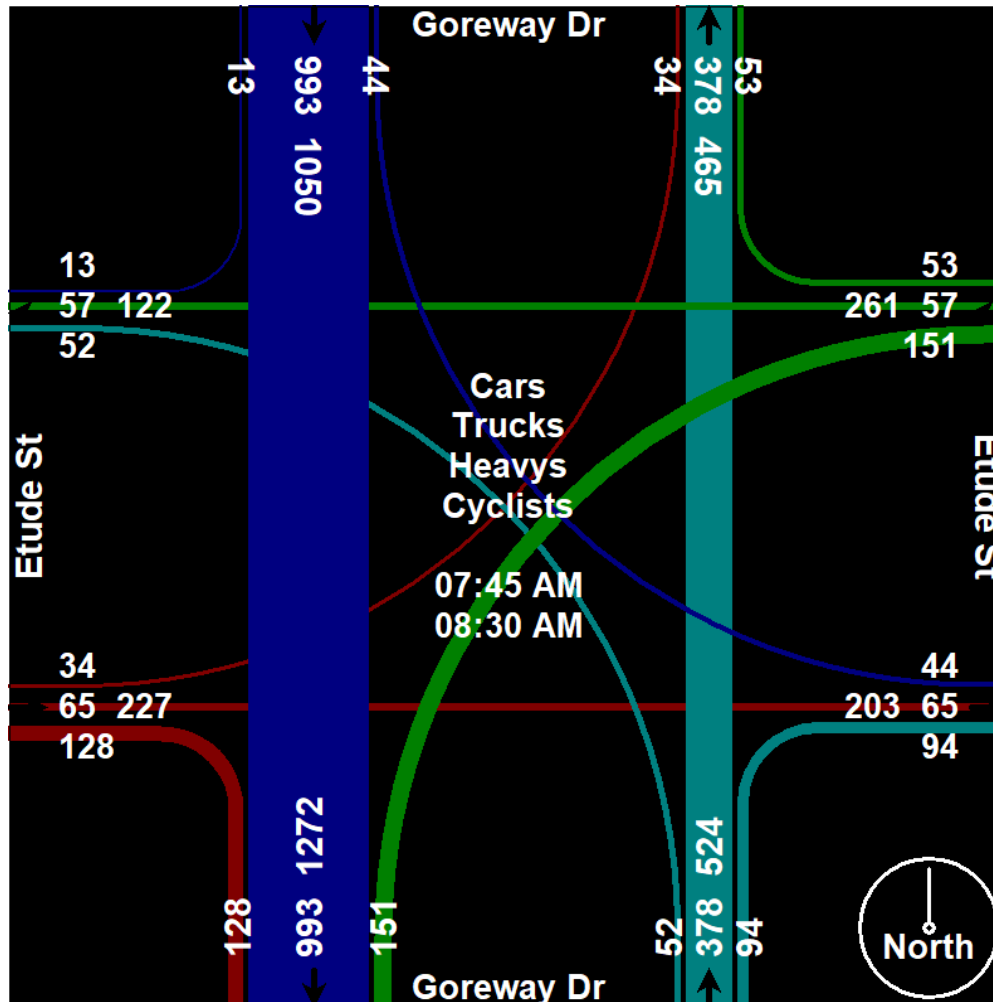


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"We do not estimate...we count"

File Name : Etude St at Goreway Dr
Site Code : 00000000
Start Date : 2020-02-25
Page No : 5



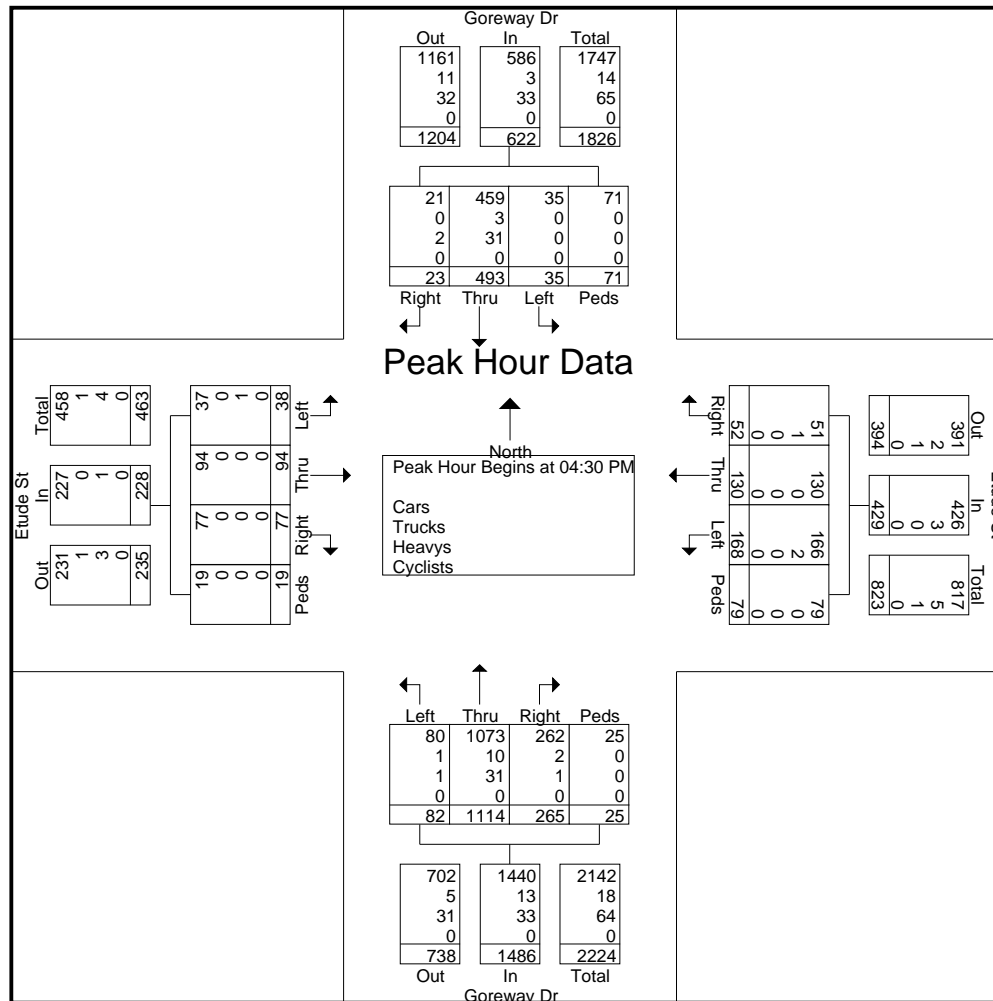


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"We do not estimate...we count"

File Name : Etude St at Goreway Dr
 Site Code : 00000000
 Start Date : 2020-02-25
 Page No : 7



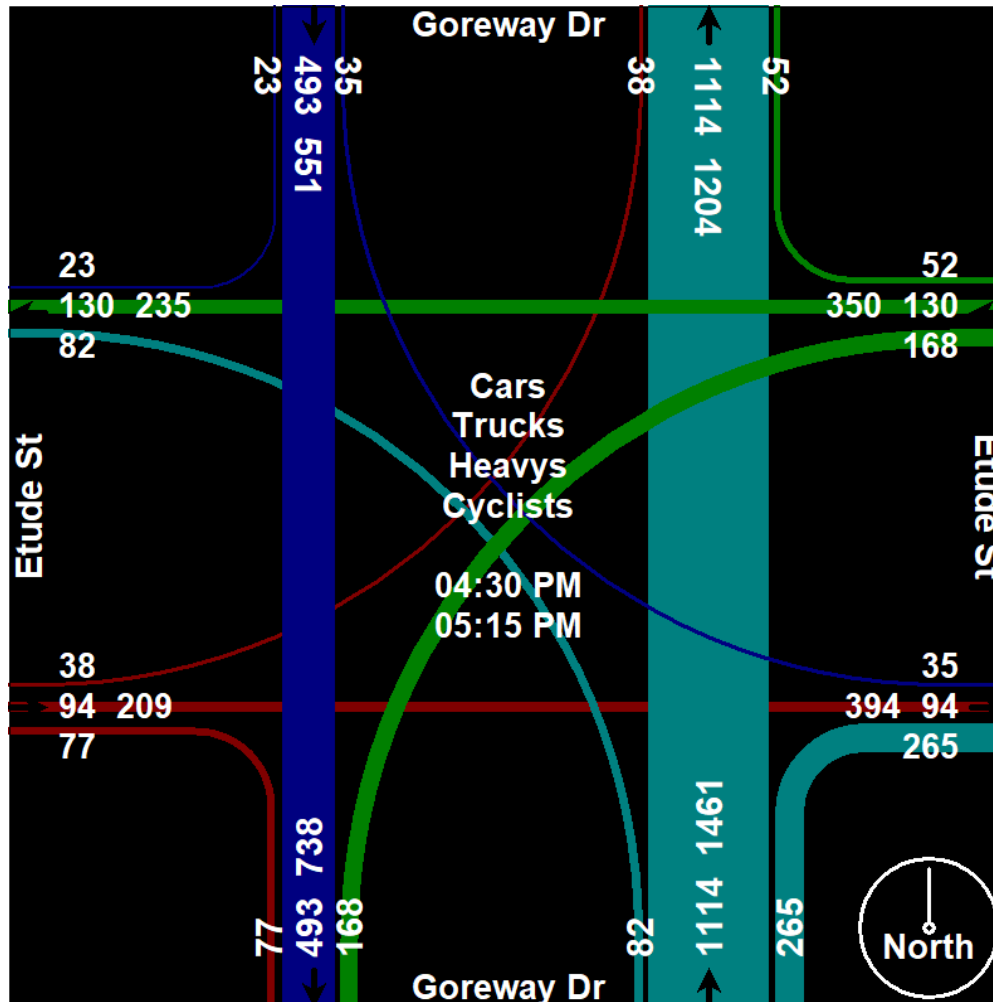


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"We do not estimate...we count"

File Name : Etude St at Goreway Dr
Site Code : 00000000
Start Date : 2020-02-25
Page No : 8



Appendix C

Signal Timing Plans

REGIONAL MUNICIPALITY OF PEEL

Traffic Signal Timing Parameters

| | | | | |
|-------------------------|----------------|--|---------------|----------------|
| Database Date | March 19, 2020 | | Prepared Date | March 19, 2020 |
| Database Rev | iNET | | Completed By | BL |
| Timing Card / Field rev | 32 | | Checked By | MA |

Location Derry Road @ Goreway Drive

| Phase # | Street Name - Direction | Vehicle Minimum (s) | Pedestrian Minimum (s) | | Amber (s) | All Red (s) | TIME PERIOD (s) (Green+Amber+All Red) | | |
|---------|------------------------------|---------------------|------------------------|-------------------------|-----------|-------------|--|------------|-----------|
| | | | WALK | FDWALK | | | AM SPLITS | OFF SPLITS | PM SPLITS |
| | | | 1 | Derry Road - W/B P.P LT | | | 5 | 0 | 0 |
| 2 | Derry Road - E/B | 8 | 14 | 21 | 4.0 | 3.6 | 63 | 73 | 63 |
| 3 | Goreway Drive - S/B Prot. LT | 8 | 0 | 0 | 3.0 | 2.0 | 39 | 26 | 36 |
| 4 | Goreway Drive - N/B | 8 | 14 | 23 | 4.0 | 3.4 | 45 | 45 | 45 |
| 5 | Derry Road - E/B Prot. LT | 8 | 0 | 0 | 3.0 | 2.0 | 20 | 21 | 21 |
| 6 | Derry Road - W/B | 8 | 14 | 21 | 4.0 | 3.6 | 56 | 68 | 58 |
| 7 | Goreway Drive - N/B Prot. LT | 8 | 0 | 0 | 3.0 | 2.0 | 20 | 24 | 24 |
| 8 | Goreway Drive - S/B | 8 | 14 | 23 | 4.0 | 3.4 | 64 | 47 | 57 |

| | | | | | |
|------------------------------|--|--------------------------------|-------------|-------------------------|-------------------|
| System Control Yes | | TIME (M-F) | PEAK | CYCLE LENGTH (s) | OFFSET (s) |
| | | 06:00 - 09:30 | AM | 160 | 106 |
| Semi-Actuated Mode | | 09:30 - 15:00 19:30 - 00:00 | OFF | 160 | 75 |
| Yes | | 15:00 - 19:30 | PM | 160 | 128 |

Signal Timing Report

Runtime: 2020-03-23 10:52:38

Device: 4710

| Region: Mississauga | | Signal ID: 4710 | | Location: Goreway Drive N at Dorcas Street | | | | | |
|---------------------|-----------|------------------------------------|---|--|-------------------------|----------------------|----------------------|----------------------|-----------------|
| Phase | Units | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Walk | Sec | 0 | 8 | 0 | 11 | 0 | 0 | 0 | 0 |
| Ped Clear | Sec | 0 | 8 | 0 | 16 | 0 | 0 | 0 | 0 |
| Min Green | Sec | 0 | 8 | 0 | 8 | 0 | 0 | 0 | 0 |
| Passage | Sec | 0.0 | 3.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Maximum 1 | Sec | 0 | 32 | 0 | 30 | 0 | 0 | 0 | 0 |
| Maximum 2 | Sec | 0 | 32 | 0 | 30 | 0 | 0 | 0 | 0 |
| Yellow Change | Sec | 3.0 | 4.0 | 3.0 | 4.0 | 3.0 | 4.0 | 3.0 | 4.0 |
| Red Clearance | Sec | 0.0 | 2.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Red Revert | Sec | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Added Initial | Sec | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Max Initial | Sec | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Time Before | Sec | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cars Before | Veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Time To Reduce | Sec | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduce By | Sec | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Min Gap | Sec | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Dynamic Max Limit | Sec | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Dynamic Max Step | Sec | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| [P2] Start Up | Enum | other | redClear | other | phaseNotOn | other | other | other | other |
| [P2] Options | Bit | 0 | Enabled Non-Actuated 1 Max Veh Recall Ped Recall Act Rest In Walk | 0 | Enabled Non Lock Det | 0 | 0 | 0 | 0 |
| [P2] Ring | Ring | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| [P2] Concurrency | Phase (,) | () | () | () | () | () | () | () | () |
| Coord Pattern | Units | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Cycle Time | Sec | 120 | 120 | 120 | 0 | 0 | 0 | 0 | 0 |
| Offset | Sec | 114 | 112 | 91 | 0 | 0 | 0 | 0 | 0 |
| Split | Split | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Sequence | Sequence | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Coord Split | Units | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Split 1 - Mode | Enum | none | none | none | none | none | none | none | none |
| Split 1 - Time | Sec | 0 | 84 | 0 | 36 | 0 | 0 | 0 | 0 |
| Split 1 - Coord | Enum | false | true | false | false | false | false | false | false |
| Split 2 - Mode | Enum | none | none | none | none | none | none | none | none |
| Split 2 - Time | Sec | 0 | 84 | 0 | 36 | 0 | 0 | 0 | 0 |
| Split 2 - Coord | Enum | false | true | false | false | false | false | false | false |
| Split 3 - Mode | Enum | none | none | none | none | none | none | none | none |
| Split 3 - Time | Sec | 0 | 84 | 0 | 36 | 0 | 0 | 0 | 0 |
| Split 3 - Coord | Enum | false | true | false | false | false | false | false | false |
| TB Schedule | Units | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Month | Bit | JFMAMJJASOND | JFMAMJJASOND | JFMAMJJASOND | J----- | -F----- | --A----- | ---M----- | ----J----- |
| Day of Week | Bit | -MTWTF- | S----- | -----S | SMTWTFS | SMTWTFS | SMTWTFS | SMTWTFS | SMTWTFS |
| Day of Month | Bit | 123456789012345 678901234567890 | 123456789012345 678901234567890 | 123456789012345 678901234567890 | 1----- ----- | -----7----- ----- | -----0----- ----- | -----8----- ----- | 1----- ----- |
| Day Plan | Number | 1 | 3 | 2 | 3 | 3 | 3 | 3 | 3 |
| TB Schedule | Units | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| Month | Bit | -----A--- | -----S--- | -----O-- | -----D | -----D | -----D | 0 | 0 |
| Day of Week | Bit | SMTWTFS | SMTWTFS | SMTWTFS | SMTWTFS | SMTWTFS | SMTWTFS | SMTWTFS | SMTWTFS |
| Day of Month | Bit | --3----- ----- | -----7----- ----- | -----2----- ----- | 5----- ----- | --8-- ----- | 4----- ----- | 0 | 0 |
| Day Plan | Number | 3 | 3 | 3 | 3 | 3 | 3 | 0 | 0 |
| TB Dayplan | Units | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Plan 1 Hour | Hour | 0 | 7 | 9 | 16 | 18 | 3 | 0 | 0 |
| Plan 1 Minute | Min | 0 | 0 | 0 | 0 | 30 | 0 | 0 | 0 |
| Plan 1 Action | Number | 8 | 1 | 2 | 3 | 8 | 7 | 0 | 0 |
| Plan 2 Hour | Hour | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 2 Minute | Min | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 2 Action | Number | 8 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 3 Hour | Hour | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 3 Minute | Min | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Plan 3 Action | Number | 8 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| TB Action | Units | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Pattern | Enum | Pattern 1 | Pattern 2 | Pattern 3 | Pattern 4 | Pattern 5 | Pattern 6 | Free | Free |

| | | | | | | | | | |
|------------------------|-----|---|---|---|---|---|---|---|---|
| Aux. Functions | Bit | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spec. Functions | Bit | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Signal Timing Report

Runtime: 2020-03-23 10:56:02

Device: 4709

| Region: | | Mississauga | | Signal ID: | 4709 | | Location: | | | GOREWAY DRIVE N at Etude Drive | | |
|-------------------|-----------|------------------------------------|---|------------------------------------|-------------------------|----------------------|----------------------|----------------------|-----------------|--------------------------------|--|--|
| Phase | Units | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | |
| Walk | Sec | 0 | 9 | 0 | 13 | 0 | 0 | 0 | 0 | | | |
| Ped Clear | Sec | 0 | 14 | 0 | 19 | 0 | 0 | 0 | 0 | | | |
| Min Green | Sec | 5 | 8 | 0 | 8 | 0 | 0 | 0 | 0 | | | |
| Passage | Sec | 2.0 | 3.0 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| Maximum 1 | Sec | 10 | 33 | 0 | 30 | 0 | 0 | 0 | 0 | | | |
| Maximum 2 | Sec | 10 | 33 | 0 | 30 | 0 | 0 | 0 | 0 | | | |
| Yellow Change | Sec | 3.0 | 4.0 | 3.0 | 4.0 | 3.0 | 4.0 | 3.0 | 4.0 | | | |
| Red Clearance | Sec | 0.0 | 2.5 | 0.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| Red Revert | Sec | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| Added Initial | Sec | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| Max Initial | Sec | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Time Before | Sec | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Cars Before | Veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Time To Reduce | Sec | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Reduce By | Sec | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| Min Gap | Sec | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| Dynamic Max Limit | Sec | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Dynamic Max Step | Sec | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| [P2] Start Up | Enum | phaseNotOn | redClear | other | phaseNotOn | other | other | other | other | | | |
| [P2] Options | Bit | Enabled Non Lock Det | Enabled Non-Actuated 1 Max Veh Recall Ped Recall Act Rest In Walk | 0 | Enabled Non Lock Det | 0 | 0 | 0 | 0 | | | |
| [P2] Ring | Ring | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | | | |
| [P2] Concurrency | Phase (,) | () | () | () | () | () | () | () | () | | | |
| Coord Pattern | Units | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | |
| Cycle Time | Sec | 120 | 120 | 120 | 0 | 0 | 0 | 0 | 0 | | | |
| Offset | Sec | 80 | 55 | 102 | 0 | 0 | 0 | 0 | 0 | | | |
| Split | Split | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | |
| Sequence | Sequence | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | |
| Coord Split | Units | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | |
| Split 1 - Mode | Enum | none | none | none | none | none | none | none | none | | | |
| Split 1 - Time | Sec | 14 | 64 | 0 | 42 | 0 | 0 | 0 | 0 | | | |
| Split 1 - Coord | Enum | false | true | false | false | false | false | false | false | | | |
| Split 2 - Mode | Enum | none | none | none | none | none | none | none | none | | | |
| Split 2 - Time | Sec | 14 | 64 | 0 | 42 | 0 | 0 | 0 | 0 | | | |
| Split 2 - Coord | Enum | false | true | false | false | false | false | false | false | | | |
| Split 3 - Mode | Enum | none | none | none | none | none | none | none | none | | | |
| Split 3 - Time | Sec | 14 | 64 | 0 | 42 | 0 | 0 | 0 | 0 | | | |
| Split 3 - Coord | Enum | false | true | false | false | false | false | false | false | | | |
| TB Schedule | Units | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | |
| Month | Bit | JFMAMJJASOND | JFMAMJJASOND | JFMAMJJASOND | J----- | -F----- | --A----- | ---M----- | ----J----- | | | |
| Day of Week | Bit | -MTWTF- | S----- | -----S | SMTWTFS | SMTWTFS | SMTWTFS | SMTWTFS | SMTWTFS | | | |
| Day of Month | Bit | 123456789012345 678901234567890 | 123456789012345 678901234567890 | 123456789012345 678901234567890 | 1----- ----- | -----7----- ----- | -----0----- ----- | -----8----- ----- | 1----- ----- | | | |
| Day Plan | Number | 1 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | | | |
| TB Schedule | Units | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | | | |
| Month | Bit | -----A--- | -----S--- | -----O-- | -----D | -----D | -----D | 0 | 0 | | | |
| Day of Week | Bit | SMTWTFS | SMTWTFS | SMTWTFS | SMTWTFS | SMTWTFS | SMTWTFS | SMTWTFS | SMTWTFS | | | |
| Day of Month | Bit | -3----- ----- | -----7----- ----- | -----2----- ----- | 5----- | --8-- | 4----- | 0 | 0 | | | |
| Day Plan | Number | 3 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | | | |
| TB Dayplan | Units | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | |
| Plan 1 Hour | Hour | 0 | 7 | 9 | 16 | 18 | 3 | 0 | 0 | | | |
| Plan 1 Minute | Min | 0 | 0 | 0 | 0 | 30 | 0 | 0 | 0 | | | |
| Plan 1 Action | Number | 8 | 1 | 2 | 3 | 8 | 7 | 0 | 0 | | | |
| Plan 2 Hour | Hour | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Plan 2 Minute | Min | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Plan 2 Action | Number | 8 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Plan 3 Hour | Hour | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Plan 3 Minute | Min | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Plan 3 Action | Number | 8 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| TB Action | Units | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | |
| Pattern | Enum | Pattern 1 | Pattern 2 | Pattern 3 | Pattern 4 | Pattern 5 | Pattern 6 | Free | Free | | | |

| | | | | | | | | | |
|------------------------|-----|---|---|---|---|---|---|---|---|
| Aux. Functions | Bit | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spec. Functions | Bit | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Appendix D

2020 Existing Conditions Synchro Reports

Queues
1: Goreway Drive & Derry Road East

AM Peak Period
Existing Conditions

































| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT |
|------------------------|-------|-------|-------|------|-------|------|------|-------|------|-------|-------|
| Lane Group Flow (vph) | 135 | 750 | 266 | 120 | 818 | 238 | 69 | 139 | 73 | 511 | 803 |
| v/c Ratio | 0.51 | 0.47 | 0.38 | 0.42 | 0.52 | 0.40 | 0.36 | 0.17 | 0.18 | 0.79 | 0.68 |
| Control Delay | 77.0 | 40.7 | 5.5 | 30.3 | 45.5 | 6.6 | 75.5 | 49.2 | 1.0 | 70.8 | 42.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 77.0 | 40.7 | 5.5 | 30.3 | 45.5 | 6.6 | 75.5 | 49.2 | 1.0 | 70.8 | 42.8 |
| Queue Length 50th (m) | 21.4 | 67.4 | 0.0 | 21.6 | 78.1 | 0.0 | 10.9 | 18.7 | 0.0 | 80.0 | 104.3 |
| Queue Length 95th (m) | 32.8 | 82.6 | 19.9 | 35.9 | 95.0 | 20.7 | 19.2 | 28.6 | 0.0 | 98.7 | 128.6 |
| Internal Link Dist (m) | | 563.5 | | | 156.8 | | | 158.8 | | | 208.0 |
| Turn Bay Length (m) | 120.0 | | 100.0 | 78.0 | | 90.0 | 81.5 | | 73.0 | 101.0 | |
| Base Capacity (vph) | 292 | 1587 | 692 | 286 | 1582 | 601 | 253 | 824 | 406 | 721 | 1184 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.46 | 0.47 | 0.38 | 0.42 | 0.52 | 0.40 | 0.27 | 0.17 | 0.18 | 0.71 | 0.68 |

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Goreway Drive & Derry Road East

AM Peak Period
Existing Conditions

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|--|---|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |   |    |  |  |    |  |   |   |  |   | | |
| Traffic Volume (vph) | 135 | 750 | 266 | 120 | 818 | 238 | 69 | 139 | 73 | 511 | 522 | 281 |
| Future Volume (vph) | 135 | 750 | 266 | 120 | 818 | 238 | 69 | 139 | 73 | 511 | 522 | 281 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 3.5 | 3.7 | 3.5 | 3.5 | 3.7 | 3.5 | 3.5 | 3.7 | 3.5 | 3.5 | 3.7 | 3.7 |
| Total Lost time (s) | 5.0 | 7.6 | 7.6 | 3.0 | 7.6 | 7.6 | 5.0 | 7.4 | 7.4 | 5.0 | 7.4 | |
| Lane Util. Factor | 0.97 | 0.91 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | |
| Frpb, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.89 | 1.00 | 1.00 | 0.95 | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.95 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 3120 | 4371 | 1439 | 1565 | 4812 | 1343 | 2705 | 3444 | 1209 | 3395 | 3172 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.32 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 3120 | 4371 | 1439 | 527 | 4812 | 1343 | 2705 | 3444 | 1209 | 3395 | 3172 | |
| Peak-hour factor, PHF | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Adj. Flow (vph) | 135 | 750 | 266 | 120 | 818 | 238 | 69 | 139 | 73 | 511 | 522 | 281 |
| RTOR Reduction (vph) | 0 | 0 | 169 | 0 | 0 | 160 | 0 | 0 | 56 | 0 | 44 | 0 |
| Lane Group Flow (vph) | 135 | 750 | 97 | 120 | 818 | 78 | 69 | 139 | 17 | 511 | 759 | 0 |
| Confl. Peds. (#/hr) | 72 | | 5 | 5 | | 72 | 4 | | 27 | 27 | | 4 |
| Heavy Vehicles (%) | 11% | 20% | 8% | 14% | 9% | 6% | 28% | 6% | 26% | 2% | 2% | 6% |
| Bus Blockages (#/hr) | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 0 |
| Turn Type | Prot | NA | Perm | pm+pt | NA | Perm | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | | 3 | 8 | |
| Permitted Phases | | | 2 | 6 | | 6 | | | 4 | | | |
| Actuated Green, G (s) | 13.5 | 58.1 | 58.1 | 62.6 | 52.6 | 52.6 | 11.4 | 38.3 | 38.3 | 30.6 | 57.5 | |
| Effective Green, g (s) | 13.5 | 58.1 | 58.1 | 62.6 | 52.6 | 52.6 | 11.4 | 38.3 | 38.3 | 30.6 | 57.5 | |
| Actuated g/C Ratio | 0.08 | 0.36 | 0.36 | 0.39 | 0.33 | 0.33 | 0.07 | 0.24 | 0.24 | 0.19 | 0.36 | |
| Clearance Time (s) | 5.0 | 7.6 | 7.6 | 3.0 | 7.6 | 7.6 | 5.0 | 7.4 | 7.4 | 5.0 | 7.4 | |
| Vehicle Extension (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | |
| Lane Grp Cap (vph) | 263 | 1587 | 522 | 271 | 1581 | 441 | 192 | 824 | 289 | 649 | 1139 | |
| v/s Ratio Prot | c0.04 | 0.17 | | 0.03 | c0.17 | | 0.03 | 0.04 | | c0.15 | c0.24 | |
| v/s Ratio Perm | | | 0.07 | 0.15 | | 0.06 | | | 0.01 | | | |
| v/c Ratio | 0.51 | 0.47 | 0.19 | 0.44 | 0.52 | 0.18 | 0.36 | 0.17 | 0.06 | 0.79 | 0.67 | |
| Uniform Delay, d1 | 70.1 | 39.2 | 34.8 | 32.2 | 43.4 | 38.3 | 70.8 | 48.2 | 47.0 | 61.6 | 43.2 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 3.3 | 1.0 | 0.8 | 2.4 | 1.2 | 0.9 | 2.4 | 0.4 | 0.4 | 7.3 | 3.1 | |
| Delay (s) | 73.4 | 40.2 | 35.6 | 34.6 | 44.6 | 39.2 | 73.2 | 48.7 | 47.4 | 68.9 | 46.3 | |
| Level of Service | E | D | D | C | D | D | E | D | D | E | D | |
| Approach Delay (s) | | 43.0 | | | 42.5 | | | 54.4 | | | 55.0 | |
| Approach LOS | | D | | | D | | | D | | | E | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 47.7 | | | HCM 2000 Level of Service | | | | D | | |
| HCM 2000 Volume to Capacity ratio | | | 0.63 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 160.0 | | | Sum of lost time (s) | | | | 25.0 | | |
| Intersection Capacity Utilization | | | 102.1% | | | ICU Level of Service | | | | G | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | |

Queues
2: Goreway Drive & Dorcas Street/Development Site South Access

AM Peak Period
Existing Conditions



| Lane Group | EBT | NBL | NBT | SBT |
|------------------------|-------|------|-------|-------|
| Lane Group Flow (vph) | 152 | 20 | 560 | 1511 |
| v/c Ratio | 0.64 | 0.09 | 0.21 | 0.54 |
| Control Delay | 45.2 | 4.9 | 3.5 | 6.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 45.2 | 4.9 | 3.5 | 6.8 |
| Queue Length 50th (m) | 23.3 | 0.9 | 13.4 | 107.9 |
| Queue Length 95th (m) | 30.5 | 3.6 | 23.7 | 108.2 |
| Internal Link Dist (m) | 104.2 | | 208.0 | 20.6 |
| Turn Bay Length (m) | | 60.0 | | |
| Base Capacity (vph) | 458 | 220 | 2692 | 2822 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.33 | 0.09 | 0.21 | 0.54 |

Intersection Summary

HCM Signalized Intersection Capacity Analysis

2: Goreway Drive & Dorcas Street/Development Site South Access

AM Peak Period
Existing Conditions



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------|-------|-------|------|------|------|------|------|------|------|-------|------|
| Lane Configurations | | ↕ | | | ↕ | | ↕ | ↕ | | ↕ | ↕ | |
| Traffic Volume (vph) | 1 | 0 | 109 | 0 | 0 | 0 | 18 | 498 | 0 | 0 | 1299 | 1 |
| Future Volume (vph) | 1 | 0 | 109 | 0 | 0 | 0 | 18 | 498 | 0 | 0 | 1299 | 1 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1640 | 1900 | 1900 | 1640 | 1900 | 1900 | 1640 | 1900 | 1900 | 1640 |
| Total Lost time (s) | | 5.0 | | | | | 6.0 | 5.0 | | | 5.0 | |
| Lane Util. Factor | | 1.00 | | | | | 1.00 | 0.95 | | | 0.95 | |
| Frbp, ped/bikes | | 0.98 | | | | | 1.00 | 1.00 | | | 1.00 | |
| Flpb, ped/bikes | | 1.00 | | | | | 1.00 | 1.00 | | | 1.00 | |
| Frt | | 0.87 | | | | | 1.00 | 1.00 | | | 1.00 | |
| Flt Protected | | 1.00 | | | | | 0.95 | 1.00 | | | 1.00 | |
| Satd. Flow (prot) | | 1634 | | | | | 1822 | 3380 | | | 3543 | |
| Flt Permitted | | 1.00 | | | | | 0.15 | 1.00 | | | 1.00 | |
| Satd. Flow (perm) | | 1633 | | | | | 279 | 3380 | | | 3543 | |
| Peak-hour factor, PHF | 0.72 | 0.72 | 0.72 | 0.92 | 0.92 | 0.92 | 0.89 | 0.89 | 0.89 | 0.86 | 0.86 | 0.86 |
| Adj. Flow (vph) | 1 | 0 | 151 | 0 | 0 | 0 | 20 | 560 | 0 | 0 | 1510 | 1 |
| RTOR Reduction (vph) | 0 | 43 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 109 | 0 | 0 | 0 | 0 | 20 | 560 | 0 | 0 | 1511 | 0 |
| Confl. Peds. (#/hr) | 9 | | 4 | 4 | | | 9 | 6 | 14 | 14 | | 6 |
| Heavy Vehicles (%) | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 8% | 0% | 0% | 3% | 0% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 18 |
| Turn Type | Perm | NA | | | | | Perm | NA | | Perm | NA | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | | 8 | | | 2 | | | 6 | | |
| Actuated Green, G (s) | | 13.4 | | | | | 94.6 | 94.6 | | | 94.6 | |
| Effective Green, g (s) | | 14.4 | | | | | 94.6 | 95.6 | | | 95.6 | |
| Actuated g/C Ratio | | 0.12 | | | | | 0.79 | 0.80 | | | 0.80 | |
| Clearance Time (s) | | 6.0 | | | | | 6.0 | 6.0 | | | 6.0 | |
| Vehicle Extension (s) | | 3.0 | | | | | 3.0 | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | | 195 | | | | | 219 | 2692 | | | 2822 | |
| v/s Ratio Prot | | | | | | | | 0.17 | | | c0.43 | |
| v/s Ratio Perm | | c0.07 | | | | | 0.07 | | | | | |
| v/c Ratio | | 0.56 | | | | | 0.09 | 0.21 | | | 0.54 | |
| Uniform Delay, d1 | | 49.8 | | | | | 2.9 | 3.0 | | | 4.3 | |
| Progression Factor | | 1.00 | | | | | 1.00 | 1.00 | | | 1.26 | |
| Incremental Delay, d2 | | 3.4 | | | | | 0.8 | 0.2 | | | 0.6 | |
| Delay (s) | | 53.2 | | | | | 3.7 | 3.1 | | | 6.1 | |
| Level of Service | | D | | | | | A | A | | | A | |
| Approach Delay (s) | | 53.2 | | | 0.0 | | | 3.2 | | | 6.1 | |
| Approach LOS | | D | | | A | | | A | | | A | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 8.5 | | | | | | | | | A |
| HCM 2000 Volume to Capacity ratio | | | 0.54 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 120.0 | | | | | | 10.0 | | | |
| Intersection Capacity Utilization | | | 55.0% | | | | | | | | | B |
| Analysis Period (min) | | | 15 | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | |

Queues
3: Goreway Drive & Etude Drive

AM Peak Period
Existing Conditions


























| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | SBL | SBT |
|------------------------|------|-------|------|-------|------|------|-------|------|-------|
| Lane Group Flow (vph) | 34 | 206 | 177 | 49 | 70 | 49 | 454 | 38 | 1210 |
| v/c Ratio | 0.12 | 0.45 | 0.93 | 0.11 | 0.18 | 0.16 | 0.20 | 0.07 | 0.56 |
| Control Delay | 35.4 | 22.9 | 94.4 | 33.5 | 8.6 | 8.3 | 7.4 | 13.3 | 16.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 35.4 | 22.9 | 94.4 | 33.5 | 8.6 | 8.3 | 7.4 | 13.3 | 16.1 |
| Queue Length 50th (m) | 6.5 | 22.1 | 40.9 | 9.0 | 0.0 | 3.1 | 17.3 | 3.6 | 84.7 |
| Queue Length 95th (m) | 13.7 | 39.3 | 57.4 | 15.9 | 8.6 | 8.4 | 29.7 | 9.9 | 119.1 |
| Internal Link Dist (m) | | 111.7 | | 462.1 | | | 246.8 | | 287.8 |
| Turn Bay Length (m) | 70.0 | | 37.0 | | 33.0 | 53.0 | | 30.0 | |
| Base Capacity (vph) | 365 | 577 | 255 | 592 | 488 | 363 | 2228 | 555 | 2176 |
| 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 | 0.09 | 0.36 | 0.69 | 0.08 | 0.14 | 0.13 | 0.20 | 0.07 | 0.56 |

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Goreway Drive & Etude Drive

AM Peak Period
Existing Conditions

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph) | 30 | 59 | 125 | 147 | 41 | 58 | 48 | 359 | 81 | 33 | 1028 | 13 |
| Future Volume (vph) | 30 | 59 | 125 | 147 | 41 | 58 | 48 | 359 | 81 | 33 | 1028 | 13 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1860 | 1900 | 1640 | 1900 | 1900 | 1640 |
| Total Lost time (s) | 7.0 | 5.0 | | 7.0 | 5.0 | 7.0 | 1.0 | 5.0 | | 6.5 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 0.99 | | 1.00 | 1.00 | 0.95 | 1.00 | 0.98 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 0.96 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 0.97 | 1.00 | |
| Frt | 1.00 | 0.90 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | | 1.00 | 1.00 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1643 | 1666 | | 1799 | 1921 | 1505 | 1685 | 3245 | | 1764 | 3493 | |
| Flt Permitted | 0.73 | 1.00 | | 0.46 | 1.00 | 1.00 | 0.17 | 1.00 | | 0.49 | 1.00 | |
| Satd. Flow (perm) | 1254 | 1666 | | 877 | 1921 | 1505 | 297 | 3245 | | 910 | 3493 | |
| Peak-hour factor, PHF | 0.89 | 0.89 | 0.89 | 0.83 | 0.83 | 0.83 | 0.97 | 0.97 | 0.97 | 0.86 | 0.86 | 0.86 |
| Adj. Flow (vph) | 34 | 66 | 140 | 177 | 49 | 70 | 49 | 370 | 84 | 38 | 1195 | 15 |
| RTOR Reduction (vph) | 0 | 70 | 0 | 0 | 0 | 55 | 0 | 13 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 34 | 136 | 0 | 177 | 49 | 15 | 49 | 441 | 0 | 38 | 1210 | 0 |
| Confl. Peds. (#/hr) | 35 | | 6 | 6 | | 35 | 10 | | 24 | 24 | | 10 |
| Heavy Vehicles (%) | 7% | 7% | 0% | 1% | 0% | 3% | 6% | 9% | 2% | 0% | 4% | 23% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 0 | 18 |
| Turn Type | Perm | NA | | Perm | NA | Perm | pm+pt | NA | | Perm | NA | |
| Protected Phases | | 8 | | | 4 | | 1 | 6 | | | 2 | |
| Permitted Phases | 8 | | | 4 | | 4 | 6 | | | 2 | | |
| Actuated Green, G (s) | 26.1 | 26.1 | | 26.1 | 26.1 | 26.1 | 80.4 | 80.4 | | 72.7 | 72.7 | |
| Effective Green, g (s) | 26.1 | 28.1 | | 26.1 | 28.1 | 26.1 | 82.4 | 81.9 | | 72.7 | 74.2 | |
| Actuated g/C Ratio | 0.22 | 0.23 | | 0.22 | 0.23 | 0.22 | 0.69 | 0.68 | | 0.61 | 0.62 | |
| Clearance Time (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 3.0 | 6.5 | | 6.5 | 6.5 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 2.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 272 | 390 | | 190 | 449 | 327 | 281 | 2214 | | 551 | 2159 | |
| v/s Ratio Prot | | 0.08 | | | 0.03 | | 0.01 | c0.14 | | | c0.35 | |
| v/s Ratio Perm | 0.03 | | | c0.20 | | 0.01 | 0.11 | | | 0.04 | | |
| v/c Ratio | 0.12 | 0.35 | | 0.93 | 0.11 | 0.05 | 0.17 | 0.20 | | 0.07 | 0.56 | |
| Uniform Delay, d1 | 37.8 | 38.3 | | 46.1 | 36.1 | 37.1 | 8.2 | 7.0 | | 9.7 | 13.4 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.08 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 0.2 | 0.5 | | 46.0 | 0.1 | 0.1 | 0.1 | 0.2 | | 0.2 | 1.1 | |
| Delay (s) | 38.0 | 38.8 | | 92.0 | 36.2 | 37.2 | 8.9 | 7.2 | | 10.0 | 14.4 | |
| Level of Service | D | D | | F | D | D | A | A | | A | B | |
| Approach Delay (s) | | 38.7 | | | 69.8 | | | 7.4 | | | 14.3 | |
| Approach LOS | | D | | | E | | | A | | | B | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 22.5 | | | | | | | | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | | | 0.61 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 120.0 | | | | | | | | Sum of lost time (s) | 11.0 |
| Intersection Capacity Utilization | | | 77.6% | | | | | | | | ICU Level of Service | D |
| Analysis Period (min) | | | 15 | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | |

HCM Unsignalized Intersection Capacity Analysis
4: Goreway Drive & Development Site North Access

AM Peak Period
Existing Conditions



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|-----------------------------------|-------|------|----------------------|------|-------|------|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 499 | 0 | 0 | 1300 |
| Future Volume (Veh/h) | 0 | 0 | 499 | 0 | 0 | 1300 |
| Sign Control | Stop | | Free | | Free | |
| Grade | 0% | | 0% | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 0 | 542 | 0 | 0 | 1413 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | TWLTL | | TWLTL | |
| Median storage (veh) | | | 2 | | 2 | |
| Upstream signal (m) | | | 45 | | 271 | |
| pX, platoon unblocked | 0.82 | 0.96 | | | 0.96 | |
| vC, conflicting volume | 1248 | 271 | | | 542 | |
| vC1, stage 1 conf vol | 542 | | | | | |
| vC2, stage 2 conf vol | 706 | | | | | |
| vCu, unblocked vol | 661 | 166 | | | 447 | |
| tC, single (s) | 6.8 | 6.9 | | | 4.1 | |
| tC, 2 stage (s) | 5.8 | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 100 | 100 | | | 100 | |
| cM capacity (veh/h) | 521 | 824 | | | 1082 | |
| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 | SB 3 |
| Volume Total | 0 | 361 | 181 | 0 | 706 | 706 |
| Volume Left | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 | 0 | 0 |
| cSH | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.00 | 0.21 | 0.11 | 0.00 | 0.42 | 0.42 |
| Queue Length 95th (m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | A | | | | | |
| Approach Delay (s) | 0.0 | 0.0 | | 0.0 | | |
| Approach LOS | A | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | 0.0 | | | | | |
| Intersection Capacity Utilization | 39.3% | | ICU Level of Service | | A | |
| Analysis Period (min) | 15 | | | | | |

Queues
1: Goreway Drive & Derry Road East

PM Peak Period
Existing Conditions



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT |
|------------------------|-------|-------|-------|------|-------|-------|------|-------|------|-------|-------|
| Lane Group Flow (vph) | 343 | 1165 | 101 | 76 | 746 | 566 | 187 | 665 | 133 | 326 | 447 |
| v/c Ratio | 1.05 | 0.64 | 0.18 | 0.38 | 0.48 | 0.78 | 0.58 | 0.69 | 0.28 | 0.69 | 0.45 |
| Control Delay | 130.8 | 43.6 | 4.2 | 28.5 | 44.2 | 24.4 | 75.8 | 56.9 | 11.0 | 72.9 | 35.6 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 130.8 | 43.6 | 4.2 | 28.5 | 44.2 | 24.4 | 75.8 | 56.9 | 11.0 | 72.9 | 35.6 |
| Queue Length 50th (m) | -61.0 | 112.1 | 0.0 | 12.8 | 69.5 | 59.3 | 29.6 | 100.2 | 3.1 | 51.6 | 46.9 |
| Queue Length 95th (m) | #93.6 | 133.2 | 9.1 | 23.4 | 84.9 | 116.7 | 42.5 | 125.1 | 20.7 | 66.0 | 63.6 |
| Internal Link Dist (m) | | 563.5 | | | 156.8 | | | 158.8 | | | 208.0 |
| Turn Bay Length (m) | 120.0 | | 100.0 | 78.0 | | 90.0 | 81.5 | | 73.0 | 101.0 | |
| Base Capacity (vph) | 326 | 1832 | 555 | 214 | 1541 | 722 | 377 | 961 | 470 | 657 | 1001 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 1.05 | 0.64 | 0.18 | 0.36 | 0.48 | 0.78 | 0.50 | 0.69 | 0.28 | 0.50 | 0.45 |


































Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

1: Goreway Drive & Derry Road East

PM Peak Period
Existing Conditions

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|--|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |   |    |  |  |    |  |   |   |  |   |   |  | |
| Traffic Volume (vph) | 343 | 1165 | 101 | 76 | 746 | 566 | 187 | 665 | 133 | 326 | 271 | 176 | |
| Future Volume (vph) | 343 | 1165 | 101 | 76 | 746 | 566 | 187 | 665 | 133 | 326 | 271 | 176 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 3.5 | 3.7 | 3.5 | 3.5 | 3.7 | 3.5 | 3.5 | 3.7 | 3.5 | 3.5 | 3.7 | 3.7 | |
| Total Lost time (s) | 5.0 | 7.6 | 7.6 | 3.0 | 7.6 | 7.6 | 5.0 | 7.4 | 7.4 | 5.0 | 7.4 | | |
| Lane Util. Factor | 0.97 | 0.91 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.90 | 1.00 | 1.00 | 0.91 | 1.00 | 0.98 | | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.94 | | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 3267 | 4902 | 1287 | 1525 | 4641 | 1416 | 3177 | 3544 | 1411 | 3395 | 3013 | | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.16 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (perm) | 3267 | 4902 | 1287 | 254 | 4641 | 1416 | 3177 | 3544 | 1411 | 3395 | 3013 | | |
| Peak-hour factor, PHF | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Adj. Flow (vph) | 343 | 1165 | 101 | 76 | 746 | 566 | 187 | 665 | 133 | 326 | 271 | 176 | |
| RTOR Reduction (vph) | 0 | 0 | 63 | 0 | 0 | 252 | 0 | 0 | 87 | 0 | 67 | 0 | |
| Lane Group Flow (vph) | 343 | 1165 | 38 | 76 | 746 | 314 | 187 | 665 | 46 | 326 | 380 | 0 | |
| Confl. Peds. (#/hr) | 62 | | 28 | 28 | | 62 | 23 | | 61 | 61 | | 23 | |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | | |
| Heavy Vehicles (%) | 6% | 7% | 17% | 17% | 13% | 2% | 9% | 3% | 3% | 2% | 5% | 10% | |
| Bus Blockages (#/hr) | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 0 | |
| Turn Type | Prot | NA | Perm | pm+pt | NA | Perm | Prot | NA | Perm | Prot | NA | | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | | 3 | 8 | | |
| Permitted Phases | | | 2 | 6 | | 6 | | | 4 | | | | |
| Actuated Green, G (s) | 16.0 | 59.9 | 59.9 | 64.5 | 53.2 | 53.2 | 16.2 | 43.4 | 43.4 | 22.4 | 49.6 | | |
| Effective Green, g (s) | 16.0 | 59.9 | 59.9 | 64.5 | 53.2 | 53.2 | 16.2 | 43.4 | 43.4 | 22.4 | 49.6 | | |
| Actuated g/C Ratio | 0.10 | 0.37 | 0.37 | 0.40 | 0.33 | 0.33 | 0.10 | 0.27 | 0.27 | 0.14 | 0.31 | | |
| Clearance Time (s) | 5.0 | 7.6 | 7.6 | 3.0 | 7.6 | 7.6 | 5.0 | 7.4 | 7.4 | 5.0 | 7.4 | | |
| Vehicle Extension (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | |
| Lane Grp Cap (vph) | 326 | 1835 | 481 | 192 | 1543 | 470 | 321 | 961 | 382 | 475 | 934 | | |
| v/s Ratio Prot | c0.10 | 0.24 | | 0.03 | 0.16 | | 0.06 | c0.19 | | c0.10 | 0.13 | | |
| v/s Ratio Perm | | | 0.03 | 0.13 | | c0.22 | | | 0.03 | | | | |
| v/c Ratio | 1.05 | 0.63 | 0.08 | 0.40 | 0.48 | 0.67 | 0.58 | 0.69 | 0.12 | 0.69 | 0.41 | | |
| Uniform Delay, d1 | 72.0 | 41.1 | 32.3 | 31.1 | 42.5 | 45.8 | 68.7 | 52.3 | 43.9 | 65.5 | 43.6 | | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 64.2 | 1.7 | 0.3 | 2.8 | 1.1 | 7.4 | 4.1 | 4.1 | 0.6 | 5.2 | 1.3 | | |
| Delay (s) | 136.2 | 42.8 | 32.6 | 33.9 | 43.6 | 53.2 | 72.8 | 56.4 | 44.5 | 70.7 | 44.9 | | |
| Level of Service | F | D | C | C | D | D | E | E | D | E | D | | |
| Approach Delay (s) | | 62.0 | | | 47.0 | | | 57.9 | | | 55.8 | | |
| Approach LOS | | E | | | D | | | E | | | E | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 55.8 | | HCM 2000 Level of Service | | | | E | | | | |
| HCM 2000 Volume to Capacity ratio | | | 0.72 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 160.0 | | Sum of lost time (s) | | | | 25.0 | | | | |
| Intersection Capacity Utilization | | | 99.9% | | ICU Level of Service | | | | F | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

Queues
2: Goreway Drive & Dorcas Street/Development Site South Access

PM Peak Period
Existing Conditions



| Lane Group | EBT | NBL | NBT | SBT |
|-----------------------------|-------|------|-------|------|
| Lane Group Flow (vph) | 72 | 122 | 1501 | 829 |
| v/c Ratio | 0.39 | 0.22 | 0.49 | 0.27 |
| Control Delay | 21.6 | 3.2 | 3.0 | 1.3 |
| Queue Delay | 0.0 | 0.0 | 0.2 | 0.0 |
| Total Delay | 21.6 | 3.2 | 3.3 | 1.3 |
| Queue Length 50th (m) | 1.8 | 4.5 | 37.7 | 9.3 |
| Queue Length 95th (m) | 5.7 | 10.2 | 54.6 | 10.9 |
| Internal Link Dist (m) | 104.2 | | 208.0 | 20.6 |
| Turn Bay Length (m) | | 60.0 | | |
| Base Capacity (vph) | 457 | 549 | 3079 | 3017 |
| Starvation Cap Reductn | 0 | 0 | 737 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.16 | 0.22 | 0.64 | 0.27 |
| Intersection Summary | | | | |

HCM Signalized Intersection Capacity Analysis
 2: Goreway Drive & Dorcas Street/Development Site South Access

PM Peak Period
 Existing Conditions



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|------|------|-------|-------|------|------|-------|------|
| Lane Configurations | | ↕ | | | ↕ | | ↗ | ↕↗ | | ↗ | ↕↗ | |
| Traffic Volume (vph) | 5 | 0 | 39 | 0 | 0 | 0 | 118 | 1456 | 0 | 0 | 734 | 4 |
| Future Volume (vph) | 5 | 0 | 39 | 0 | 0 | 0 | 118 | 1456 | 0 | 0 | 734 | 4 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1640 | 1900 | 1900 | 1640 | 1900 | 1900 | 1640 | 1900 | 1900 | 1640 |
| Total Lost time (s) | | 5.0 | | | | | 6.0 | 5.0 | | | 5.0 | |
| Lane Util. Factor | | 1.00 | | | | | 1.00 | 0.95 | | | 0.95 | |
| Frbp, ped/bikes | | 0.98 | | | | | 1.00 | 1.00 | | | 1.00 | |
| Flpb, ped/bikes | | 1.00 | | | | | 0.98 | 1.00 | | | 1.00 | |
| Frt | | 0.88 | | | | | 1.00 | 1.00 | | | 1.00 | |
| Flt Protected | | 0.99 | | | | | 0.95 | 1.00 | | | 1.00 | |
| Satd. Flow (prot) | | 1646 | | | | | 1787 | 3544 | | | 3473 | |
| Flt Permitted | | 0.96 | | | | | 0.34 | 1.00 | | | 1.00 | |
| Satd. Flow (perm) | | 1589 | | | | | 634 | 3544 | | | 3473 | |
| Peak-hour factor, PHF | 0.61 | 0.61 | 0.61 | 0.92 | 0.92 | 0.92 | 0.97 | 0.97 | 0.97 | 0.89 | 0.89 | 0.89 |
| Adj. Flow (vph) | 8 | 0 | 64 | 0 | 0 | 0 | 122 | 1501 | 0 | 0 | 825 | 4 |
| RTOR Reduction (vph) | 0 | 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 12 | 0 | 0 | 0 | 0 | 122 | 1501 | 0 | 0 | 829 | 0 |
| Confl. Peds. (#/hr) | 15 | | 7 | 7 | | | 15 | 18 | | 33 | 33 | 18 |
| Heavy Vehicles (%) | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 3% | 0% | 0% | 5% | 0% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 18 |
| Turn Type | Perm | NA | | | | | Perm | NA | | Perm | NA | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | | 8 | | | 2 | | | 6 | | |
| Actuated Green, G (s) | | 6.9 | | | | | 101.1 | 101.1 | | | 101.1 | |
| Effective Green, g (s) | | 7.9 | | | | | 101.1 | 102.1 | | | 102.1 | |
| Actuated g/C Ratio | | 0.07 | | | | | 0.84 | 0.85 | | | 0.85 | |
| Clearance Time (s) | | 6.0 | | | | | 6.0 | 6.0 | | | 6.0 | |
| Vehicle Extension (s) | | 3.0 | | | | | 3.0 | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | | 104 | | | | | 534 | 3015 | | | 2954 | |
| v/s Ratio Prot | | | | | | | | c0.42 | | | 0.24 | |
| v/s Ratio Perm | | c0.01 | | | | | 0.19 | | | | | |
| v/c Ratio | | 0.12 | | | | | 0.23 | 0.50 | | | 0.28 | |
| Uniform Delay, d1 | | 52.8 | | | | | 1.8 | 2.3 | | | 1.8 | |
| Progression Factor | | 1.00 | | | | | 1.00 | 1.00 | | | 0.60 | |
| Incremental Delay, d2 | | 0.5 | | | | | 1.0 | 0.6 | | | 0.2 | |
| Delay (s) | | 53.3 | | | | | 2.8 | 2.9 | | | 1.3 | |
| Level of Service | | D | | | | | A | A | | | A | |
| Approach Delay (s) | | 53.3 | | | 0.0 | | | 2.9 | | | 1.3 | |
| Approach LOS | | D | | | A | | | A | | | A | |

| Intersection Summary | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 3.8 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.47 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 10.0 |
| Intersection Capacity Utilization | 73.1% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

Queues
3: Goreway Drive & Etude Drive

PM Peak Period
Existing Conditions



| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | SBL | SBT |
|------------------------|------|-------|-------|-------|------|------|-------|------|-------|
| Lane Group Flow (vph) | 50 | 225 | 183 | 141 | 57 | 85 | 1421 | 45 | 661 |
| v/c Ratio | 0.21 | 0.48 | 0.95 | 0.29 | 0.14 | 0.16 | 0.65 | 0.28 | 0.32 |
| Control Delay | 36.2 | 34.2 | 97.7 | 36.2 | 8.5 | 6.4 | 11.8 | 22.4 | 14.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 36.2 | 34.2 | 97.7 | 36.2 | 8.5 | 6.4 | 11.8 | 22.4 | 14.1 |
| Queue Length 50th (m) | 9.4 | 37.3 | 42.0 | 26.4 | 0.0 | 4.5 | 96.1 | 5.3 | 40.8 |
| Queue Length 95th (m) | 15.9 | 45.5 | #76.2 | 41.0 | 9.4 | 8.1 | 135.7 | 13.3 | 50.7 |
| Internal Link Dist (m) | | 111.7 | | 462.1 | | | 246.8 | | 287.8 |
| Turn Bay Length (m) | 70.0 | | 37.0 | | 33.0 | 53.0 | | 30.0 | |
| Base Capacity (vph) | 299 | 567 | 238 | 592 | 474 | 567 | 2187 | 162 | 2038 |
| 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 | 0.17 | 0.40 | 0.77 | 0.24 | 0.12 | 0.15 | 0.65 | 0.28 | 0.32 |

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

3: Goreway Drive & Etude Drive

PM Peak Period
Existing Conditions



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|-------|------|------|-------|-------|------|------|------|------|
| Lane Configurations | ↖ | ↗ | | ↖ | ↗ | ↗ | ↖ | ↖↗ | | ↖ | ↗ | |
| Traffic Volume (vph) | 38 | 94 | 77 | 168 | 130 | 52 | 82 | 1114 | 265 | 35 | 493 | 23 |
| Future Volume (vph) | 38 | 94 | 77 | 168 | 130 | 52 | 82 | 1114 | 265 | 35 | 493 | 23 |
| Ideal Flow (vphp) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1860 | 1900 | 1640 | 1900 | 1900 | 1640 |
| Total Lost time (s) | 7.0 | 5.0 | | 7.0 | 5.0 | 7.0 | 1.0 | 5.0 | | 6.5 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 0.98 | | 1.00 | 1.00 | 0.91 | 1.00 | 0.96 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 0.94 | 1.00 | | 0.98 | 1.00 | 1.00 | 0.99 | 1.00 | | 0.98 | 1.00 | |
| Frt | 1.00 | 0.93 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | | 1.00 | 0.99 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1612 | 1760 | | 1741 | 1921 | 1484 | 1725 | 3272 | | 1789 | 3408 | |
| Flt Permitted | 0.61 | 1.00 | | 0.45 | 1.00 | 1.00 | 0.36 | 1.00 | | 0.15 | 1.00 | |
| Satd. Flow (perm) | 1027 | 1760 | | 820 | 1921 | 1484 | 650 | 3272 | | 277 | 3408 | |
| Peak-hour factor, PHF | 0.76 | 0.76 | 0.76 | 0.92 | 0.92 | 0.92 | 0.97 | 0.97 | 0.97 | 0.78 | 0.78 | 0.78 |
| Adj. Flow (vph) | 50 | 124 | 101 | 183 | 141 | 57 | 85 | 1148 | 273 | 45 | 632 | 29 |
| RTOR Reduction (vph) | 0 | 26 | 0 | 0 | 0 | 44 | 0 | 15 | 0 | 0 | 2 | 0 |
| Lane Group Flow (vph) | 50 | 199 | 0 | 183 | 141 | 13 | 85 | 1406 | 0 | 45 | 659 | 0 |
| Confl. Peds. (#/hr) | 72 | | 24 | 24 | | 72 | 19 | | 81 | 81 | | 19 |
| Confl. Bikes (#/hr) | | | 1 | | | | | | | | | |
| Heavy Vehicles (%) | 6% | 0% | 0% | 3% | 0% | 0% | 3% | 4% | 2% | 0% | 6% | 8% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 0 | 18 |
| Turn Type | Perm | NA | | Perm | NA | Perm | pm+pt | NA | | Perm | NA | |
| Protected Phases | | 8 | | | 4 | | 1 | 6 | | | | 2 |
| Permitted Phases | 8 | | | 4 | | 4 | 6 | | | 2 | | |
| Actuated Green, G (s) | 28.3 | 28.3 | | 28.3 | 28.3 | 28.3 | 78.2 | 78.2 | | 69.6 | 69.6 | |
| Effective Green, g (s) | 28.3 | 30.3 | | 28.3 | 30.3 | 28.3 | 80.2 | 79.7 | | 69.6 | 71.1 | |
| Actuated g/C Ratio | 0.24 | 0.25 | | 0.24 | 0.25 | 0.24 | 0.67 | 0.66 | | 0.58 | 0.59 | |
| Clearance Time (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 3.0 | 6.5 | | 6.5 | 6.5 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 2.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 242 | 444 | | 193 | 485 | 349 | 502 | 2173 | | 160 | 2019 | |
| v/s Ratio Prot | | 0.11 | | | 0.07 | | 0.01 | c0.43 | | | 0.19 | |
| v/s Ratio Perm | 0.05 | | | c0.22 | | 0.01 | 0.10 | | | 0.16 | | |
| v/c Ratio | 0.21 | 0.45 | | 0.95 | 0.29 | 0.04 | 0.17 | 0.65 | | 0.28 | 0.33 | |
| Uniform Delay, d1 | 36.8 | 37.8 | | 45.1 | 36.2 | 35.4 | 7.2 | 11.9 | | 12.6 | 12.4 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 0.82 | 0.82 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 0.4 | 0.7 | | 49.4 | 0.3 | 0.0 | 0.1 | 1.4 | | 4.3 | 0.4 | |
| Delay (s) | 37.3 | 38.5 | | 94.6 | 36.5 | 35.4 | 6.0 | 11.1 | | 17.0 | 12.8 | |
| Level of Service | D | D | | F | D | D | A | B | | B | B | |
| Approach Delay (s) | | 38.3 | | | 64.2 | | | 10.8 | | | 13.1 | |
| Approach LOS | | D | | | E | | | B | | | B | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 21.1 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.72 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 11.0 |
| Intersection Capacity Utilization | 98.1% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 4: Goreway Drive & Development Site North Access

PM Peak Period
 Existing Conditions



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|-----------------------------------|-------|------|----------------------|------|-------|------|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 1461 | 0 | 0 | 738 |
| Future Volume (Veh/h) | 0 | 0 | 1461 | 0 | 0 | 738 |
| Sign Control | Stop | | Free | | Free | |
| Grade | 0% | | 0% | | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 0 | 1588 | 0 | 0 | 802 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | TWLTL | | TWLTL | |
| Median storage (veh) | | | 2 | | 2 | |
| Upstream signal (m) | | | 45 | | 271 | |
| pX, platoon unblocked | 0.91 | 0.88 | | | 0.88 | |
| vC, conflicting volume | 1989 | 794 | | | 1588 | |
| vC1, stage 1 conf vol | 1588 | | | | | |
| vC2, stage 2 conf vol | 401 | | | | | |
| vCu, unblocked vol | 1624 | 505 | | | 1403 | |
| tC, single (s) | 6.8 | 6.9 | | | 4.1 | |
| tC, 2 stage (s) | 5.8 | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 100 | 100 | | | 100 | |
| cM capacity (veh/h) | 168 | 458 | | | 436 | |
| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 | SB 3 |
| Volume Total | 0 | 1059 | 529 | 0 | 401 | 401 |
| Volume Left | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 | 0 | 0 |
| cSH | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.00 | 0.62 | 0.31 | 0.00 | 0.24 | 0.24 |
| Queue Length 95th (m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | A | | | | | |
| Approach Delay (s) | 0.0 | 0.0 | | 0.0 | | |
| Approach LOS | A | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | 0.0 | | | | | |
| Intersection Capacity Utilization | 43.7% | | ICU Level of Service | | A | |
| Analysis Period (min) | 15 | | | | | |

Appendix E

2025 Future Background Conditions Synchro
Reports

Queues
1: Goreway Drive & Derry Road East

AM Peak Period
Future Background Conditions



























| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT |
|------------------------|-------|-------|-------|------|-------|------|------|-------|------|-------|-------|
| Lane Group Flow (vph) | 135 | 792 | 266 | 120 | 866 | 238 | 69 | 150 | 73 | 514 | 806 |
| v/c Ratio | 0.51 | 0.50 | 0.38 | 0.44 | 0.55 | 0.40 | 0.36 | 0.18 | 0.18 | 0.79 | 0.68 |
| Control Delay | 77.0 | 41.3 | 5.5 | 30.9 | 46.2 | 6.6 | 75.5 | 49.4 | 1.0 | 71.0 | 42.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 77.0 | 41.3 | 5.5 | 30.9 | 46.2 | 6.6 | 75.5 | 49.4 | 1.0 | 71.0 | 42.8 |
| Queue Length 50th (m) | 21.4 | 72.1 | 0.0 | 21.6 | 83.8 | 0.0 | 10.9 | 20.2 | 0.0 | 80.5 | 104.6 |
| Queue Length 95th (m) | 32.8 | 87.7 | 19.9 | 35.9 | 101.2 | 20.7 | 19.2 | 30.5 | 0.0 | 99.4 | 129.0 |
| Internal Link Dist (m) | | 563.5 | | | 156.8 | | | 158.8 | | | 208.0 |
| Turn Bay Length (m) | 120.0 | | 100.0 | 78.0 | | 90.0 | 81.5 | | 73.0 | 101.0 | |
| Base Capacity (vph) | 292 | 1587 | 692 | 273 | 1581 | 601 | 253 | 824 | 406 | 721 | 1184 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.46 | 0.50 | 0.38 | 0.44 | 0.55 | 0.40 | 0.27 | 0.18 | 0.18 | 0.71 | 0.68 |

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Goreway Drive & Derry Road East

AM Peak Period
Future Background Conditions

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph) | 135 | 792 | 266 | 120 | 866 | 238 | 69 | 150 | 73 | 514 | 523 | 283 |
| Future Volume (vph) | 135 | 792 | 266 | 120 | 866 | 238 | 69 | 150 | 73 | 514 | 523 | 283 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 3.5 | 3.7 | 3.5 | 3.5 | 3.7 | 3.5 | 3.5 | 3.7 | 3.5 | 3.5 | 3.7 | 3.7 |
| Total Lost time (s) | 5.0 | 7.6 | 7.6 | 3.0 | 7.6 | 7.6 | 5.0 | 7.4 | 7.4 | 5.0 | 7.4 | |
| Lane Util. Factor | 0.97 | 0.91 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | |
| Frpb, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.89 | 1.00 | 1.00 | 0.95 | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.95 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 3120 | 4371 | 1439 | 1565 | 4812 | 1343 | 2705 | 3444 | 1209 | 3395 | 3171 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.30 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 3120 | 4371 | 1439 | 491 | 4812 | 1343 | 2705 | 3444 | 1209 | 3395 | 3171 | |
| Peak-hour factor, PHF | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Adj. Flow (vph) | 135 | 792 | 266 | 120 | 866 | 238 | 69 | 150 | 73 | 514 | 523 | 283 |
| RTOR Reduction (vph) | 0 | 0 | 169 | 0 | 0 | 160 | 0 | 0 | 56 | 0 | 45 | 0 |
| Lane Group Flow (vph) | 135 | 792 | 97 | 120 | 866 | 78 | 69 | 150 | 17 | 514 | 761 | 0 |
| Confl. Peds. (#/hr) | 72 | | 5 | 5 | | 72 | 4 | | 27 | 27 | | 4 |
| Heavy Vehicles (%) | 11% | 20% | 8% | 14% | 9% | 6% | 28% | 6% | 26% | 2% | 2% | 6% |
| Bus Blockages (#/hr) | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 0 |
| Turn Type | Prot | NA | Perm | pm+pt | NA | Perm | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | | 3 | 8 | |
| Permitted Phases | | | 2 | 6 | | 6 | | | 4 | | | |
| Actuated Green, G (s) | 13.5 | 58.1 | 58.1 | 62.6 | 52.6 | 52.6 | 11.4 | 38.3 | 38.3 | 30.6 | 57.5 | |
| Effective Green, g (s) | 13.5 | 58.1 | 58.1 | 62.6 | 52.6 | 52.6 | 11.4 | 38.3 | 38.3 | 30.6 | 57.5 | |
| Actuated g/C Ratio | 0.08 | 0.36 | 0.36 | 0.39 | 0.33 | 0.33 | 0.07 | 0.24 | 0.24 | 0.19 | 0.36 | |
| Clearance Time (s) | 5.0 | 7.6 | 7.6 | 3.0 | 7.6 | 7.6 | 5.0 | 7.4 | 7.4 | 5.0 | 7.4 | |
| Vehicle Extension (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | |
| Lane Grp Cap (vph) | 263 | 1587 | 522 | 259 | 1581 | 441 | 192 | 824 | 289 | 649 | 1139 | |
| v/s Ratio Prot | c0.04 | 0.18 | | 0.03 | c0.18 | | 0.03 | 0.04 | | c0.15 | c0.24 | |
| v/s Ratio Perm | | | 0.07 | 0.15 | | 0.06 | | | 0.01 | | | |
| v/c Ratio | 0.51 | 0.50 | 0.19 | 0.46 | 0.55 | 0.18 | 0.36 | 0.18 | 0.06 | 0.79 | 0.67 | |
| Uniform Delay, d1 | 70.1 | 39.6 | 34.8 | 32.3 | 44.0 | 38.3 | 70.8 | 48.4 | 47.0 | 61.7 | 43.2 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 3.3 | 1.1 | 0.8 | 2.7 | 1.4 | 0.9 | 2.4 | 0.5 | 0.4 | 7.5 | 3.1 | |
| Delay (s) | 73.4 | 40.8 | 35.6 | 35.0 | 45.3 | 39.2 | 73.2 | 48.9 | 47.4 | 69.2 | 46.3 | |
| Level of Service | E | D | D | D | D | D | E | D | D | E | D | |
| Approach Delay (s) | | 43.3 | | | 43.1 | | | 54.3 | | | 55.2 | |
| Approach LOS | | D | | | D | | | D | | | E | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 47.9 | | | HCM 2000 Level of Service | | D | | | | |
| HCM 2000 Volume to Capacity ratio | | | 0.65 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 160.0 | | | Sum of lost time (s) | | 25.0 | | | | |
| Intersection Capacity Utilization | | | 102.2% | | | ICU Level of Service | | G | | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | |

Queues
 2: Goreway Drive & Dorcas Street/Development Site South Access

AM Peak Period
 Future Background Conditions



| Lane Group | EBT | NBL | NBT | SBT |
|------------------------|-------|------|-------|-------|
| Lane Group Flow (vph) | 152 | 20 | 572 | 1521 |
| v/c Ratio | 0.64 | 0.09 | 0.21 | 0.54 |
| Control Delay | 45.5 | 4.9 | 3.5 | 6.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 45.5 | 4.9 | 3.5 | 6.8 |
| Queue Length 50th (m) | 23.5 | 0.9 | 13.9 | 108.9 |
| Queue Length 95th (m) | 30.7 | 3.6 | 24.3 | 109.1 |
| Internal Link Dist (m) | 104.2 | | 208.0 | 20.6 |
| Turn Bay Length (m) | | 60.0 | | |
| Base Capacity (vph) | 457 | 216 | 2689 | 2820 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.33 | 0.09 | 0.21 | 0.54 |

Intersection Summary

HCM Signalized Intersection Capacity Analysis

2: Goreway Drive & Dorcas Street/Development Site South Access

AM Peak Period
Future Background Conditions



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|------|------|------|------|------|------|-------|------|
| Lane Configurations | | ↕ | | | ↕ | | ↕ | ↕ | | ↕ | ↕ | |
| Traffic Volume (vph) | 1 | 0 | 109 | 0 | 0 | 0 | 18 | 509 | 0 | 0 | 1307 | 1 |
| Future Volume (vph) | 1 | 0 | 109 | 0 | 0 | 0 | 18 | 509 | 0 | 0 | 1307 | 1 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1640 | 1900 | 1900 | 1640 | 1900 | 1900 | 1640 | 1900 | 1900 | 1640 |
| Total Lost time (s) | | 5.0 | | | | | 6.0 | 5.0 | | | 5.0 | |
| Lane Util. Factor | | 1.00 | | | | | 1.00 | 0.95 | | | 0.95 | |
| Frbp, ped/bikes | | 0.98 | | | | | 1.00 | 1.00 | | | 1.00 | |
| Flpb, ped/bikes | | 1.00 | | | | | 1.00 | 1.00 | | | 1.00 | |
| Frt | | 0.87 | | | | | 1.00 | 1.00 | | | 1.00 | |
| Flt Protected | | 1.00 | | | | | 0.95 | 1.00 | | | 1.00 | |
| Satd. Flow (prot) | | 1634 | | | | | 1822 | 3380 | | | 3543 | |
| Flt Permitted | | 1.00 | | | | | 0.14 | 1.00 | | | 1.00 | |
| Satd. Flow (perm) | | 1633 | | | | | 275 | 3380 | | | 3543 | |
| Peak-hour factor, PHF | 0.72 | 0.72 | 0.72 | 0.92 | 0.92 | 0.92 | 0.89 | 0.89 | 0.89 | 0.86 | 0.86 | 0.86 |
| Adj. Flow (vph) | 1 | 0 | 151 | 0 | 0 | 0 | 20 | 572 | 0 | 0 | 1520 | 1 |
| RTOR Reduction (vph) | 0 | 42 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 110 | 0 | 0 | 0 | 0 | 20 | 572 | 0 | 0 | 1521 | 0 |
| Confl. Peds. (#/hr) | 9 | | 4 | 4 | | | 9 | 6 | 14 | 14 | | 6 |
| Heavy Vehicles (%) | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 8% | 0% | 0% | 3% | 0% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 18 |
| Turn Type | Perm | NA | | | | | Perm | NA | | Perm | NA | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | | 8 | | | 2 | | | 6 | | |
| Actuated Green, G (s) | | 13.5 | | | | | 94.5 | 94.5 | | | 94.5 | |
| Effective Green, g (s) | | 14.5 | | | | | 94.5 | 95.5 | | | 95.5 | |
| Actuated g/C Ratio | | 0.12 | | | | | 0.79 | 0.80 | | | 0.80 | |
| Clearance Time (s) | | 6.0 | | | | | 6.0 | 6.0 | | | 6.0 | |
| Vehicle Extension (s) | | 3.0 | | | | | 3.0 | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | | 197 | | | | | 216 | 2689 | | | 2819 | |
| v/s Ratio Prot | | | | | | | | 0.17 | | | c0.43 | |
| v/s Ratio Perm | | c0.07 | | | | | 0.07 | | | | | |
| v/c Ratio | | 0.56 | | | | | 0.09 | 0.21 | | | 0.54 | |
| Uniform Delay, d1 | | 49.7 | | | | | 2.9 | 3.0 | | | 4.4 | |
| Progression Factor | | 1.00 | | | | | 1.00 | 1.00 | | | 1.25 | |
| Incremental Delay, d2 | | 3.4 | | | | | 0.8 | 0.2 | | | 0.6 | |
| Delay (s) | | 53.1 | | | | | 3.8 | 3.2 | | | 6.1 | |
| Level of Service | | D | | | | | A | A | | | A | |
| Approach Delay (s) | | 53.1 | | | 0.0 | | | 3.2 | | | 6.1 | |
| Approach LOS | | D | | | A | | | A | | | A | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 8.5 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.54 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 10.0 |
| Intersection Capacity Utilization | 55.3% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

Queues
3: Goreway Drive & Etude Drive

AM Peak Period
Future Background Conditions


























| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | SBL | SBT |
|------------------------|------|-------|------|-------|------|------|-------|------|-------|
| Lane Group Flow (vph) | 35 | 212 | 177 | 49 | 70 | 49 | 465 | 38 | 1215 |
| v/c Ratio | 0.13 | 0.45 | 0.94 | 0.11 | 0.18 | 0.16 | 0.21 | 0.07 | 0.56 |
| Control Delay | 35.4 | 22.6 | 97.1 | 33.3 | 8.6 | 8.4 | 7.6 | 13.4 | 16.2 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 35.4 | 22.6 | 97.1 | 33.3 | 8.6 | 8.4 | 7.6 | 13.4 | 16.2 |
| Queue Length 50th (m) | 6.6 | 22.4 | 41.0 | 9.0 | 0.0 | 3.1 | 17.9 | 3.6 | 85.9 |
| Queue Length 95th (m) | 13.9 | 40.1 | 57.9 | 15.9 | 8.6 | 8.4 | 30.6 | 9.9 | 119.6 |
| Internal Link Dist (m) | | 111.7 | | 462.1 | | | 246.8 | | 287.8 |
| Turn Bay Length (m) | 70.0 | | 37.0 | | 33.0 | 53.0 | | 30.0 | |
| Base Capacity (vph) | 365 | 579 | 250 | 592 | 488 | 361 | 2223 | 548 | 2169 |
| 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 | 0.10 | 0.37 | 0.71 | 0.08 | 0.14 | 0.14 | 0.21 | 0.07 | 0.56 |

Intersection Summary

HCM Signalized Intersection Capacity Analysis











3: Goreway Drive & Etude Drive

AM Peak Period
Future Background Conditions

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph) | 31 | 59 | 130 | 147 | 41 | 58 | 48 | 370 | 81 | 33 | 1031 | 14 |
| Future Volume (vph) | 31 | 59 | 130 | 147 | 41 | 58 | 48 | 370 | 81 | 33 | 1031 | 14 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1860 | 1900 | 1640 | 1900 | 1900 | 1640 |
| Total Lost time (s) | 7.0 | 5.0 | | 7.0 | 5.0 | 7.0 | 1.0 | 5.0 | | 6.5 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 0.99 | | 1.00 | 1.00 | 0.95 | 1.00 | 0.99 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 0.96 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 0.97 | 1.00 | |
| Frt | 1.00 | 0.90 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | | 1.00 | 1.00 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1643 | 1664 | | 1799 | 1921 | 1505 | 1685 | 3248 | | 1765 | 3492 | |
| Flt Permitted | 0.73 | 1.00 | | 0.45 | 1.00 | 1.00 | 0.17 | 1.00 | | 0.48 | 1.00 | |
| Satd. Flow (perm) | 1254 | 1664 | | 858 | 1921 | 1505 | 294 | 3248 | | 901 | 3492 | |
| Peak-hour factor, PHF | 0.89 | 0.89 | 0.89 | 0.83 | 0.83 | 0.83 | 0.97 | 0.97 | 0.97 | 0.86 | 0.86 | 0.86 |
| Adj. Flow (vph) | 35 | 66 | 146 | 177 | 49 | 70 | 49 | 381 | 84 | 38 | 1199 | 16 |
| RTOR Reduction (vph) | 0 | 73 | 0 | 0 | 0 | 55 | 0 | 13 | 0 | 0 | 1 | 0 |
| Lane Group Flow (vph) | 35 | 139 | 0 | 177 | 49 | 15 | 49 | 452 | 0 | 38 | 1214 | 0 |
| Confl. Peds. (#/hr) | 35 | | 6 | 6 | | 35 | 10 | | 24 | 24 | | 10 |
| Heavy Vehicles (%) | 7% | 7% | 0% | 1% | 0% | 3% | 6% | 9% | 2% | 0% | 4% | 23% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 0 | 18 |
| Turn Type | Perm | NA | | Perm | NA | Perm | pm+pt | NA | | Perm | NA | |
| Protected Phases | | 8 | | | 4 | | 1 | 6 | | | | 2 |
| Permitted Phases | 8 | | | 4 | | 4 | 6 | | | 2 | | |
| Actuated Green, G (s) | 26.3 | 26.3 | | 26.3 | 26.3 | 26.3 | 80.2 | 80.2 | | 72.5 | 72.5 | |
| Effective Green, g (s) | 26.3 | 28.3 | | 26.3 | 28.3 | 26.3 | 82.2 | 81.7 | | 72.5 | 74.0 | |
| Actuated g/C Ratio | 0.22 | 0.24 | | 0.22 | 0.24 | 0.22 | 0.69 | 0.68 | | 0.60 | 0.62 | |
| Clearance Time (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 3.0 | 6.5 | | 6.5 | 6.5 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 2.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 274 | 392 | | 188 | 453 | 329 | 279 | 2211 | | 544 | 2153 | |
| v/s Ratio Prot | | 0.08 | | | 0.03 | | 0.01 | c0.14 | | | | c0.35 |
| v/s Ratio Perm | 0.03 | | | c0.21 | | 0.01 | 0.11 | | | 0.04 | | |
| v/c Ratio | 0.13 | 0.35 | | 0.94 | 0.11 | 0.05 | 0.18 | 0.20 | | 0.07 | 0.56 | |
| Uniform Delay, d1 | 37.6 | 38.2 | | 46.1 | 36.0 | 37.0 | 8.3 | 7.1 | | 9.8 | 13.5 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.08 | 1.01 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 0.2 | 0.6 | | 48.8 | 0.1 | 0.1 | 0.1 | 0.2 | | 0.2 | 1.1 | |
| Delay (s) | 37.8 | 38.8 | | 94.9 | 36.1 | 37.0 | 9.0 | 7.3 | | 10.1 | 14.6 | |
| Level of Service | D | D | | F | D | D | A | A | | B | B | |
| Approach Delay (s) | | 38.6 | | | 71.5 | | | 7.5 | | | 14.5 | |
| Approach LOS | | D | | | E | | | A | | | B | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 22.8 | | | HCM 2000 Level of Service | | | C | | | |
| HCM 2000 Volume to Capacity ratio | | | 0.62 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 120.0 | | | Sum of lost time (s) | | | 11.0 | | | |
| Intersection Capacity Utilization | | | 77.7% | | | ICU Level of Service | | | D | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | |

HCM Unsignalized Intersection Capacity Analysis
 4: Goreway Drive & Development Site North Access

AM Peak Period
 Future Background Conditions

| |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations |  | |  | |  |  |
| Traffic Volume (veh/h) | 0 | 0 | 510 | 0 | 0 | 1308 |
| Future Volume (Veh/h) | 0 | 0 | 510 | 0 | 0 | 1308 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 0 | 554 | 0 | 0 | 1422 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | TWLTL | | TWLTL | |
| Median storage veh | | | 2 | | 2 | |
| Upstream signal (m) | | | 45 | | 271 | |
| pX, platoon unblocked | 0.82 | 0.96 | | | 0.96 | |
| vC, conflicting volume | 1265 | 277 | | | 554 | |
| vC1, stage 1 conf vol | 554 | | | | | |
| vC2, stage 2 conf vol | 711 | | | | | |
| vCu, unblocked vol | 670 | 168 | | | 456 | |
| tC, single (s) | 6.8 | 6.9 | | | 4.1 | |
| tC, 2 stage (s) | 5.8 | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 100 | 100 | | | 100 | |
| cM capacity (veh/h) | 516 | 820 | | | 1072 | |
| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 | SB 3 |
| Volume Total | 0 | 369 | 185 | 0 | 711 | 711 |
| Volume Left | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 | 0 | 0 |
| cSH | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.00 | 0.22 | 0.11 | 0.00 | 0.42 | 0.42 |
| Queue Length 95th (m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | A | | | | | |
| Approach Delay (s) | 0.0 | 0.0 | | 0.0 | | |
| Approach LOS | A | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 0.0 | | | |
| Intersection Capacity Utilization | | | 39.5% | | ICU Level of Service | A |
| Analysis Period (min) | | | 15 | | | |

Queues
1: Goreway Drive & Derry Road East

PM Peak Period
 Future Background Conditions



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT |
|------------------------|-------|-------|-------|------|-------|-------|------|-------|------|-------|-------|
| Lane Group Flow (vph) | 345 | 1230 | 101 | 76 | 789 | 568 | 188 | 610 | 133 | 329 | 382 |
| v/c Ratio | 1.06 | 0.67 | 0.18 | 0.41 | 0.51 | 0.79 | 0.58 | 0.64 | 0.28 | 0.69 | 0.38 |
| Control Delay | 132.2 | 44.7 | 4.2 | 29.5 | 44.8 | 24.4 | 75.8 | 55.1 | 9.1 | 72.8 | 27.6 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 132.2 | 44.7 | 4.2 | 29.5 | 44.8 | 24.4 | 75.8 | 55.1 | 9.1 | 72.8 | 27.6 |
| Queue Length 50th (m) | -61.7 | 120.4 | 0.0 | 12.8 | 74.3 | 59.5 | 29.8 | 90.4 | 0.9 | 52.1 | 31.0 |
| Queue Length 95th (m) | #94.2 | 142.6 | 9.1 | 23.4 | 90.3 | 116.9 | 42.6 | 114.0 | 18.1 | 66.5 | 46.1 |
| Internal Link Dist (m) | | 563.5 | | | 156.8 | | | 158.8 | | | 208.0 |
| Turn Bay Length (m) | 120.0 | | 100.0 | 78.0 | | 90.0 | 81.5 | | 73.0 | 101.0 | |
| Base Capacity (vph) | 326 | 1830 | 555 | 203 | 1540 | 723 | 377 | 960 | 476 | 657 | 1014 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 1.06 | 0.67 | 0.18 | 0.37 | 0.51 | 0.79 | 0.50 | 0.64 | 0.28 | 0.50 | 0.38 |

































Intersection Summary

- ~ 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.

HCM Signalized Intersection Capacity Analysis

1: Goreway Drive & Derry Road East

PM Peak Period
Future Background Conditions

| |  |  |  |  |  |  |  |  |  |  |  |  | |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|--|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
| Lane Configurations |   |    |  |  |    |  |   |   |  |   |   | | |
| Traffic Volume (vph) | 345 | 1230 | 101 | 76 | 789 | 568 | 188 | 610 | 133 | 329 | 205 | 177 | |
| Future Volume (vph) | 345 | 1230 | 101 | 76 | 789 | 568 | 188 | 610 | 133 | 329 | 205 | 177 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 3.5 | 3.7 | 3.5 | 3.5 | 3.7 | 3.5 | 3.5 | 3.7 | 3.5 | 3.5 | 3.7 | 3.7 | |
| Total Lost time (s) | 5.0 | 7.6 | 7.6 | 3.0 | 7.6 | 7.6 | 5.0 | 7.4 | 7.4 | 5.0 | 7.4 | | |
| Lane Util. Factor | 0.97 | 0.91 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.90 | 1.00 | 1.00 | 0.91 | 1.00 | 0.98 | | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.93 | | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 3267 | 4902 | 1287 | 1525 | 4641 | 1416 | 3177 | 3544 | 1411 | 3395 | 2962 | | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.14 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (perm) | 3267 | 4902 | 1287 | 221 | 4641 | 1416 | 3177 | 3544 | 1411 | 3395 | 2962 | | |
| Peak-hour factor, PHF | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Adj. Flow (vph) | 345 | 1230 | 101 | 76 | 789 | 568 | 188 | 610 | 133 | 329 | 205 | 177 | |
| RTOR Reduction (vph) | 0 | 0 | 63 | 0 | 0 | 253 | 0 | 0 | 94 | 0 | 97 | 0 | |
| Lane Group Flow (vph) | 345 | 1230 | 38 | 76 | 789 | 315 | 188 | 610 | 39 | 329 | 285 | 0 | |
| Confl. Peds. (#/hr) | 62 | | 28 | 28 | | 62 | 23 | | 61 | 61 | | 23 | |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | | |
| Heavy Vehicles (%) | 6% | 7% | 17% | 17% | 13% | 2% | 9% | 3% | 3% | 2% | 5% | 10% | |
| Bus Blockages (#/hr) | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 0 | |
| Turn Type | Prot | NA | Perm | pm+pt | NA | Perm | Prot | NA | Perm | Prot | NA | | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | | 3 | 8 | | |
| Permitted Phases | | | 2 | 6 | | 6 | | | 4 | | | | |
| Actuated Green, G (s) | 16.0 | 59.8 | 59.8 | 64.4 | 53.1 | 53.1 | 16.3 | 43.3 | 43.3 | 22.6 | 49.6 | | |
| Effective Green, g (s) | 16.0 | 59.8 | 59.8 | 64.4 | 53.1 | 53.1 | 16.3 | 43.3 | 43.3 | 22.6 | 49.6 | | |
| Actuated g/C Ratio | 0.10 | 0.37 | 0.37 | 0.40 | 0.33 | 0.33 | 0.10 | 0.27 | 0.27 | 0.14 | 0.31 | | |
| Clearance Time (s) | 5.0 | 7.6 | 7.6 | 3.0 | 7.6 | 7.6 | 5.0 | 7.4 | 7.4 | 5.0 | 7.4 | | |
| Vehicle Extension (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | |
| Lane Grp Cap (vph) | 326 | 1832 | 481 | 181 | 1540 | 469 | 323 | 959 | 381 | 479 | 918 | | |
| v/s Ratio Prot | c0.11 | c0.25 | | 0.03 | 0.17 | | 0.06 | c0.17 | | c0.10 | 0.10 | | |
| v/s Ratio Perm | | | 0.03 | 0.14 | | 0.22 | | | 0.03 | | | | |
| v/c Ratio | 1.06 | 0.67 | 0.08 | 0.42 | 0.51 | 0.67 | 0.58 | 0.64 | 0.10 | 0.69 | 0.31 | | |
| Uniform Delay, d1 | 72.0 | 41.9 | 32.3 | 31.5 | 43.0 | 45.9 | 68.6 | 51.4 | 43.8 | 65.3 | 42.1 | | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 66.0 | 2.0 | 0.3 | 3.3 | 1.2 | 7.5 | 4.1 | 3.2 | 0.5 | 5.2 | 0.9 | | |
| Delay (s) | 138.0 | 43.9 | 32.6 | 34.8 | 44.2 | 53.4 | 72.7 | 54.6 | 44.3 | 70.5 | 43.0 | | |
| Level of Service | F | D | C | C | D | D | E | D | D | E | D | | |
| Approach Delay (s) | | 62.6 | | | 47.4 | | | 56.8 | | | 55.8 | | |
| Approach LOS | | E | | | D | | | E | | | E | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 55.8 | | HCM 2000 Level of Service | | | | | E | | | |
| HCM 2000 Volume to Capacity ratio | | | 0.72 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 160.0 | | Sum of lost time (s) | | | | | 25.0 | | | |
| Intersection Capacity Utilization | | | 100.1% | | ICU Level of Service | | | | | G | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

Queues
 2: Goreway Drive & Dorcas Street/Development Site South Access

PM Peak Period
 Future Background Conditions



| Lane Group | EBT | NBL | NBT | SBT |
|------------------------|-------|------|-------|------|
| Lane Group Flow (vph) | 55 | 107 | 1470 | 769 |
| v/c Ratio | 0.33 | 0.18 | 0.48 | 0.25 |
| Control Delay | 22.8 | 2.8 | 2.9 | 1.2 |
| Queue Delay | 0.0 | 0.0 | 0.2 | 0.0 |
| Total Delay | 22.8 | 2.8 | 3.2 | 1.2 |
| Queue Length 50th (m) | 1.6 | 3.8 | 36.3 | 8.5 |
| Queue Length 95th (m) | 5.8 | 8.2 | 50.2 | 10.1 |
| Internal Link Dist (m) | 104.2 | | 208.0 | 20.6 |
| Turn Bay Length (m) | | 60.0 | | |
| Base Capacity (vph) | 444 | 586 | 3083 | 3021 |
| Starvation Cap Reductn | 0 | 0 | 753 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.12 | 0.18 | 0.63 | 0.25 |

Intersection Summary

HCM Signalized Intersection Capacity Analysis

2: Goreway Drive & Dorcas Street/Development Site South Access

PM Peak Period
Future Background Conditions



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|------|------|-------|-------|------|------|-------|------|
| Lane Configurations | | ↕ | | | ↕ | | ↗ | ↕ | | ↗ | ↕ | |
| Traffic Volume (vph) | 4 | 0 | 29 | 0 | 0 | 0 | 104 | 1426 | 0 | 0 | 681 | 4 |
| Future Volume (vph) | 4 | 0 | 29 | 0 | 0 | 0 | 104 | 1426 | 0 | 0 | 681 | 4 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1640 | 1900 | 1900 | 1640 | 1900 | 1900 | 1640 | 1900 | 1900 | 1640 |
| Total Lost time (s) | | 5.0 | | | | | 6.0 | 5.0 | | | 5.0 | |
| Lane Util. Factor | | 1.00 | | | | | 1.00 | 0.95 | | | 0.95 | |
| Frbp, ped/bikes | | 0.98 | | | | | 1.00 | 1.00 | | | 1.00 | |
| Flpb, ped/bikes | | 1.00 | | | | | 0.98 | 1.00 | | | 1.00 | |
| Frt | | 0.88 | | | | | 1.00 | 1.00 | | | 1.00 | |
| Flt Protected | | 0.99 | | | | | 0.95 | 1.00 | | | 1.00 | |
| Satd. Flow (prot) | | 1649 | | | | | 1783 | 3544 | | | 3473 | |
| Flt Permitted | | 0.95 | | | | | 0.36 | 1.00 | | | 1.00 | |
| Satd. Flow (perm) | | 1583 | | | | | 675 | 3544 | | | 3473 | |
| Peak-hour factor, PHF | 0.61 | 0.61 | 0.61 | 0.92 | 0.92 | 0.92 | 0.97 | 0.97 | 0.97 | 0.89 | 0.89 | 0.89 |
| Adj. Flow (vph) | 7 | 0 | 48 | 0 | 0 | 0 | 107 | 1470 | 0 | 0 | 765 | 4 |
| RTOR Reduction (vph) | 0 | 45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 10 | 0 | 0 | 0 | 0 | 107 | 1470 | 0 | 0 | 769 | 0 |
| Confl. Peds. (#/hr) | 15 | | 7 | 7 | | | 15 | 18 | | 33 | 33 | 18 |
| Heavy Vehicles (%) | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 3% | 0% | 0% | 5% | 0% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 18 |
| Turn Type | Perm | NA | | | | | Perm | NA | | Perm | NA | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | 8 | | | 2 | | | 6 | | | |
| Actuated Green, G (s) | | 6.8 | | | | | 101.2 | 101.2 | | | 101.2 | |
| Effective Green, g (s) | | 7.8 | | | | | 101.2 | 102.2 | | | 102.2 | |
| Actuated g/C Ratio | | 0.06 | | | | | 0.84 | 0.85 | | | 0.85 | |
| Clearance Time (s) | | 6.0 | | | | | 6.0 | 6.0 | | | 6.0 | |
| Vehicle Extension (s) | | 3.0 | | | | | 3.0 | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | | 102 | | | | | 569 | 3018 | | | 2957 | |
| v/s Ratio Prot | | | | | | | | c0.41 | | | 0.22 | |
| v/s Ratio Perm | | c0.01 | | | | | 0.16 | | | | | |
| v/c Ratio | | 0.10 | | | | | 0.19 | 0.49 | | | 0.26 | |
| Uniform Delay, d1 | | 52.8 | | | | | 1.8 | 2.3 | | | 1.7 | |
| Progression Factor | | 1.00 | | | | | 1.00 | 1.00 | | | 0.59 | |
| Incremental Delay, d2 | | 0.4 | | | | | 0.7 | 0.6 | | | 0.2 | |
| Delay (s) | | 53.2 | | | | | 2.5 | 2.8 | | | 1.2 | |
| Level of Service | | D | | | | | A | A | | | A | |
| Approach Delay (s) | | 53.2 | | 0.0 | | | | 2.8 | | | 1.2 | |
| Approach LOS | | D | | A | | | | A | | | A | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 3.4 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.46 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 10.0 |
| Intersection Capacity Utilization | 72.3% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

Queues
3: Goreway Drive & Etude Drive

PM Peak Period
Future Background Conditions



| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | SBL | SBT |
|------------------------|------|-------|-------|-------|------|------|-------|------|-------|
| Lane Group Flow (vph) | 43 | 238 | 183 | 134 | 58 | 88 | 1414 | 44 | 641 |
| v/c Ratio | 0.17 | 0.49 | 0.96 | 0.27 | 0.14 | 0.17 | 0.65 | 0.28 | 0.33 |
| Control Delay | 34.8 | 35.7 | 99.6 | 35.3 | 8.6 | 6.6 | 12.2 | 22.8 | 14.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 34.8 | 35.7 | 99.6 | 35.3 | 8.6 | 6.6 | 12.2 | 22.8 | 14.8 |
| Queue Length 50th (m) | 7.9 | 41.0 | 41.7 | 24.6 | 0.0 | 4.7 | 99.0 | 5.3 | 40.4 |
| Queue Length 95th (m) | 14.1 | 49.8 | #78.3 | 39.2 | 9.5 | 8.3 | 134.4 | 13.0 | 49.0 |
| Internal Link Dist (m) | | 111.7 | | 462.1 | | | 246.8 | | 287.8 |
| Turn Bay Length (m) | 70.0 | | 37.0 | | 33.0 | 53.0 | | 30.0 | |
| Base Capacity (vph) | 307 | 568 | 230 | 592 | 474 | 569 | 2176 | 158 | 1966 |
| 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 | 0.14 | 0.42 | 0.80 | 0.23 | 0.12 | 0.15 | 0.65 | 0.28 | 0.33 |

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

3: Goreway Drive & Etude Drive











PM Peak Period
Future Background Conditions

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------|------|-------|-------|------|---------------------------|-------|-------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 33 | 110 | 71 | 168 | 123 | 53 | 85 | 1124 | 247 | 34 | 474 | 26 |
| Future Volume (vph) | 33 | 110 | 71 | 168 | 123 | 53 | 85 | 1124 | 247 | 34 | 474 | 26 |
| Ideal Flow (vphp) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1860 | 1900 | 1640 | 1900 | 1900 | 1640 |
| Total Lost time (s) | 7.0 | 5.0 | | 7.0 | 5.0 | 7.0 | 1.0 | 5.0 | | 6.5 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 0.98 | | 1.00 | 1.00 | 0.91 | 1.00 | 0.96 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 0.94 | 1.00 | | 0.98 | 1.00 | 1.00 | 0.99 | 1.00 | | 0.98 | 1.00 | |
| Frt | 1.00 | 0.94 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | | 1.00 | 0.99 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1610 | 1781 | | 1742 | 1921 | 1484 | 1725 | 3286 | | 1788 | 3402 | |
| Flt Permitted | 0.62 | 1.00 | | 0.43 | 1.00 | 1.00 | 0.36 | 1.00 | | 0.15 | 1.00 | |
| Satd. Flow (perm) | 1054 | 1781 | | 791 | 1921 | 1484 | 661 | 3286 | | 281 | 3402 | |
| Peak-hour factor, PHF | 0.76 | 0.76 | 0.76 | 0.92 | 0.92 | 0.92 | 0.97 | 0.97 | 0.97 | 0.78 | 0.78 | 0.78 |
| Adj. Flow (vph) | 43 | 145 | 93 | 183 | 134 | 58 | 88 | 1159 | 255 | 44 | 608 | 33 |
| RTOR Reduction (vph) | 0 | 21 | 0 | 0 | 0 | 44 | 0 | 14 | 0 | 0 | 3 | 0 |
| Lane Group Flow (vph) | 43 | 217 | 0 | 183 | 134 | 14 | 88 | 1400 | 0 | 44 | 638 | 0 |
| Confl. Peds. (#/hr) | 72 | | 24 | 24 | | 72 | 19 | | 81 | 81 | | 19 |
| Confl. Bikes (#/hr) | | | 1 | | | | | | | | | |
| Heavy Vehicles (%) | 6% | 0% | 0% | 3% | 0% | 0% | 3% | 4% | 2% | 0% | 6% | 8% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 0 | 18 |
| Turn Type | Perm | NA | | Perm | NA | Perm | pm+pt | NA | | Perm | NA | |
| Protected Phases | | 8 | | | 4 | | 1 | 6 | | | 2 | |
| Permitted Phases | 8 | | | 4 | | 4 | 6 | | | 2 | | |
| Actuated Green, G (s) | 29.1 | 29.1 | | 29.1 | 29.1 | 29.1 | 77.4 | 77.4 | | 67.7 | 67.7 | |
| Effective Green, g (s) | 29.1 | 31.1 | | 29.1 | 31.1 | 29.1 | 79.4 | 78.9 | | 67.7 | 69.2 | |
| Actuated g/C Ratio | 0.24 | 0.26 | | 0.24 | 0.26 | 0.24 | 0.66 | 0.66 | | 0.56 | 0.58 | |
| Clearance Time (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 3.0 | 6.5 | | 6.5 | 6.5 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 2.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 255 | 461 | | 191 | 497 | 359 | 514 | 2160 | | 158 | 1961 | |
| v/s Ratio Prot | | 0.12 | | | 0.07 | | 0.01 | c0.43 | | | 0.19 | |
| v/s Ratio Perm | 0.04 | | | c0.23 | | 0.01 | 0.10 | | | 0.16 | | |
| v/c Ratio | 0.17 | 0.47 | | 0.96 | 0.27 | 0.04 | 0.17 | 0.65 | | 0.28 | 0.33 | |
| Uniform Delay, d1 | 35.9 | 37.5 | | 44.8 | 35.4 | 34.8 | 7.5 | 12.3 | | 13.5 | 13.2 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 0.82 | 0.83 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 0.3 | 0.8 | | 52.4 | 0.3 | 0.0 | 0.1 | 1.4 | | 4.3 | 0.4 | |
| Delay (s) | 36.2 | 38.3 | | 97.3 | 35.7 | 34.8 | 6.2 | 11.5 | | 17.9 | 13.7 | |
| Level of Service | D | D | | F | D | C | A | B | | B | B | |
| Approach Delay (s) | | 38.0 | | | 65.6 | | | 11.2 | | | 13.9 | |
| Approach LOS | | D | | | E | | | B | | | B | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 21.7 | | | HCM 2000 Level of Service | | | C | | | |
| HCM 2000 Volume to Capacity ratio | | | 0.72 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 120.0 | | | Sum of lost time (s) | | | 11.0 | | | |
| Intersection Capacity Utilization | | | 97.7% | | | ICU Level of Service | | | F | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: Goreway Drive & Development Site North Access

PM Peak Period
Future Background Conditions

| |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations |  | |  | |  |  |
| Traffic Volume (veh/h) | 0 | 0 | 1430 | 0 | 0 | 685 |
| Future Volume (Veh/h) | 0 | 0 | 1430 | 0 | 0 | 685 |
| Sign Control | Stop | | Free | | Free | Free |
| Grade | 0% | | 0% | | 0% | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 0 | 1554 | 0 | 0 | 745 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | TWLTL | | TWLTL | |
| Median storage (veh) | | | 2 | | 2 | |
| Upstream signal (m) | | | 45 | | 271 | |
| pX, platoon unblocked | 0.91 | 0.89 | | | 0.89 | |
| vC, conflicting volume | 1926 | 777 | | | 1554 | |
| vC1, stage 1 conf vol | 1554 | | | | | |
| vC2, stage 2 conf vol | 372 | | | | | |
| vCu, unblocked vol | 1599 | 500 | | | 1374 | |
| tC, single (s) | 6.8 | 6.9 | | | 4.1 | |
| tC, 2 stage (s) | 5.8 | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 100 | 100 | | | 100 | |
| cM capacity (veh/h) | 175 | 464 | | | 450 | |
| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 | SB 3 |
| Volume Total | 0 | 1036 | 518 | 0 | 372 | 372 |
| Volume Left | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 | 0 | 0 |
| cSH | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.00 | 0.61 | 0.30 | 0.00 | 0.22 | 0.22 |
| Queue Length 95th (m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | A | | | | | |
| Approach Delay (s) | 0.0 | 0.0 | | 0.0 | | |
| Approach LOS | A | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 0.0 | | | |
| Intersection Capacity Utilization | | | 42.9% | | ICU Level of Service | A |
| Analysis Period (min) | | | 15 | | | |

Appendix F

2025 Future Total Conditions Synchro Reports

Queues
1: Goreway Drive & Derry Road East


































AM Peak Period
Future Total Conditions



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT |
|------------------------|-------|-------|-------|------|-------|------|------|-------|------|-------|-------|
| Lane Group Flow (vph) | 135 | 792 | 266 | 120 | 866 | 243 | 69 | 152 | 73 | 529 | 818 |
| v/c Ratio | 0.51 | 0.50 | 0.39 | 0.44 | 0.55 | 0.40 | 0.36 | 0.19 | 0.18 | 0.80 | 0.69 |
| Control Delay | 77.0 | 41.6 | 5.5 | 31.1 | 46.4 | 6.6 | 75.5 | 49.6 | 1.0 | 71.1 | 43.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 77.0 | 41.6 | 5.5 | 31.1 | 46.4 | 6.6 | 75.5 | 49.6 | 1.0 | 71.1 | 43.1 |
| Queue Length 50th (m) | 21.4 | 72.6 | 0.0 | 21.8 | 84.3 | 0.0 | 10.9 | 20.5 | 0.0 | 82.8 | 106.3 |
| Queue Length 95th (m) | 32.8 | 87.7 | 19.9 | 35.9 | 101.2 | 21.3 | 19.2 | 30.8 | 0.0 | 102.4 | 131.7 |
| Internal Link Dist (m) | | 563.5 | | | 156.8 | | | 158.8 | | | 208.0 |
| Turn Bay Length (m) | 120.0 | | 100.0 | 78.0 | | 90.0 | 81.5 | | 73.0 | 101.0 | |
| Base Capacity (vph) | 292 | 1579 | 689 | 272 | 1572 | 602 | 253 | 818 | 404 | 721 | 1190 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.46 | 0.50 | 0.39 | 0.44 | 0.55 | 0.40 | 0.27 | 0.19 | 0.18 | 0.73 | 0.69 |
| Intersection Summary | | | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
1: Goreway Drive & Derry Road East

AM Peak Period
Future Total Conditions

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |   |    |  |  |    |  |   |   |  |   |   |  |
| Traffic Volume (vph) | 135 | 792 | 266 | 120 | 866 | 243 | 69 | 152 | 73 | 529 | 533 | 285 |
| Future Volume (vph) | 135 | 792 | 266 | 120 | 866 | 243 | 69 | 152 | 73 | 529 | 533 | 285 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 3.5 | 3.7 | 3.5 | 3.5 | 3.7 | 3.5 | 3.5 | 3.7 | 3.5 | 3.5 | 3.7 | 3.7 |
| Total Lost time (s) | 5.0 | 7.6 | 7.6 | 3.0 | 7.6 | 7.6 | 5.0 | 7.4 | 7.4 | 5.0 | 7.4 | |
| Lane Util. Factor | 0.97 | 0.91 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | |
| Frpb, ped/bikes | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 | 0.89 | 1.00 | 1.00 | 0.95 | 1.00 | 0.99 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.95 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 3120 | 4371 | 1439 | 1565 | 4812 | 1343 | 2705 | 3444 | 1209 | 3395 | 3173 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.30 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 3120 | 4371 | 1439 | 490 | 4812 | 1343 | 2705 | 3444 | 1209 | 3395 | 3173 | |
| Peak-hour factor, PHF | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Adj. Flow (vph) | 135 | 792 | 266 | 120 | 866 | 243 | 69 | 152 | 73 | 529 | 533 | 285 |
| RTOR Reduction (vph) | 0 | 0 | 170 | 0 | 0 | 164 | 0 | 0 | 56 | 0 | 43 | 0 |
| Lane Group Flow (vph) | 135 | 792 | 96 | 120 | 866 | 79 | 69 | 152 | 17 | 529 | 775 | 0 |
| Confl. Peds. (#/hr) | 72 | | 5 | 5 | | 72 | 4 | | 27 | 27 | | 4 |
| Heavy Vehicles (%) | 11% | 20% | 8% | 14% | 9% | 6% | 28% | 6% | 26% | 2% | 2% | 6% |
| Bus Blockages (#/hr) | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 0 |
| Turn Type | Prot | NA | Perm | pm+pt | NA | Perm | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | | 3 | 8 | |
| Permitted Phases | | | 2 | 6 | | 6 | | | 4 | | | |
| Actuated Green, G (s) | 13.5 | 57.8 | 57.8 | 62.3 | 52.3 | 52.3 | 11.4 | 38.0 | 38.0 | 31.2 | 57.8 | |
| Effective Green, g (s) | 13.5 | 57.8 | 57.8 | 62.3 | 52.3 | 52.3 | 11.4 | 38.0 | 38.0 | 31.2 | 57.8 | |
| Actuated g/C Ratio | 0.08 | 0.36 | 0.36 | 0.39 | 0.33 | 0.33 | 0.07 | 0.24 | 0.24 | 0.19 | 0.36 | |
| Clearance Time (s) | 5.0 | 7.6 | 7.6 | 3.0 | 7.6 | 7.6 | 5.0 | 7.4 | 7.4 | 5.0 | 7.4 | |
| Vehicle Extension (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | |
| Lane Grp Cap (vph) | 263 | 1579 | 519 | 257 | 1572 | 438 | 192 | 817 | 287 | 662 | 1146 | |
| v/s Ratio Prot | c0.04 | 0.18 | | 0.03 | c0.18 | | 0.03 | 0.04 | | c0.16 | c0.24 | |
| v/s Ratio Perm | | | 0.07 | 0.15 | | 0.06 | | | 0.01 | | | |
| v/c Ratio | 0.51 | 0.50 | 0.19 | 0.47 | 0.55 | 0.18 | 0.36 | 0.19 | 0.06 | 0.80 | 0.68 | |
| Uniform Delay, d1 | 70.1 | 39.9 | 35.0 | 32.5 | 44.2 | 38.5 | 70.8 | 48.7 | 47.2 | 61.4 | 43.2 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 3.3 | 1.1 | 0.8 | 2.8 | 1.4 | 0.9 | 2.4 | 0.5 | 0.4 | 7.7 | 3.2 | |
| Delay (s) | 73.4 | 41.0 | 35.8 | 35.3 | 45.6 | 39.4 | 73.2 | 49.2 | 47.6 | 69.1 | 46.4 | |
| Level of Service | E | D | D | D | D | D | E | D | D | E | D | |
| Approach Delay (s) | | 43.5 | | | 43.4 | | | 54.4 | | | 55.3 | |
| Approach LOS | | D | | | D | | | D | | | E | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 48.2 | | | HCM 2000 Level of Service | | | | D | | |
| HCM 2000 Volume to Capacity ratio | | | 0.65 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 160.0 | | | Sum of lost time (s) | | | | 25.0 | | |
| Intersection Capacity Utilization | | | 102.6% | | | ICU Level of Service | | | | G | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

Queues
2: Goreway Drive & Dorcas Street/Development Site South Access

AM Peak Period
Future Total Conditions





















| Lane Group | EBT | WBT | NBL | NBT | SBL | SBT |
|------------------------|-------|------|------|-------|------|-------|
| Lane Group Flow (vph) | 152 | 74 | 20 | 581 | 16 | 1521 |
| v/c Ratio | 0.64 | 0.50 | 0.09 | 0.22 | 0.03 | 0.54 |
| Control Delay | 45.5 | 36.0 | 5.3 | 3.6 | 1.8 | 6.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 45.5 | 36.0 | 5.3 | 3.6 | 1.8 | 6.8 |
| Queue Length 50th (m) | 23.5 | 7.2 | 0.9 | 14.2 | 0.5 | 109.5 |
| Queue Length 95th (m) | 30.7 | 21.6 | 3.7 | 24.6 | m0.7 | 103.8 |
| Internal Link Dist (m) | 104.2 | 51.5 | | 208.0 | | 20.6 |
| Turn Bay Length (m) | | | 60.0 | | 34.0 | |
| Base Capacity (vph) | 457 | 269 | 213 | 2684 | 634 | 2820 |
| 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 | 0.33 | 0.28 | 0.09 | 0.22 | 0.03 | 0.54 |

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
 2: Goreway Drive & Dorcas Street/Development Site South Access

AM Peak Period
 Future Total Conditions

| |  |  |  |  |  |  |  |  |  |  |  |  | | |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|----------------------|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | | |
| Lane Configurations | |  | | |  | |  |  | |  |  | | | |
| Traffic Volume (vph) | 1 | 0 | 109 | 30 | 0 | 38 | 18 | 510 | 7 | 14 | 1307 | 1 | | |
| Future Volume (vph) | 1 | 0 | 109 | 30 | 0 | 38 | 18 | 510 | 7 | 14 | 1307 | 1 | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1640 | 1900 | 1900 | 1640 | 1900 | 1900 | 1640 | 1900 | 1900 | 1640 | | |
| Total Lost time (s) | | 5.0 | | | 5.0 | | 7.0 | 5.0 | | 7.0 | 5.0 | | | |
| Lane Util. Factor | | 1.00 | | | 1.00 | | 1.00 | 0.95 | | 1.00 | 0.95 | | | |
| Frbp, ped/bikes | | 0.98 | | | 0.99 | | 1.00 | 1.00 | | 1.00 | 1.00 | | | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | | 1.00 | 1.00 | | 0.98 | 1.00 | | | |
| Frt | | 0.87 | | | 0.93 | | 1.00 | 1.00 | | 1.00 | 1.00 | | | |
| Flt Protected | | 1.00 | | | 0.98 | | 0.95 | 1.00 | | 0.95 | 1.00 | | | |
| Satd. Flow (prot) | | 1634 | | | 1713 | | 1822 | 3373 | | 1782 | 3543 | | | |
| Flt Permitted | | 1.00 | | | 0.53 | | 0.14 | 1.00 | | 0.43 | 1.00 | | | |
| Satd. Flow (perm) | | 1632 | | | 924 | | 275 | 3373 | | 812 | 3543 | | | |
| Peak-hour factor, PHF | 0.72 | 0.72 | 0.72 | 0.92 | 0.92 | 0.92 | 0.89 | 0.89 | 0.89 | 0.86 | 0.86 | 0.86 | | |
| Adj. Flow (vph) | 1 | 0 | 151 | 33 | 0 | 41 | 20 | 573 | 8 | 16 | 1520 | 1 | | |
| RTOR Reduction (vph) | 0 | 42 | 0 | 0 | 36 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Lane Group Flow (vph) | 0 | 110 | 0 | 0 | 38 | 0 | 20 | 581 | 0 | 16 | 1521 | 0 | | |
| Confl. Peds. (#/hr) | 9 | | 4 | 4 | | 9 | 6 | | 14 | 14 | | 6 | | |
| Heavy Vehicles (%) | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 8% | 0% | 0% | 3% | 0% | | |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 18 | | |
| Turn Type | Perm | NA | | Perm | NA | | Perm | NA | | Perm | NA | | | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | 6 | | | |
| Permitted Phases | 4 | | | 8 | | | 2 | | | 6 | | | | |
| Actuated Green, G (s) | | 13.5 | | | 13.5 | | 93.5 | 93.5 | | 93.5 | 93.5 | | | |
| Effective Green, g (s) | | 14.5 | | | 14.5 | | 93.5 | 95.5 | | 93.5 | 95.5 | | | |
| Actuated g/C Ratio | | 0.12 | | | 0.12 | | 0.78 | 0.80 | | 0.78 | 0.80 | | | |
| Clearance Time (s) | | 6.0 | | | 6.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | | | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | | | |
| Lane Grp Cap (vph) | | 197 | | | 111 | | 214 | 2684 | | 632 | 2819 | | | |
| v/s Ratio Prot | | | | | | | | 0.17 | | | c0.43 | | | |
| v/s Ratio Perm | | c0.07 | | | 0.04 | | 0.07 | | | 0.02 | | | | |
| v/c Ratio | | 0.56 | | | 0.34 | | 0.09 | 0.22 | | 0.03 | 0.54 | | | |
| Uniform Delay, d1 | | 49.7 | | | 48.4 | | 3.2 | 3.0 | | 3.0 | 4.4 | | | |
| Progression Factor | | 1.00 | | | 1.00 | | 1.00 | 1.00 | | 0.43 | 1.25 | | | |
| Incremental Delay, d2 | | 3.4 | | | 1.8 | | 0.9 | 0.2 | | 0.1 | 0.6 | | | |
| Delay (s) | | 53.1 | | | 50.2 | | 4.0 | 3.2 | | 1.3 | 6.1 | | | |
| Level of Service | | D | | | D | | A | A | | A | A | | | |
| Approach Delay (s) | | 53.1 | | | 50.2 | | | 3.2 | | | 6.1 | | | |
| Approach LOS | | D | | | D | | | A | | | A | | | |
| Intersection Summary | | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 9.8 | | | | | | | | | HCM 2000 Level of Service | A | |
| HCM 2000 Volume to Capacity ratio | | | 0.54 | | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 120.0 | | | | | | | | 10.0 | | | |
| Intersection Capacity Utilization | | | 58.6% | | | | | | | | | | ICU Level of Service | B |
| Analysis Period (min) | | | 15 | | | | | | | | | | | |
| c | Critical Lane Group | | | | | | | | | | | | | |

Queues
3: Goreway Drive & Etude Drive

AM Peak Period
Future Total Conditions



| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | SBL | SBT |
|------------------------|------|-------|------|-------|------|------|-------|------|-------|
| Lane Group Flow (vph) | 37 | 210 | 177 | 49 | 70 | 49 | 506 | 38 | 1233 |
| v/c Ratio | 0.14 | 0.45 | 0.94 | 0.11 | 0.18 | 0.17 | 0.23 | 0.07 | 0.57 |
| Control Delay | 35.6 | 22.7 | 96.9 | 33.4 | 8.6 | 8.0 | 7.5 | 13.4 | 16.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 35.6 | 22.7 | 96.9 | 33.4 | 8.6 | 8.0 | 7.5 | 13.4 | 16.3 |
| Queue Length 50th (m) | 7.0 | 22.3 | 41.0 | 9.0 | 0.0 | 3.0 | 19.4 | 3.6 | 87.5 |
| Queue Length 95th (m) | 14.6 | 39.9 | 57.7 | 15.9 | 8.6 | 8.0 | 31.9 | 9.9 | 122.1 |
| Internal Link Dist (m) | | 111.7 | | 462.1 | | | 246.8 | | 287.8 |
| Turn Bay Length (m) | 70.0 | | 37.0 | | 33.0 | 53.0 | | 30.0 | |
| Base Capacity (vph) | 365 | 579 | 251 | 592 | 488 | 356 | 2230 | 528 | 2172 |
| 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 | 0.10 | 0.36 | 0.71 | 0.08 | 0.14 | 0.14 | 0.23 | 0.07 | 0.57 |
| Intersection Summary | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
3: Goreway Drive & Etude Drive

AM Peak Period
Future Total Conditions

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------|------|-------|-------|------|------|-------|-------|------|------|------|-----------------------------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 33 | 59 | 128 | 147 | 41 | 58 | 48 | 409 | 81 | 33 | 1047 | 14 |
| Future Volume (vph) | 33 | 59 | 128 | 147 | 41 | 58 | 48 | 409 | 81 | 33 | 1047 | 14 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1860 | 1900 | 1640 | 1900 | 1900 | 1640 |
| Total Lost time (s) | 7.0 | 5.0 | | 7.0 | 5.0 | 7.0 | 1.0 | 5.0 | | 6.5 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 0.99 | | 1.00 | 1.00 | 0.95 | 1.00 | 0.99 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 0.96 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 0.97 | 1.00 | |
| Frt | 1.00 | 0.90 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.98 | | 1.00 | 1.00 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1643 | 1665 | | 1799 | 1921 | 1505 | 1685 | 3256 | | 1768 | 3493 | |
| Flt Permitted | 0.73 | 1.00 | | 0.46 | 1.00 | 1.00 | 0.16 | 1.00 | | 0.47 | 1.00 | |
| Satd. Flow (perm) | 1254 | 1665 | | 864 | 1921 | 1505 | 286 | 3256 | | 867 | 3493 | |
| Peak-hour factor, PHF | 0.89 | 0.89 | 0.89 | 0.83 | 0.83 | 0.83 | 0.97 | 0.97 | 0.97 | 0.86 | 0.86 | 0.86 |
| Adj. Flow (vph) | 37 | 66 | 144 | 177 | 49 | 70 | 49 | 422 | 84 | 38 | 1217 | 16 |
| RTOR Reduction (vph) | 0 | 73 | 0 | 0 | 0 | 55 | 0 | 11 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 37 | 137 | 0 | 177 | 49 | 15 | 49 | 495 | 0 | 38 | 1233 | 0 |
| Confl. Peds. (#/hr) | 35 | | 6 | 6 | | 35 | 10 | | 24 | 24 | | 10 |
| Heavy Vehicles (%) | 7% | 7% | 0% | 1% | 0% | 3% | 6% | 9% | 2% | 0% | 4% | 23% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 0 | 18 |
| Turn Type | Perm | NA | | Perm | NA | Perm | pm+pt | NA | | Perm | NA | |
| Protected Phases | | 8 | | | 4 | | 1 | 6 | | | | 2 |
| Permitted Phases | 8 | | | 4 | | 4 | 6 | | | 2 | | |
| Actuated Green, G (s) | 26.2 | 26.2 | | 26.2 | 26.2 | 26.2 | 80.3 | 80.3 | | 72.6 | 72.6 | |
| Effective Green, g (s) | 26.2 | 28.2 | | 26.2 | 28.2 | 26.2 | 82.3 | 81.8 | | 72.6 | 74.1 | |
| Actuated g/C Ratio | 0.22 | 0.23 | | 0.22 | 0.23 | 0.22 | 0.69 | 0.68 | | 0.60 | 0.62 | |
| Clearance Time (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 3.0 | 6.5 | | 6.5 | 6.5 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 2.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 273 | 391 | | 188 | 451 | 328 | 274 | 2219 | | 524 | 2156 | |
| v/s Ratio Prot | | 0.08 | | | 0.03 | | 0.01 | c0.15 | | | | c0.35 |
| v/s Ratio Perm | 0.03 | | | c0.20 | | 0.01 | 0.11 | | | 0.04 | | |
| v/c Ratio | 0.14 | 0.35 | | 0.94 | 0.11 | 0.05 | 0.18 | 0.22 | | 0.07 | 0.57 | |
| Uniform Delay, d1 | 37.8 | 38.3 | | 46.1 | 36.0 | 37.0 | 8.4 | 7.2 | | 9.8 | 13.6 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.02 | 0.96 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 0.2 | 0.5 | | 48.8 | 0.1 | 0.1 | 0.1 | 0.2 | | 0.3 | 1.1 | |
| Delay (s) | 38.0 | 38.8 | | 95.0 | 36.1 | 37.1 | 8.6 | 7.1 | | 10.1 | 14.7 | |
| Level of Service | D | D | | F | D | D | A | A | | B | B | |
| Approach Delay (s) | | 38.7 | | | 71.5 | | | 7.2 | | | 14.5 | |
| Approach LOS | | D | | | E | | | A | | | B | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 22.5 | | | | | | | | | HCM 2000 Level of Service C |
| HCM 2000 Volume to Capacity ratio | | | 0.62 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 120.0 | | | | | | | | 11.0 | |
| Intersection Capacity Utilization | | | 78.2% | | | | | | | | | ICU Level of Service D |
| Analysis Period (min) | | | 15 | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | |

Queues
1: Goreway Drive & Derry Road East

PM Peak Period
Future Total Conditions



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT |
|------------------------|-------|-------|-------|------|-------|--------|------|-------|------|-------|-------|
| Lane Group Flow (vph) | 345 | 1230 | 101 | 76 | 790 | 601 | 187 | 622 | 133 | 349 | 383 |
| v/c Ratio | 1.06 | 0.67 | 0.18 | 0.41 | 0.51 | 0.83 | 0.58 | 0.67 | 0.29 | 0.70 | 0.38 |
| Control Delay | 132.2 | 44.7 | 4.2 | 29.4 | 44.8 | 28.8 | 75.8 | 57.0 | 9.8 | 72.1 | 27.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 132.2 | 44.7 | 4.2 | 29.4 | 44.8 | 28.8 | 75.8 | 57.0 | 9.8 | 72.1 | 27.1 |
| Queue Length 50th (m) | ~61.7 | 120.4 | 0.0 | 12.8 | 74.5 | 74.2 | 29.6 | 93.2 | 1.4 | 55.2 | 30.4 |
| Queue Length 95th (m) | #94.2 | 142.6 | 9.1 | 23.4 | 90.4 | #142.8 | 42.5 | 118.3 | 19.0 | 69.5 | 45.4 |
| Internal Link Dist (m) | | 563.5 | | | 156.8 | | | 158.8 | | | 208.0 |
| Turn Bay Length (m) | 120.0 | | 100.0 | 78.0 | | 90.0 | 81.5 | | 73.0 | 101.0 | |
| Base Capacity (vph) | 326 | 1832 | 555 | 203 | 1541 | 723 | 377 | 934 | 465 | 657 | 1018 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 1.06 | 0.67 | 0.18 | 0.37 | 0.51 | 0.83 | 0.50 | 0.67 | 0.29 | 0.53 | 0.38 |

Intersection Summary

~ 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.

HCM Signalized Intersection Capacity Analysis
1: Goreway Drive & Derry Road East

PM Peak Period
Future Total Conditions

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|-------|------|--------|-------|------|-------|------|-------|------|-------|------|---------------------------|------|
| Lane Configurations | | | | | | | | | | | | | |
| Traffic Volume (vph) | 345 | 1230 | 101 | 76 | 790 | 601 | 187 | 622 | 133 | 349 | 204 | 179 | |
| Future Volume (vph) | 345 | 1230 | 101 | 76 | 790 | 601 | 187 | 622 | 133 | 349 | 204 | 179 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 3.5 | 3.7 | 3.5 | 3.5 | 3.7 | 3.5 | 3.5 | 3.7 | 3.5 | 3.5 | 3.7 | 3.7 | |
| Total Lost time (s) | 5.0 | 7.6 | 7.6 | 3.0 | 7.6 | 7.6 | 5.0 | 7.4 | 7.4 | 5.0 | 7.4 | | |
| Lane Util. Factor | 0.97 | 0.91 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.90 | 1.00 | 1.00 | 0.91 | 1.00 | 0.98 | | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.93 | | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 3267 | 4902 | 1287 | 1525 | 4641 | 1416 | 3177 | 3544 | 1411 | 3395 | 2959 | | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.14 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (perm) | 3267 | 4902 | 1287 | 222 | 4641 | 1416 | 3177 | 3544 | 1411 | 3395 | 2959 | | |
| Peak-hour factor, PHF | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Adj. Flow (vph) | 345 | 1230 | 101 | 76 | 790 | 601 | 187 | 622 | 133 | 349 | 204 | 179 | |
| RTOR Reduction (vph) | 0 | 0 | 63 | 0 | 0 | 253 | 0 | 0 | 94 | 0 | 101 | 0 | |
| Lane Group Flow (vph) | 345 | 1230 | 38 | 76 | 790 | 348 | 187 | 622 | 39 | 349 | 282 | 0 | |
| Confl. Peds. (#/hr) | 62 | | 28 | 28 | | 62 | 23 | | 61 | 61 | | 23 | |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | | |
| Heavy Vehicles (%) | 6% | 7% | 17% | 17% | 13% | 2% | 9% | 3% | 3% | 2% | 5% | 10% | |
| Bus Blockages (#/hr) | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 0 | |
| Turn Type | Prot | NA | Perm | pm+pt | NA | Perm | Prot | NA | Perm | Prot | NA | | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | | 3 | 8 | | |
| Permitted Phases | | | 2 | 6 | | 6 | | | 4 | | | | |
| Actuated Green, G (s) | 16.0 | 59.9 | 59.9 | 64.5 | 53.2 | 53.2 | 16.2 | 42.2 | 42.2 | 23.6 | 49.6 | | |
| Effective Green, g (s) | 16.0 | 59.9 | 59.9 | 64.5 | 53.2 | 53.2 | 16.2 | 42.2 | 42.2 | 23.6 | 49.6 | | |
| Actuated g/C Ratio | 0.10 | 0.37 | 0.37 | 0.40 | 0.33 | 0.33 | 0.10 | 0.26 | 0.26 | 0.15 | 0.31 | | |
| Clearance Time (s) | 5.0 | 7.6 | 7.6 | 3.0 | 7.6 | 7.6 | 5.0 | 7.4 | 7.4 | 5.0 | 7.4 | | |
| Vehicle Extension (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | |
| Lane Grp Cap (vph) | 326 | 1835 | 481 | 181 | 1543 | 470 | 321 | 934 | 372 | 500 | 917 | | |
| v/s Ratio Prot | c0.11 | 0.25 | | 0.03 | 0.17 | | 0.06 | c0.18 | | c0.10 | 0.10 | | |
| v/s Ratio Perm | | | 0.03 | 0.14 | | c0.25 | | | 0.03 | | | | |
| v/c Ratio | 1.06 | 0.67 | 0.08 | 0.42 | 0.51 | 0.74 | 0.58 | 0.67 | 0.11 | 0.70 | 0.31 | | |
| Uniform Delay, d1 | 72.0 | 41.8 | 32.3 | 31.5 | 43.0 | 47.3 | 68.7 | 52.6 | 44.6 | 64.8 | 42.1 | | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 66.0 | 2.0 | 0.3 | 3.3 | 1.2 | 10.1 | 4.1 | 3.7 | 0.6 | 5.3 | 0.9 | | |
| Delay (s) | 138.0 | 43.8 | 32.6 | 34.7 | 44.2 | 57.3 | 72.8 | 56.4 | 45.2 | 70.2 | 43.0 | | |
| Level of Service | F | D | C | C | D | E | E | E | D | E | D | | |
| Approach Delay (s) | | 62.5 | | | 49.1 | | | 58.0 | | | 55.9 | | |
| Approach LOS | | E | | | D | | | E | | | E | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 56.5 | | | | | | | | | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | | | 0.75 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 160.0 | | | | | | | | | Sum of lost time (s) | 25.0 |
| Intersection Capacity Utilization | | | 100.6% | | | | | | | | | ICU Level of Service | G |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

Queues
2: Goreway Drive & Dorcas Street/Development Site South Access

PM Peak Period
Future Total Conditions



| Lane Group | EBT | WBT | NBL | NBT | SBL | SBT |
|------------------------|-------|------|------|-------|------|------|
| Lane Group Flow (vph) | 55 | 45 | 107 | 1520 | 19 | 769 |
| v/c Ratio | 0.33 | 0.30 | 0.18 | 0.50 | 0.08 | 0.25 |
| Control Delay | 22.8 | 26.4 | 3.0 | 3.0 | 2.0 | 1.2 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 |
| Total Delay | 22.8 | 26.4 | 3.0 | 3.3 | 2.0 | 1.2 |
| Queue Length 50th (m) | 1.6 | 2.0 | 4.0 | 38.6 | 0.5 | 8.6 |
| Queue Length 95th (m) | 5.8 | 13.4 | 8.8 | 53.3 | m1.1 | 10.2 |
| Internal Link Dist (m) | 104.2 | 51.5 | | 208.0 | | 20.6 |
| Turn Bay Length (m) | | | 60.0 | | 34.0 | |
| Base Capacity (vph) | 447 | 410 | 582 | 3058 | 253 | 3021 |
| Starvation Cap Reductn | 0 | 0 | 0 | 716 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.12 | 0.11 | 0.18 | 0.65 | 0.08 | 0.25 |

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

2: Goreway Drive & Dorcas Street/Development Site South Access

PM Peak Period
Future Total Conditions



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|------|-------|------|-------|-------|------|-------|-------|------|
| Lane Configurations | | ↕ | | | ↕ | | ↗ | ↕↔ | | ↗ | ↕↔ | |
| Traffic Volume (vph) | 4 | 0 | 29 | 22 | 0 | 19 | 104 | 1429 | 46 | 17 | 681 | 4 |
| Future Volume (vph) | 4 | 0 | 29 | 22 | 0 | 19 | 104 | 1429 | 46 | 17 | 681 | 4 |
| Ideal Flow (vphp) | 1900 | 1900 | 1640 | 1900 | 1900 | 1640 | 1900 | 1900 | 1640 | 1900 | 1900 | 1640 |
| Total Lost time (s) | | 5.0 | | | 5.0 | | 7.0 | 5.0 | | 7.0 | 5.0 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 0.98 | | | 0.99 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | | 0.98 | 1.00 | | 0.99 | 1.00 | |
| Frt | | 0.88 | | | 0.94 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flt Protected | | 0.99 | | | 0.97 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1649 | | | 1720 | | 1783 | 3515 | | 1806 | 3473 | |
| Flt Permitted | | 0.96 | | | 0.84 | | 0.36 | 1.00 | | 0.15 | 1.00 | |
| Satd. Flow (perm) | | 1595 | | | 1485 | | 675 | 3515 | | 293 | 3473 | |
| Peak-hour factor, PHF | 0.61 | 0.61 | 0.61 | 0.92 | 0.92 | 0.92 | 0.97 | 0.97 | 0.97 | 0.89 | 0.89 | 0.89 |
| Adj. Flow (vph) | 7 | 0 | 48 | 24 | 0 | 21 | 107 | 1473 | 47 | 19 | 765 | 4 |
| RTOR Reduction (vph) | 0 | 45 | 0 | 0 | 34 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 10 | 0 | 0 | 11 | 0 | 107 | 1519 | 0 | 19 | 769 | 0 |
| Confl. Peds. (#/hr) | 15 | | 7 | 7 | | | 15 | 18 | | 33 | 33 | 18 |
| Heavy Vehicles (%) | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 3% | 0% | 0% | 5% | 0% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 18 |
| Turn Type | Perm | NA | | Perm | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | | 8 | | | 2 | | | 6 | | |
| Actuated Green, G (s) | | 6.8 | | | 6.8 | | 100.2 | 100.2 | | 100.2 | 100.2 | |
| Effective Green, g (s) | | 7.8 | | | 7.8 | | 100.2 | 102.2 | | 100.2 | 102.2 | |
| Actuated g/C Ratio | | 0.06 | | | 0.06 | | 0.84 | 0.85 | | 0.84 | 0.85 | |
| Clearance Time (s) | | 6.0 | | | 6.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | | 103 | | | 96 | | 563 | 2993 | | 244 | 2957 | |
| v/s Ratio Prot | | | | | | | | c0.43 | | | | 0.22 |
| v/s Ratio Perm | | 0.01 | | | c0.01 | | 0.16 | | | 0.06 | | |
| v/c Ratio | | 0.10 | | | 0.12 | | 0.19 | 0.51 | | 0.08 | 0.26 | |
| Uniform Delay, d1 | | 52.8 | | | 52.9 | | 1.9 | 2.3 | | 1.7 | 1.7 | |
| Progression Factor | | 1.00 | | | 1.00 | | 1.00 | 1.00 | | 0.64 | 0.59 | |
| Incremental Delay, d2 | | 0.4 | | | 0.6 | | 0.7 | 0.6 | | 0.6 | 0.2 | |
| Delay (s) | | 53.2 | | | 53.4 | | 2.7 | 2.9 | | 1.7 | 1.2 | |
| Level of Service | | D | | | D | | A | A | | A | A | |
| Approach Delay (s) | | 53.2 | | | 53.4 | | | 2.9 | | | 1.2 | |
| Approach LOS | | D | | | D | | | A | | | A | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 4.4 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.48 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 10.0 |
| Intersection Capacity Utilization | 75.6% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

Queues
3: Goreway Drive & Etude Drive

PM Peak Period
Future Total Conditions



| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | SBL | SBT |
|------------------------|------|-------|-------|-------|------|------|-------|------|-------|
| Lane Group Flow (vph) | 45 | 237 | 183 | 134 | 58 | 87 | 1437 | 44 | 666 |
| v/c Ratio | 0.18 | 0.49 | 0.96 | 0.27 | 0.14 | 0.17 | 0.66 | 0.29 | 0.34 |
| Control Delay | 35.1 | 35.7 | 99.6 | 35.4 | 8.6 | 6.6 | 12.5 | 23.3 | 14.9 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 35.1 | 35.7 | 99.6 | 35.4 | 8.6 | 6.6 | 12.5 | 23.3 | 14.9 |
| Queue Length 50th (m) | 8.2 | 40.9 | 41.8 | 24.7 | 0.0 | 4.7 | 101.7 | 5.3 | 42.2 |
| Queue Length 95th (m) | 14.4 | 49.6 | #78.2 | 39.2 | 9.5 | 8.5 | 139.3 | 13.2 | 51.0 |
| Internal Link Dist (m) | | 111.7 | | 462.1 | | | 246.8 | | 287.8 |
| Turn Bay Length (m) | 70.0 | | 37.0 | | 33.0 | 53.0 | | 30.0 | |
| Base Capacity (vph) | 306 | 568 | 231 | 592 | 474 | 557 | 2179 | 153 | 1968 |
| 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 | 0.15 | 0.42 | 0.79 | 0.23 | 0.12 | 0.16 | 0.66 | 0.29 | 0.34 |

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
3: Goreway Drive & Etude Drive

PM Peak Period
Future Total Conditions

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------|------|-------|-------|------|------|-------|-------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 34 | 110 | 70 | 168 | 123 | 53 | 84 | 1147 | 247 | 34 | 492 | 27 |
| Future Volume (vph) | 34 | 110 | 70 | 168 | 123 | 53 | 84 | 1147 | 247 | 34 | 492 | 27 |
| Ideal Flow (vphp) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1860 | 1900 | 1640 | 1900 | 1900 | 1640 |
| Total Lost time (s) | 7.0 | 5.0 | | 7.0 | 5.0 | 7.0 | 1.0 | 5.0 | | 6.5 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frpb, ped/bikes | 1.00 | 0.98 | | 1.00 | 1.00 | 0.91 | 1.00 | 0.96 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 0.94 | 1.00 | | 0.98 | 1.00 | 1.00 | 0.99 | 1.00 | | 0.98 | 1.00 | |
| Frt | 1.00 | 0.94 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | | 1.00 | 0.99 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1610 | 1782 | | 1742 | 1921 | 1484 | 1726 | 3290 | | 1790 | 3401 | |
| Flt Permitted | 0.62 | 1.00 | | 0.43 | 1.00 | 1.00 | 0.35 | 1.00 | | 0.14 | 1.00 | |
| Satd. Flow (perm) | 1053 | 1782 | | 792 | 1921 | 1484 | 639 | 3290 | | 271 | 3401 | |
| Peak-hour factor, PHF | 0.76 | 0.76 | 0.76 | 0.92 | 0.92 | 0.92 | 0.97 | 0.97 | 0.97 | 0.78 | 0.78 | 0.78 |
| Adj. Flow (vph) | 45 | 145 | 92 | 183 | 134 | 58 | 87 | 1182 | 255 | 44 | 631 | 35 |
| RTOR Reduction (vph) | 0 | 21 | 0 | 0 | 0 | 44 | 0 | 13 | 0 | 0 | 3 | 0 |
| Lane Group Flow (vph) | 45 | 216 | 0 | 183 | 134 | 14 | 87 | 1424 | 0 | 44 | 663 | 0 |
| Confl. Peds. (#/hr) | 72 | | 24 | 24 | | 72 | 19 | | 81 | 81 | | 19 |
| Confl. Bikes (#/hr) | | | 1 | | | | | | | | | |
| Heavy Vehicles (%) | 6% | 0% | 0% | 3% | 0% | 0% | 3% | 4% | 2% | 0% | 6% | 8% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 0 | 18 |
| Turn Type | Perm | NA | | Perm | NA | Perm | pm+pt | NA | | Perm | NA | |
| Protected Phases | | 8 | | | 4 | | 1 | 6 | | | 2 | |
| Permitted Phases | 8 | | | 4 | | 4 | 6 | | | 2 | | |
| Actuated Green, G (s) | 29.0 | 29.0 | | 29.0 | 29.0 | 29.0 | 77.5 | 77.5 | | 67.8 | 67.8 | |
| Effective Green, g (s) | 29.0 | 31.0 | | 29.0 | 31.0 | 29.0 | 79.5 | 79.0 | | 67.8 | 69.3 | |
| Actuated g/C Ratio | 0.24 | 0.26 | | 0.24 | 0.26 | 0.24 | 0.66 | 0.66 | | 0.56 | 0.58 | |
| Clearance Time (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 3.0 | 6.5 | | 6.5 | 6.5 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 2.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 254 | 460 | | 191 | 496 | 358 | 502 | 2165 | | 153 | 1964 | |
| v/s Ratio Prot | | 0.12 | | | 0.07 | | 0.01 | c0.43 | | | 0.19 | |
| v/s Ratio Perm | 0.04 | | | c0.23 | | 0.01 | 0.10 | | | 0.16 | | |
| v/c Ratio | 0.18 | 0.47 | | 0.96 | 0.27 | 0.04 | 0.17 | 0.66 | | 0.29 | 0.34 | |
| Uniform Delay, d1 | 36.0 | 37.6 | | 44.9 | 35.5 | 34.8 | 7.5 | 12.4 | | 13.6 | 13.3 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 0.82 | 0.83 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 0.3 | 0.8 | | 52.4 | 0.3 | 0.0 | 0.1 | 1.4 | | 4.7 | 0.5 | |
| Delay (s) | 36.4 | 38.3 | | 97.3 | 35.8 | 34.9 | 6.2 | 11.7 | | 18.2 | 13.8 | |
| Level of Service | D | D | | F | D | C | A | B | | B | B | |
| Approach Delay (s) | | 38.0 | | | 65.7 | | | 11.4 | | | 14.0 | |
| Approach LOS | | D | | | E | | | B | | | B | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 21.7 | | | | | | | | | C |
| HCM 2000 Volume to Capacity ratio | | | 0.73 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 120.0 | | | | | | | 11.0 | | |
| Intersection Capacity Utilization | | | 98.3% | | | | | | | | | F |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

Appendix G

2025 Future Background and 2025 Future Total
Conditions (Mitigated) Synchro Reports

Queues
1: Goreway Drive & Derry Road East

PM Peak Period
Future Background Conditions (Mitigated)



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT |
|------------------------|-------|-------|-------|------|-------|--------|------|-------|------|-------|-------|
| Lane Group Flow (vph) | 345 | 1230 | 101 | 76 | 789 | 568 | 188 | 610 | 133 | 329 | 382 |
| v/c Ratio | 0.89 | 0.67 | 0.18 | 0.41 | 0.54 | 0.82 | 0.58 | 0.64 | 0.27 | 0.69 | 0.38 |
| Control Delay | 94.2 | 44.7 | 4.2 | 29.8 | 47.5 | 28.0 | 75.8 | 55.1 | 5.2 | 72.8 | 27.6 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 94.2 | 44.7 | 4.2 | 29.8 | 47.5 | 28.0 | 75.8 | 55.1 | 5.2 | 72.8 | 27.6 |
| Queue Length 50th (m) | 56.7 | 120.4 | 0.0 | 12.8 | 76.5 | 65.8 | 29.8 | 90.4 | 0.0 | 52.1 | 31.0 |
| Queue Length 95th (m) | #83.9 | 142.6 | 9.1 | 23.4 | 92.9 | #126.1 | 42.6 | 114.0 | 11.6 | 66.5 | 46.1 |
| Internal Link Dist (m) | | 563.5 | | | 156.8 | | | 158.8 | | | 208.0 |
| Turn Bay Length (m) | 120.0 | | 100.0 | 78.0 | | 90.0 | 81.5 | | 73.0 | 101.0 | |
| Base Capacity (vph) | 387 | 1830 | 555 | 203 | 1453 | 696 | 377 | 960 | 494 | 657 | 1014 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.89 | 0.67 | 0.18 | 0.37 | 0.54 | 0.82 | 0.50 | 0.64 | 0.27 | 0.50 | 0.38 |


































Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

1: Goreway Drive & Derry Road East

PM Peak Period
Future Background Conditions (Mitigated)

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |   |    |  |  |    |  |   |   |  |   |   |  |
| Traffic Volume (vph) | 345 | 1230 | 101 | 76 | 789 | 568 | 188 | 610 | 133 | 329 | 205 | 177 |
| Future Volume (vph) | 345 | 1230 | 101 | 76 | 789 | 568 | 188 | 610 | 133 | 329 | 205 | 177 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Lane Width | 3.5 | 3.7 | 3.5 | 3.5 | 3.7 | 3.5 | 3.5 | 3.7 | 3.5 | 3.5 | 3.7 | 3.7 |
| Total Lost time (s) | 5.0 | 7.6 | 7.6 | 3.0 | 7.6 | 7.6 | 5.0 | 7.4 | 7.4 | 5.0 | 7.4 | |
| Lane Util. Factor | 0.97 | 0.91 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.90 | 1.00 | 1.00 | 0.91 | 1.00 | 0.98 | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.93 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 3267 | 4902 | 1287 | 1525 | 4641 | 1416 | 3177 | 3544 | 1411 | 3395 | 2962 | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.15 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (perm) | 3267 | 4902 | 1287 | 235 | 4641 | 1416 | 3177 | 3544 | 1411 | 3395 | 2962 | |
| Peak-hour factor, PHF | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Adj. Flow (vph) | 345 | 1230 | 101 | 76 | 789 | 568 | 188 | 610 | 133 | 329 | 205 | 177 |
| RTOR Reduction (vph) | 0 | 0 | 63 | 0 | 0 | 253 | 0 | 0 | 97 | 0 | 97 | 0 |
| Lane Group Flow (vph) | 345 | 1230 | 38 | 76 | 789 | 315 | 188 | 610 | 36 | 329 | 285 | 0 |
| Confl. Peds. (#/hr) | 62 | | 28 | 28 | | 62 | 23 | | 61 | 61 | | 23 |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | |
| Heavy Vehicles (%) | 6% | 7% | 17% | 17% | 13% | 2% | 9% | 3% | 3% | 2% | 5% | 10% |
| Bus Blockages (#/hr) | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 0 |
| Turn Type | Prot | NA | Perm | pm+pt | NA | Perm | Prot | NA | Perm | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | | 3 | 8 | |
| Permitted Phases | | | 2 | 6 | | 6 | | | 4 | | | |
| Actuated Green, G (s) | 19.0 | 59.8 | 59.8 | 61.4 | 50.1 | 50.1 | 16.3 | 43.3 | 43.3 | 22.6 | 49.6 | |
| Effective Green, g (s) | 19.0 | 59.8 | 59.8 | 61.4 | 50.1 | 50.1 | 16.3 | 43.3 | 43.3 | 22.6 | 49.6 | |
| Actuated g/C Ratio | 0.12 | 0.37 | 0.37 | 0.38 | 0.31 | 0.31 | 0.10 | 0.27 | 0.27 | 0.14 | 0.31 | |
| Clearance Time (s) | 5.0 | 7.6 | 7.6 | 3.0 | 7.6 | 7.6 | 5.0 | 7.4 | 7.4 | 5.0 | 7.4 | |
| Vehicle Extension (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | |
| Lane Grp Cap (vph) | 387 | 1832 | 481 | 181 | 1453 | 443 | 323 | 959 | 381 | 479 | 918 | |
| v/s Ratio Prot | c0.11 | 0.25 | | 0.03 | 0.17 | | 0.06 | c0.17 | | c0.10 | 0.10 | |
| v/s Ratio Perm | | | 0.03 | 0.13 | | c0.22 | | | 0.03 | | | |
| v/c Ratio | 0.89 | 0.67 | 0.08 | 0.42 | 0.54 | 0.71 | 0.58 | 0.64 | 0.09 | 0.69 | 0.31 | |
| Uniform Delay, d1 | 69.5 | 41.9 | 32.3 | 33.0 | 45.5 | 48.6 | 68.6 | 51.4 | 43.7 | 65.3 | 42.1 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | 23.0 | 2.0 | 0.3 | 3.3 | 1.5 | 9.4 | 4.1 | 3.2 | 0.5 | 5.2 | 0.9 | |
| Delay (s) | 92.5 | 43.9 | 32.6 | 36.3 | 46.9 | 57.9 | 72.7 | 54.6 | 44.2 | 70.5 | 43.0 | |
| Level of Service | F | D | C | D | D | E | E | D | D | E | D | |
| Approach Delay (s) | | 53.2 | | | 50.7 | | | 56.8 | | | 55.8 | |
| Approach LOS | | D | | | D | | | E | | | E | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 53.5 | | | | | | | | | D |
| HCM 2000 Volume to Capacity ratio | | | 0.71 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 160.0 | | | | | | | 25.0 | | |
| Intersection Capacity Utilization | | | 100.1% | | | | | | | | | G |
| Analysis Period (min) | | | 15 | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | |

Queues

PM Peak Period

2: Goreway Drive & Dorcas Street/Development Site South Access Future Background Conditions (Mitigated)



| Lane Group | EBT | NBL | NBT | SBT |
|------------------------|-------|------|-------|------|
| Lane Group Flow (vph) | 55 | 107 | 1470 | 769 |
| v/c Ratio | 0.33 | 0.18 | 0.48 | 0.25 |
| Control Delay | 22.8 | 2.8 | 2.9 | 1.2 |
| Queue Delay | 0.0 | 0.0 | 0.2 | 0.0 |
| Total Delay | 22.8 | 2.8 | 3.2 | 1.2 |
| Queue Length 50th (m) | 1.6 | 3.8 | 36.3 | 8.5 |
| Queue Length 95th (m) | 5.8 | 8.2 | 50.2 | 10.1 |
| Internal Link Dist (m) | 104.2 | | 208.0 | 20.6 |
| Turn Bay Length (m) | | 60.0 | | |
| Base Capacity (vph) | 444 | 586 | 3083 | 3021 |
| Starvation Cap Reductn | 0 | 0 | 753 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.12 | 0.18 | 0.63 | 0.25 |

Intersection Summary

HCM Signalized Intersection Capacity Analysis PM Peak Period
 2: Goreway Drive & Dorcas Street/Development Site South Access Future Background Conditions (Mitigated)



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|-------|------|------|------|------|-------|-------|------|------|-------|------|
| Lane Configurations | | ↕ | | | ↕ | | ↗ | ↕↔ | | ↗ | ↕↔ | |
| Traffic Volume (vph) | 4 | 0 | 29 | 0 | 0 | 0 | 104 | 1426 | 0 | 0 | 681 | 4 |
| Future Volume (vph) | 4 | 0 | 29 | 0 | 0 | 0 | 104 | 1426 | 0 | 0 | 681 | 4 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1640 | 1900 | 1900 | 1640 | 1900 | 1900 | 1640 | 1900 | 1900 | 1640 |
| Total Lost time (s) | | 5.0 | | | | | 6.0 | 5.0 | | | 5.0 | |
| Lane Util. Factor | | 1.00 | | | | | 1.00 | 0.95 | | | 0.95 | |
| Frbp, ped/bikes | | 0.98 | | | | | 1.00 | 1.00 | | | 1.00 | |
| Flpb, ped/bikes | | 1.00 | | | | | 0.98 | 1.00 | | | 1.00 | |
| Frt | | 0.88 | | | | | 1.00 | 1.00 | | | 1.00 | |
| Flt Protected | | 0.99 | | | | | 0.95 | 1.00 | | | 1.00 | |
| Satd. Flow (prot) | | 1649 | | | | | 1783 | 3544 | | | 3473 | |
| Flt Permitted | | 0.95 | | | | | 0.36 | 1.00 | | | 1.00 | |
| Satd. Flow (perm) | | 1583 | | | | | 675 | 3544 | | | 3473 | |
| Peak-hour factor, PHF | 0.61 | 0.61 | 0.61 | 0.92 | 0.92 | 0.92 | 0.97 | 0.97 | 0.97 | 0.89 | 0.89 | 0.89 |
| Adj. Flow (vph) | 7 | 0 | 48 | 0 | 0 | 0 | 107 | 1470 | 0 | 0 | 765 | 4 |
| RTOR Reduction (vph) | 0 | 45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 10 | 0 | 0 | 0 | 0 | 107 | 1470 | 0 | 0 | 769 | 0 |
| Confl. Peds. (#/hr) | 15 | | 7 | 7 | | | 15 | 18 | | 33 | 33 | 18 |
| Heavy Vehicles (%) | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 3% | 0% | 0% | 5% | 0% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 18 |
| Turn Type | Perm | NA | | | | | Perm | NA | | Perm | NA | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | | 8 | | | 2 | | | 6 | | |
| Actuated Green, G (s) | | 6.8 | | | | | 101.2 | 101.2 | | | 101.2 | |
| Effective Green, g (s) | | 7.8 | | | | | 101.2 | 102.2 | | | 102.2 | |
| Actuated g/C Ratio | | 0.06 | | | | | 0.84 | 0.85 | | | 0.85 | |
| Clearance Time (s) | | 6.0 | | | | | 6.0 | 6.0 | | | 6.0 | |
| Vehicle Extension (s) | | 3.0 | | | | | 3.0 | 3.0 | | | 3.0 | |
| Lane Grp Cap (vph) | | 102 | | | | | 569 | 3018 | | | 2957 | |
| v/s Ratio Prot | | | | | | | | c0.41 | | | 0.22 | |
| v/s Ratio Perm | | c0.01 | | | | | 0.16 | | | | | |
| v/c Ratio | | 0.10 | | | | | 0.19 | 0.49 | | | 0.26 | |
| Uniform Delay, d1 | | 52.8 | | | | | 1.8 | 2.3 | | | 1.7 | |
| Progression Factor | | 1.00 | | | | | 1.00 | 1.00 | | | 0.59 | |
| Incremental Delay, d2 | | 0.4 | | | | | 0.7 | 0.6 | | | 0.2 | |
| Delay (s) | | 53.2 | | | | | 2.5 | 2.8 | | | 1.2 | |
| Level of Service | | D | | | | | A | A | | | A | |
| Approach Delay (s) | | 53.2 | | | 0.0 | | | 2.8 | | | 1.2 | |
| Approach LOS | | D | | | A | | | A | | | A | |

| Intersection Summary | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 3.4 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.46 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 10.0 |
| Intersection Capacity Utilization | 72.3% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

Queues
3: Goreway Drive & Etude Drive

PM Peak Period
Future Background Conditions (Mitigated)



| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | SBL | SBT |
|------------------------|------|-------|-------|-------|------|------|-------|------|-------|
| Lane Group Flow (vph) | 43 | 238 | 183 | 134 | 58 | 88 | 1414 | 44 | 641 |
| v/c Ratio | 0.17 | 0.49 | 0.96 | 0.27 | 0.14 | 0.17 | 0.65 | 0.28 | 0.33 |
| Control Delay | 34.8 | 35.7 | 99.6 | 35.3 | 8.6 | 6.6 | 12.2 | 22.8 | 14.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 34.8 | 35.7 | 99.6 | 35.3 | 8.6 | 6.6 | 12.2 | 22.8 | 14.8 |
| Queue Length 50th (m) | 7.9 | 41.0 | 41.7 | 24.6 | 0.0 | 4.7 | 99.0 | 5.3 | 40.4 |
| Queue Length 95th (m) | 14.1 | 49.8 | #78.3 | 39.2 | 9.5 | 8.3 | 134.4 | 13.0 | 49.0 |
| Internal Link Dist (m) | | 111.7 | | 462.1 | | | 246.8 | | 287.8 |
| Turn Bay Length (m) | 70.0 | | 37.0 | | 33.0 | 53.0 | | 30.0 | |
| Base Capacity (vph) | 307 | 568 | 230 | 592 | 474 | 569 | 2176 | 158 | 1966 |
| 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 | 0.14 | 0.42 | 0.80 | 0.23 | 0.12 | 0.15 | 0.65 | 0.28 | 0.33 |
























Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

3: Goreway Drive & Etude Drive











PM Peak Period
Future Background Conditions (Mitigated)

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  |  | |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph) | 33 | 110 | 71 | 168 | 123 | 53 | 85 | 1124 | 247 | 34 | 474 | 26 |
| Future Volume (vph) | 33 | 110 | 71 | 168 | 123 | 53 | 85 | 1124 | 247 | 34 | 474 | 26 |
| Ideal Flow (vphp) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1860 | 1900 | 1640 | 1900 | 1900 | 1640 |
| Total Lost time (s) | 7.0 | 5.0 | | 7.0 | 5.0 | 7.0 | 1.0 | 5.0 | | 6.5 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 0.98 | | 1.00 | 1.00 | 0.91 | 1.00 | 0.96 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 0.94 | 1.00 | | 0.98 | 1.00 | 1.00 | 0.99 | 1.00 | | 0.98 | 1.00 | |
| Frt | 1.00 | 0.94 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | | 1.00 | 0.99 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1610 | 1781 | | 1742 | 1921 | 1484 | 1725 | 3286 | | 1788 | 3402 | |
| Flt Permitted | 0.62 | 1.00 | | 0.43 | 1.00 | 1.00 | 0.36 | 1.00 | | 0.15 | 1.00 | |
| Satd. Flow (perm) | 1054 | 1781 | | 791 | 1921 | 1484 | 661 | 3286 | | 281 | 3402 | |
| Peak-hour factor, PHF | 0.76 | 0.76 | 0.76 | 0.92 | 0.92 | 0.92 | 0.97 | 0.97 | 0.97 | 0.78 | 0.78 | 0.78 |
| Adj. Flow (vph) | 43 | 145 | 93 | 183 | 134 | 58 | 88 | 1159 | 255 | 44 | 608 | 33 |
| RTOR Reduction (vph) | 0 | 21 | 0 | 0 | 0 | 44 | 0 | 14 | 0 | 0 | 3 | 0 |
| Lane Group Flow (vph) | 43 | 217 | 0 | 183 | 134 | 14 | 88 | 1400 | 0 | 44 | 638 | 0 |
| Confl. Peds. (#/hr) | 72 | | 24 | 24 | | 72 | 19 | | 81 | 81 | | 19 |
| Confl. Bikes (#/hr) | | | 1 | | | | | | | | | |
| Heavy Vehicles (%) | 6% | 0% | 0% | 3% | 0% | 0% | 3% | 4% | 2% | 0% | 6% | 8% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 0 | 18 |
| Turn Type | Perm | NA | | Perm | NA | Perm | pm+pt | NA | | Perm | NA | |
| Protected Phases | | 8 | | | 4 | | 1 | 6 | | | 2 | |
| Permitted Phases | 8 | | | 4 | | 4 | 6 | | | 2 | | |
| Actuated Green, G (s) | 29.1 | 29.1 | | 29.1 | 29.1 | 29.1 | 77.4 | 77.4 | | 67.7 | 67.7 | |
| Effective Green, g (s) | 29.1 | 31.1 | | 29.1 | 31.1 | 29.1 | 79.4 | 78.9 | | 67.7 | 69.2 | |
| Actuated g/C Ratio | 0.24 | 0.26 | | 0.24 | 0.26 | 0.24 | 0.66 | 0.66 | | 0.56 | 0.58 | |
| Clearance Time (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 3.0 | 6.5 | | 6.5 | 6.5 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 2.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 255 | 461 | | 191 | 497 | 359 | 514 | 2160 | | 158 | 1961 | |
| v/s Ratio Prot | | 0.12 | | | 0.07 | | 0.01 | c0.43 | | | 0.19 | |
| v/s Ratio Perm | 0.04 | | | c0.23 | | 0.01 | 0.10 | | | 0.16 | | |
| v/c Ratio | 0.17 | 0.47 | | 0.96 | 0.27 | 0.04 | 0.17 | 0.65 | | 0.28 | 0.33 | |
| Uniform Delay, d1 | 35.9 | 37.5 | | 44.8 | 35.4 | 34.8 | 7.5 | 12.3 | | 13.5 | 13.2 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 0.82 | 0.83 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 0.3 | 0.8 | | 52.4 | 0.3 | 0.0 | 0.1 | 1.4 | | 4.3 | 0.4 | |
| Delay (s) | 36.2 | 38.3 | | 97.3 | 35.7 | 34.8 | 6.2 | 11.5 | | 17.9 | 13.7 | |
| Level of Service | D | D | | F | D | C | A | B | | B | B | |
| Approach Delay (s) | | 38.0 | | | 65.6 | | | 11.2 | | | 13.9 | |
| Approach LOS | | D | | | E | | | B | | | B | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 21.7 | | | | | | | | | C |
| HCM 2000 Volume to Capacity ratio | | | 0.72 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 120.0 | | | | | | | 11.0 | | |
| Intersection Capacity Utilization | | | 97.7% | | | | | | | | | F |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: Goreway Drive & Development Site North Access

PM Peak Period
Future Background Conditions (Mitigated)

| |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations |  | |  | |  |  |
| Traffic Volume (veh/h) | 0 | 0 | 1430 | 0 | 0 | 685 |
| Future Volume (Veh/h) | 0 | 0 | 1430 | 0 | 0 | 685 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 0 | 1554 | 0 | 0 | 745 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | TWLTL | | | TWLTL |
| Median storage veh | | | 2 | | | 2 |
| Upstream signal (m) | | | 45 | | | 271 |
| pX, platoon unblocked | 0.91 | 0.89 | | | 0.89 | |
| vC, conflicting volume | 1926 | 777 | | | 1554 | |
| vC1, stage 1 conf vol | 1554 | | | | | |
| vC2, stage 2 conf vol | 372 | | | | | |
| vCu, unblocked vol | 1599 | 500 | | | 1374 | |
| tC, single (s) | 6.8 | 6.9 | | | 4.1 | |
| tC, 2 stage (s) | 5.8 | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 100 | 100 | | | 100 | |
| cM capacity (veh/h) | 175 | 464 | | | 450 | |
| Direction, Lane # | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 | SB 3 |
| Volume Total | 0 | 1036 | 518 | 0 | 372 | 372 |
| Volume Left | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 0 | 0 | 0 | 0 | 0 | 0 |
| cSH | 1700 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.00 | 0.61 | 0.30 | 0.00 | 0.22 | 0.22 |
| Queue Length 95th (m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Control Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | A | | | | | |
| Approach Delay (s) | 0.0 | 0.0 | | 0.0 | | |
| Approach LOS | A | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 0.0 | | | |
| Intersection Capacity Utilization | | | 42.9% | | ICU Level of Service | A |
| Analysis Period (min) | | | 15 | | | |

Queues
1: Goreway Drive & Derry Road East

PM Peak Period
Future Total Conditions (Mitigated)



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT |
|------------------------|-------|-------|-------|------|-------|--------|------|-------|------|-------|-------|
| Lane Group Flow (vph) | 345 | 1230 | 101 | 76 | 790 | 601 | 187 | 622 | 133 | 349 | 383 |
| v/c Ratio | 0.89 | 0.67 | 0.18 | 0.41 | 0.54 | 0.86 | 0.58 | 0.67 | 0.27 | 0.70 | 0.38 |
| Control Delay | 94.2 | 44.7 | 4.2 | 29.8 | 47.5 | 33.5 | 75.8 | 57.0 | 5.4 | 72.1 | 27.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 94.2 | 44.7 | 4.2 | 29.8 | 47.5 | 33.5 | 75.8 | 57.0 | 5.4 | 72.1 | 27.1 |
| Queue Length 50th (m) | 56.7 | 120.4 | 0.0 | 12.8 | 76.7 | 81.4 | 29.6 | 93.2 | 0.0 | 55.2 | 30.4 |
| Queue Length 95th (m) | #83.9 | 142.6 | 9.1 | 23.4 | 93.0 | #159.6 | 42.5 | 118.3 | 11.8 | 69.5 | 45.4 |
| Internal Link Dist (m) | | 563.5 | | | 156.8 | | | 158.8 | | | 208.0 |
| Turn Bay Length (m) | 120.0 | | 100.0 | 78.0 | | 90.0 | 81.5 | | 73.0 | 101.0 | |
| Base Capacity (vph) | 387 | 1832 | 555 | 203 | 1454 | 695 | 377 | 934 | 485 | 657 | 1018 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.89 | 0.67 | 0.18 | 0.37 | 0.54 | 0.86 | 0.50 | 0.67 | 0.27 | 0.53 | 0.38 |

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
1: Goreway Drive & Derry Road East

PM Peak Period
Future Total Conditions (Mitigated)

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|-----------------------------------|-------|------|--------|-------|---------------------------|-------|------|-------|------|-------|------|------|--|
| Lane Configurations | | | | | | | | | | | | | |
| Traffic Volume (vph) | 345 | 1230 | 101 | 76 | 790 | 601 | 187 | 622 | 133 | 349 | 204 | 179 | |
| Future Volume (vph) | 345 | 1230 | 101 | 76 | 790 | 601 | 187 | 622 | 133 | 349 | 204 | 179 | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | |
| Lane Width | 3.5 | 3.7 | 3.5 | 3.5 | 3.7 | 3.5 | 3.5 | 3.7 | 3.5 | 3.5 | 3.7 | 3.7 | |
| Total Lost time (s) | 5.0 | 7.6 | 7.6 | 3.0 | 7.6 | 7.6 | 5.0 | 7.4 | 7.4 | 5.0 | 7.4 | | |
| Lane Util. Factor | 0.97 | 0.91 | 1.00 | 1.00 | 0.91 | 1.00 | 0.97 | 0.95 | 1.00 | 0.97 | 0.95 | | |
| Frbp, ped/bikes | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.90 | 1.00 | 1.00 | 0.91 | 1.00 | 0.98 | | |
| Flpb, ped/bikes | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.93 | | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 3267 | 4902 | 1287 | 1525 | 4641 | 1416 | 3177 | 3544 | 1411 | 3395 | 2959 | | |
| Flt Permitted | 0.95 | 1.00 | 1.00 | 0.15 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | |
| Satd. Flow (perm) | 3267 | 4902 | 1287 | 235 | 4641 | 1416 | 3177 | 3544 | 1411 | 3395 | 2959 | | |
| Peak-hour factor, PHF | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Adj. Flow (vph) | 345 | 1230 | 101 | 76 | 790 | 601 | 187 | 622 | 133 | 349 | 204 | 179 | |
| RTOR Reduction (vph) | 0 | 0 | 63 | 0 | 0 | 252 | 0 | 0 | 98 | 0 | 101 | 0 | |
| Lane Group Flow (vph) | 345 | 1230 | 38 | 76 | 790 | 349 | 187 | 622 | 35 | 349 | 282 | 0 | |
| Confl. Peds. (#/hr) | 62 | | 28 | 28 | | 62 | 23 | | 61 | 61 | | 23 | |
| Confl. Bikes (#/hr) | | | | | | | | | 1 | | | | |
| Heavy Vehicles (%) | 6% | 7% | 17% | 17% | 13% | 2% | 9% | 3% | 3% | 2% | 5% | 10% | |
| Bus Blockages (#/hr) | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 0 | |
| Turn Type | Prot | NA | Perm | pm+pt | NA | Perm | Prot | NA | Perm | Prot | NA | | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | | 3 | 8 | | |
| Permitted Phases | | | 2 | 6 | | 6 | | | 4 | | | | |
| Actuated Green, G (s) | 19.0 | 59.9 | 59.9 | 61.5 | 50.2 | 50.2 | 16.2 | 42.2 | 42.2 | 23.6 | 49.6 | | |
| Effective Green, g (s) | 19.0 | 59.9 | 59.9 | 61.5 | 50.2 | 50.2 | 16.2 | 42.2 | 42.2 | 23.6 | 49.6 | | |
| Actuated g/C Ratio | 0.12 | 0.37 | 0.37 | 0.38 | 0.31 | 0.31 | 0.10 | 0.26 | 0.26 | 0.15 | 0.31 | | |
| Clearance Time (s) | 5.0 | 7.6 | 7.6 | 3.0 | 7.6 | 7.6 | 5.0 | 7.4 | 7.4 | 5.0 | 7.4 | | |
| Vehicle Extension (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | |
| Lane Grp Cap (vph) | 387 | 1835 | 481 | 181 | 1456 | 444 | 321 | 934 | 372 | 500 | 917 | | |
| v/s Ratio Prot | c0.11 | 0.25 | | 0.03 | 0.17 | | 0.06 | c0.18 | | c0.10 | 0.10 | | |
| v/s Ratio Perm | | | 0.03 | 0.13 | | c0.25 | | | 0.02 | | | | |
| v/c Ratio | 0.89 | 0.67 | 0.08 | 0.42 | 0.54 | 0.79 | 0.58 | 0.67 | 0.09 | 0.70 | 0.31 | | |
| Uniform Delay, d1 | 69.5 | 41.8 | 32.3 | 33.0 | 45.4 | 50.0 | 68.7 | 52.6 | 44.5 | 64.8 | 42.1 | | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 23.0 | 2.0 | 0.3 | 3.3 | 1.5 | 13.1 | 4.1 | 3.7 | 0.5 | 5.3 | 0.9 | | |
| Delay (s) | 92.5 | 43.8 | 32.6 | 36.2 | 46.9 | 63.1 | 72.8 | 56.4 | 45.0 | 70.2 | 43.0 | | |
| Level of Service | F | D | C | D | D | E | E | E | D | E | D | | |
| Approach Delay (s) | | 53.1 | | | 53.0 | | | 58.0 | | | 55.9 | | |
| Approach LOS | | D | | | D | | | E | | | E | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 54.5 | | HCM 2000 Level of Service | | | | | D | | | |
| HCM 2000 Volume to Capacity ratio | | | 0.75 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 160.0 | | Sum of lost time (s) | | | | | 25.0 | | | |
| Intersection Capacity Utilization | | | 100.6% | | ICU Level of Service | | | | | G | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

Queues

2: Goreway Drive & Dorcas Street/Development Site South Access

PM Peak Period

Future Total Conditions (Mitigated)



| Lane Group | EBT | WBT | NBL | NBT | SBL | SBT |
|------------------------|-------|------|------|-------|------|------|
| Lane Group Flow (vph) | 55 | 45 | 107 | 1520 | 19 | 769 |
| v/c Ratio | 0.33 | 0.30 | 0.18 | 0.50 | 0.08 | 0.25 |
| Control Delay | 22.8 | 26.4 | 3.0 | 3.0 | 2.0 | 1.2 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 |
| Total Delay | 22.8 | 26.4 | 3.0 | 3.3 | 2.0 | 1.2 |
| Queue Length 50th (m) | 1.6 | 2.0 | 4.0 | 38.6 | 0.5 | 8.6 |
| Queue Length 95th (m) | 5.8 | 13.4 | 8.8 | 53.3 | m1.1 | 10.2 |
| Internal Link Dist (m) | 104.2 | 51.5 | | 208.0 | | 20.6 |
| Turn Bay Length (m) | | | 60.0 | | 34.0 | |
| Base Capacity (vph) | 447 | 410 | 582 | 3058 | 253 | 3021 |
| Starvation Cap Reductn | 0 | 0 | 0 | 716 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.12 | 0.11 | 0.18 | 0.65 | 0.08 | 0.25 |

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
 2: Goreway Drive & Dorcas Street/Development Site South Access

PM Peak Period
 Future Total Conditions (Mitigated)



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|------|-------|------|-------|-------|------|-------|-------|------|
| Lane Configurations | | ↕ | | | ↕ | | ↗ | ↕↗ | | ↗ | ↕↗ | |
| Traffic Volume (vph) | 4 | 0 | 29 | 22 | 0 | 19 | 104 | 1429 | 46 | 17 | 681 | 4 |
| Future Volume (vph) | 4 | 0 | 29 | 22 | 0 | 19 | 104 | 1429 | 46 | 17 | 681 | 4 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1640 | 1900 | 1900 | 1640 | 1900 | 1900 | 1640 | 1900 | 1900 | 1640 |
| Total Lost time (s) | | 5.0 | | | 5.0 | | 7.0 | 5.0 | | 7.0 | 5.0 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | | 0.98 | | | 0.99 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | | 1.00 | | | 1.00 | | 0.98 | 1.00 | | 0.99 | 1.00 | |
| Frt | | 0.88 | | | 0.94 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Flt Protected | | 0.99 | | | 0.97 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1649 | | | 1720 | | 1783 | 3515 | | 1806 | 3473 | |
| Flt Permitted | | 0.96 | | | 0.84 | | 0.36 | 1.00 | | 0.15 | 1.00 | |
| Satd. Flow (perm) | | 1595 | | | 1485 | | 675 | 3515 | | 293 | 3473 | |
| Peak-hour factor, PHF | 0.61 | 0.61 | 0.61 | 0.92 | 0.92 | 0.92 | 0.97 | 0.97 | 0.97 | 0.89 | 0.89 | 0.89 |
| Adj. Flow (vph) | 7 | 0 | 48 | 24 | 0 | 21 | 107 | 1473 | 47 | 19 | 765 | 4 |
| RTOR Reduction (vph) | 0 | 45 | 0 | 0 | 34 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 10 | 0 | 0 | 11 | 0 | 107 | 1519 | 0 | 19 | 769 | 0 |
| Confl. Peds. (#/hr) | 15 | | 7 | 7 | | | 15 | 18 | | 33 | 33 | 18 |
| Heavy Vehicles (%) | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 3% | 0% | 0% | 5% | 0% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 18 |
| Turn Type | Perm | NA | | Perm | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | | 8 | | | 2 | | | 6 | | |
| Actuated Green, G (s) | | 6.8 | | | 6.8 | | 100.2 | 100.2 | | 100.2 | 100.2 | |
| Effective Green, g (s) | | 7.8 | | | 7.8 | | 100.2 | 102.2 | | 100.2 | 102.2 | |
| Actuated g/C Ratio | | 0.06 | | | 0.06 | | 0.84 | 0.85 | | 0.84 | 0.85 | |
| Clearance Time (s) | | 6.0 | | | 6.0 | | 7.0 | 7.0 | | 7.0 | 7.0 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | | 103 | | | 96 | | 563 | 2993 | | 244 | 2957 | |
| v/s Ratio Prot | | | | | | | | c0.43 | | | | 0.22 |
| v/s Ratio Perm | | 0.01 | | | c0.01 | | 0.16 | | | 0.06 | | |
| v/c Ratio | | 0.10 | | | 0.12 | | 0.19 | 0.51 | | 0.08 | 0.26 | |
| Uniform Delay, d1 | | 52.8 | | | 52.9 | | 1.9 | 2.3 | | 1.7 | 1.7 | |
| Progression Factor | | 1.00 | | | 1.00 | | 1.00 | 1.00 | | 0.64 | 0.59 | |
| Incremental Delay, d2 | | 0.4 | | | 0.6 | | 0.7 | 0.6 | | 0.6 | 0.2 | |
| Delay (s) | | 53.2 | | | 53.4 | | 2.7 | 2.9 | | 1.7 | 1.2 | |
| Level of Service | | D | | | D | | A | A | | A | A | |
| Approach Delay (s) | | 53.2 | | | 53.4 | | | 2.9 | | | 1.2 | |
| Approach LOS | | D | | | D | | | A | | | A | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 4.4 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.48 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 10.0 |
| Intersection Capacity Utilization | 75.6% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

Queues
3: Goreway Drive & Etude Drive

PM Peak Period
Future Total Conditions (Mitigated)



| Lane Group | EBL | EBT | WBL | WBT | WBR | NBL | NBT | SBL | SBT |
|------------------------|------|-------|-------|-------|------|------|-------|------|-------|
| Lane Group Flow (vph) | 45 | 237 | 183 | 134 | 58 | 87 | 1437 | 44 | 666 |
| v/c Ratio | 0.18 | 0.49 | 0.96 | 0.27 | 0.14 | 0.17 | 0.66 | 0.29 | 0.34 |
| Control Delay | 35.1 | 35.7 | 99.6 | 35.4 | 8.6 | 6.6 | 12.5 | 23.3 | 14.9 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 35.1 | 35.7 | 99.6 | 35.4 | 8.6 | 6.6 | 12.5 | 23.3 | 14.9 |
| Queue Length 50th (m) | 8.2 | 40.9 | 41.8 | 24.7 | 0.0 | 4.7 | 101.7 | 5.3 | 42.2 |
| Queue Length 95th (m) | 14.4 | 49.6 | #78.2 | 39.2 | 9.5 | 8.5 | 139.3 | 13.2 | 51.0 |
| Internal Link Dist (m) | | 111.7 | | 462.1 | | | 246.8 | | 287.8 |
| Turn Bay Length (m) | 70.0 | | 37.0 | | 33.0 | 53.0 | | 30.0 | |
| Base Capacity (vph) | 306 | 568 | 231 | 592 | 474 | 557 | 2179 | 153 | 1968 |
| 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 | 0.15 | 0.42 | 0.79 | 0.23 | 0.12 | 0.16 | 0.66 | 0.29 | 0.34 |

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

3: Goreway Drive & Etude Drive

PM Peak Period
Future Total Conditions (Mitigated)

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------|------|-------|-------|------|------|---------------------------|-------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 34 | 110 | 70 | 168 | 123 | 53 | 84 | 1147 | 247 | 34 | 492 | 27 |
| Future Volume (vph) | 34 | 110 | 70 | 168 | 123 | 53 | 84 | 1147 | 247 | 34 | 492 | 27 |
| Ideal Flow (vphp) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1860 | 1900 | 1640 | 1900 | 1900 | 1640 |
| Total Lost time (s) | 7.0 | 5.0 | | 7.0 | 5.0 | 7.0 | 1.0 | 5.0 | | 6.5 | 5.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Frbp, ped/bikes | 1.00 | 0.98 | | 1.00 | 1.00 | 0.91 | 1.00 | 0.96 | | 1.00 | 1.00 | |
| Flpb, ped/bikes | 0.94 | 1.00 | | 0.98 | 1.00 | 1.00 | 0.99 | 1.00 | | 0.98 | 1.00 | |
| Frt | 1.00 | 0.94 | | 1.00 | 1.00 | 0.85 | 1.00 | 0.97 | | 1.00 | 0.99 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1610 | 1782 | | 1742 | 1921 | 1484 | 1726 | 3290 | | 1790 | 3401 | |
| Flt Permitted | 0.62 | 1.00 | | 0.43 | 1.00 | 1.00 | 0.35 | 1.00 | | 0.14 | 1.00 | |
| Satd. Flow (perm) | 1053 | 1782 | | 792 | 1921 | 1484 | 639 | 3290 | | 271 | 3401 | |
| Peak-hour factor, PHF | 0.76 | 0.76 | 0.76 | 0.92 | 0.92 | 0.92 | 0.97 | 0.97 | 0.97 | 0.78 | 0.78 | 0.78 |
| Adj. Flow (vph) | 45 | 145 | 92 | 183 | 134 | 58 | 87 | 1182 | 255 | 44 | 631 | 35 |
| RTOR Reduction (vph) | 0 | 21 | 0 | 0 | 0 | 44 | 0 | 13 | 0 | 0 | 3 | 0 |
| Lane Group Flow (vph) | 45 | 216 | 0 | 183 | 134 | 14 | 87 | 1424 | 0 | 44 | 663 | 0 |
| Confl. Peds. (#/hr) | 72 | | 24 | 24 | | 72 | 19 | | 81 | 81 | | 19 |
| Confl. Bikes (#/hr) | | | 1 | | | | | | | | | |
| Heavy Vehicles (%) | 6% | 0% | 0% | 3% | 0% | 0% | 3% | 4% | 2% | 0% | 6% | 8% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 0 | 18 |
| Turn Type | Perm | NA | | Perm | NA | Perm | pm+pt | NA | | Perm | NA | |
| Protected Phases | | 8 | | | 4 | | 1 | 6 | | | | 2 |
| Permitted Phases | 8 | | | 4 | | 4 | 6 | | | 2 | | |
| Actuated Green, G (s) | 29.0 | 29.0 | | 29.0 | 29.0 | 29.0 | 77.5 | 77.5 | | 67.8 | 67.8 | |
| Effective Green, g (s) | 29.0 | 31.0 | | 29.0 | 31.0 | 29.0 | 79.5 | 79.0 | | 67.8 | 69.3 | |
| Actuated g/C Ratio | 0.24 | 0.26 | | 0.24 | 0.26 | 0.24 | 0.66 | 0.66 | | 0.56 | 0.58 | |
| Clearance Time (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 3.0 | 6.5 | | 6.5 | 6.5 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 2.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 254 | 460 | | 191 | 496 | 358 | 502 | 2165 | | 153 | 1964 | |
| v/s Ratio Prot | | 0.12 | | | 0.07 | | 0.01 | c0.43 | | | 0.19 | |
| v/s Ratio Perm | 0.04 | | | c0.23 | | 0.01 | 0.10 | | | 0.16 | | |
| v/c Ratio | 0.18 | 0.47 | | 0.96 | 0.27 | 0.04 | 0.17 | 0.66 | | 0.29 | 0.34 | |
| Uniform Delay, d1 | 36.0 | 37.6 | | 44.9 | 35.5 | 34.8 | 7.5 | 12.4 | | 13.6 | 13.3 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 0.82 | 0.83 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 0.3 | 0.8 | | 52.4 | 0.3 | 0.0 | 0.1 | 1.4 | | 4.7 | 0.5 | |
| Delay (s) | 36.4 | 38.3 | | 97.3 | 35.8 | 34.9 | 6.2 | 11.7 | | 18.2 | 13.8 | |
| Level of Service | D | D | | F | D | C | A | B | | B | B | |
| Approach Delay (s) | | 38.0 | | | 65.7 | | | 11.4 | | | 14.0 | |
| Approach LOS | | D | | | E | | | B | | | B | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 21.7 | | | | HCM 2000 Level of Service | | | | C | |
| HCM 2000 Volume to Capacity ratio | | | 0.73 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 120.0 | | | | Sum of lost time (s) | | | | 11.0 | |
| Intersection Capacity Utilization | | | 98.3% | | | | ICU Level of Service | | | | F | |
| Analysis Period (min) | | | 15 | | | | | | | | | |

c Critical Lane Group

Appendix H

Transportation Demand Management Options
Memorandum



IBI GROUP
200 East Wing – 360 James Street North
Hamilton ON L8L 1H5 Canada
tel 905 546 1010

Memorandum

| | | | |
|---------------------|--|-------------------|--------------|
| To/Attention | City of Mississauga | Date | May 27, 2020 |
| From | IBI Group | Project No | 120212 |
| Cc | Redwood Properties | | |
| Subject | Transportation Demand Management Options Memorandum - 7085 Goreway Drive | | |

1.0 Introduction

Redwood Properties proposes to construct a high-rise residential development at 7085 Goreway Drive and has retained IBI Group Professional Services Canada Inc. (“IBI Group”) to complete a Traffic Demand Management (TDM) options memorandum for this development. In accordance with the City of Mississauga’s TIS Guidelines, IBI Group is pleased to submit this Transportation Demand Management (TDM) memo as part of this TIS.

2.0 Overview of Development

The subject lands are located at 7085 Goreway Drive in the City of Mississauga (refer to **Exhibit 2-1**) and are situated about 250 metres northwest of the Goreway Drive and Derry Road E intersection, on the northeast side of Goreway Drive. The subject lands cover an area of 9,870 m² and is currently the site of the former Starwind Supermarket.

The subject lands are located within the Malton Village neighbourhood in Mississauga, bordering both Brampton and Toronto. The site is located within a major thoroughfare of these municipalities.

The site is bordered by low-density residential neighbourhoods consisting of single-detached and multi-family homes to the southwest and northwest side. It borders a fire station and retail plaza directly northwest and abuts the Malton Greenway and Mimico Creek spanning southeast to the north. The subject lands are within walking and cycling distance of retail plazas, restaurants, a gas station, arena, medical services, light industrial buildings and other residential developments to the southeast, closer to the Goreway Drive and Derry Road E intersection.

The proposal is to construct a high-rise residential building with two towers, 18-storey with 138 residential units and 16-storey with 121 residential units along the southeast limits of the site, linked by a two storey amenities podium and a block of 12 two storey townhouse units along the northwest limit of the site, totaling 271 residential units.

On the ground floor, a bike room will be provided with 74 spaces, approximately 292 bike spaces will be provided through the site. Underground parking will be provided, with 318 residential spaces and 54 visitor spaces, totalling 372 parking spaces.

The subject lands will be accessible from Goreway Drive and will have an access point from the pedestrian connection to the Malton Greenway Trail.

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Exhibit 2-1: Subject Lands (aerial view)



Source: Mississauga Maps (2018)

3.0 Existing TDM-supportive Infrastructure

3.1 Active Transportation

The subject lands are nearby to the following active transportation facilities:

1. An existing off-road paved multi-use trail, part of the Malton Greenway, abutting the subject lands (refer to **Exhibit 3-1**);
2. An existing off-road paved multi-use trail, part of the Derry Road Trail (Wildwood Trail), 250 metres southeast of the subject lands (refer to **Exhibit 3-1**);
3. Existing signed bike route, part of the Malton Loop, 280 metres northwest of the subject lands (refer to **Exhibit 3-2**).

There are sidewalks on both sides of the street on Goreway Drive. Derry Road E south of Goreway Drive has a sidewalk on the northwest side and a paved multi-use trail on the southeast side. The neighbourhood opposite the development site on Goreway Drive has sidewalks on one side of the street.

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Exhibit 3-1: City of Mississauga Malton Greenway Trail



Exhibit 3-2: City of Mississauga Existing and Proposed Cycling Facilities



Source: Mississauga Cycling Map (2010)

3.2 Transit

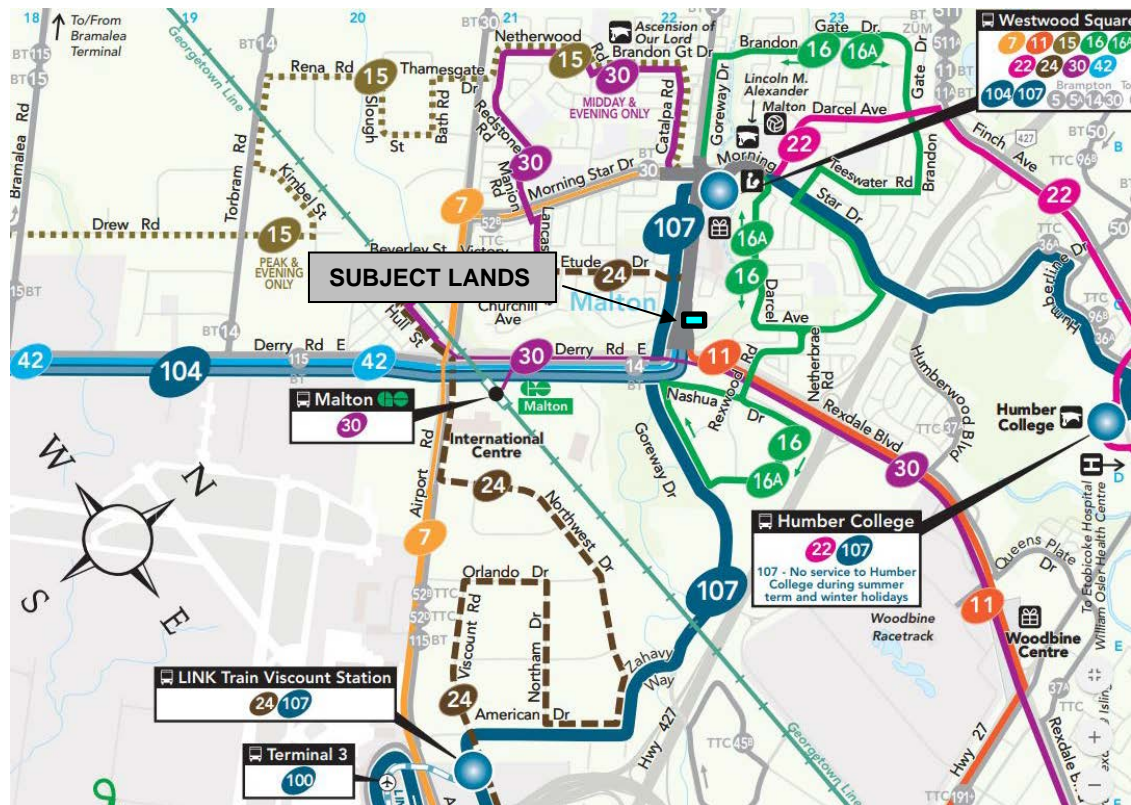
MiWay has multiple routes that run adjacent and near the subject lands. The subject lands are also provided overlapping inter-municipal transit service from Brampton Transit and TTC due to the proximity of their respective municipalities. These transit routes provide access to major transfer points – Westwood Square, Humber College, Pearson International Airport, Malton GO Station, and Bramalea Terminal – within City of Mississauga, City of Toronto and the City of Brampton. The Malton GO Station and adjacent parking lot is approximately 1 KM from the subject

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lands and provides vital regional transit access via GO train (Kitchener Line) and bus (Route 38 – Bolton/Malton). A list of weekday routes in the surrounding area that are within a 10-minute walk from the subject lands (400m-800m) include:

- Route 11 (MiWay) – Westwood
- Route 14 (Brampton Transit) – Torbram
- Route 16/A (MiWay) - Malton
- Route 24 (MiWay) – Northwest
- Route 30 (MiWay) – Rexdale
- Route 42 (MiWay) – Derry
- Route 52B (TTC) – Lawrence West
- Express Route 104 (MiWay) – Derry Express
- Express Route 107 (MiWay) – Malton Express

Exhibit 3-3: Existing Transit Routes



Source: City of Mississauga Transit System Map (Weekday)

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4.0 Proposed On-Site TDM Measures

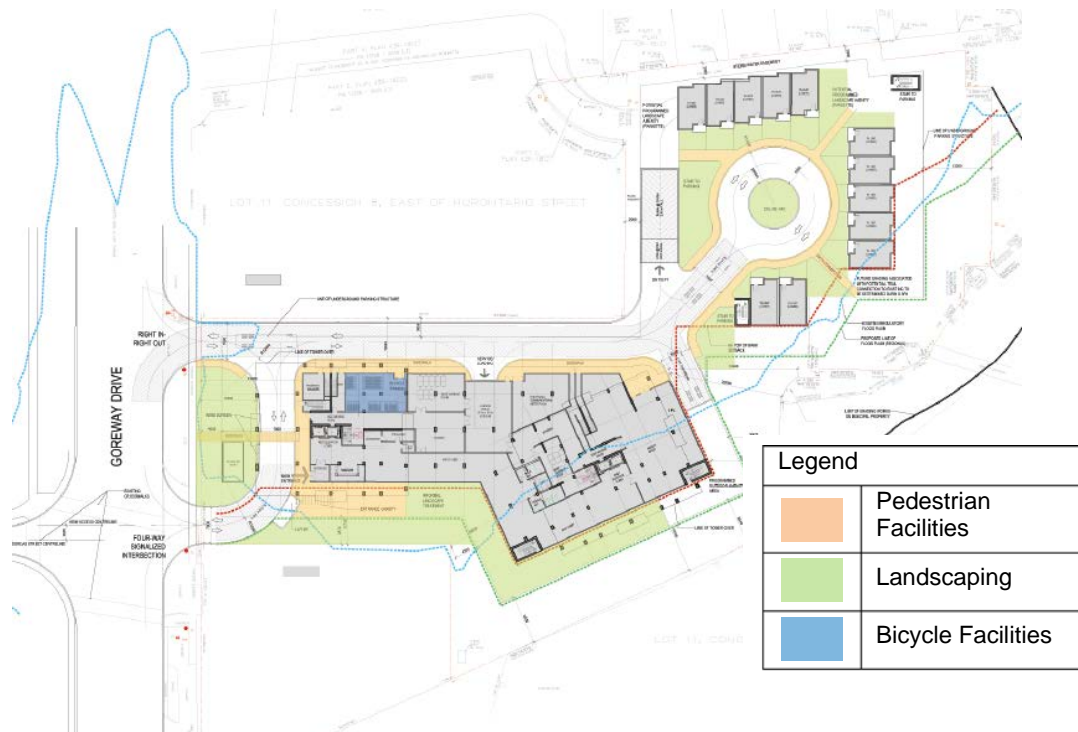
The TDM measures prescribed within this document are informed by The City of Mississauga's TDM Strategy and Implementation Plan, Peel Sustainable Transportation Strategy, Mississauga Official Plan, Region of Peel Official Plan, Region of Peel Long Range Transportation Plan, Mississauga Transportation Master Plan, and Mississauga Cycling Master Plan.

4.1 Active Transportation – Walking

The proposed site will have concrete sidewalks surrounding the high-rise residential buildings, with landscaped and amenity areas near the main entrance providing a pleasant pedestrian experience. Across the front loop, a crosswalk connecting to a concrete sidewalk will provide direct access from the building's main entrance to Goreway Drive. The laneway access has a concrete sidewalk adjacent to the north side of the high-rise residential buildings on one side and extends to the cul-de-sac of proposed townhouses on site. The sidewalks will be maintained with pedestrian amenities to provide safe and convenient pedestrian access to all development entrances. Pedestrian amenities include benches, textured surfaces, and planters. The proposed sidewalks will be complimented by landscaping.

Exhibit 4-1, shows the site plan including pedestrian facilities. The proposed development has one entrance to the main building off Goreway Drive and an east side entrance off the laneway. A path connection to the Malton Greenway Trail, paved multi-use trail, off the cul-de-sac is also established providing access to the subject lands. Signage will be provided for clear wayfinding to all active transportation.

Exhibit 4-1: Proposed Site Plan



City of Mississauga – May 27, 2020

4.2 Active Transportation – Cycling

The subject lands are adjacent to Goreway Drive where a cycle track/separated bike lane are proposed (refer to **Exhibit 4-2**). The subject lands are adjacent to the existing Malton Greenway multi-use trail that will directly connect with the proposed multi-use trail on Derry Road E. The existing and proposed cycling network surrounding the subject lands will support safe cycling in Mississauga and added infrastructure will encourage residents to cycle to and from their destination.

Based on the City of Mississauga’s TDM guidelines, a recommended minimum bike parking requirement for the proposed development would be 0.8 spaces per unit and 6 spaces for visitors. The development will have short-term bike parking facilities, ring-and-post, located securely near the entrance of the main building and other convenient locations throughout the site to accommodate visitors. Approximately 292 bicycle parking spaces will be provided on site. The development will have a designated bike parking room on the ground floor with 74 bike parking spaces accessible from the north side of the main building (refer to **Exhibit 4-3**). The development will also have locker rooms within each of the three levels of the underground parking and on the second-floor podium, that can be used as bike lockers (refer to **Exhibit 4-4** and **Exhibit 4-5**). Safe and secure bicycle infrastructure is important in enabling and motivating cycling, as it can help both promote and security of bicycles.

In Mississauga 0.3% of all trips made by bicycles and 84% of these trips are 5km or less. The subject lands are surrounded by major hubs within this distance and make taking active transportation feasible. The Malton GO Station has cycling park and ride facilities for its riders, which will encourage the use of sustainable modes for the origin-destination trips.

Exhibit 4-2: Existing and Proposed Cycling Facilities



Source: Mississauga Cycling Map 2018 Final Report

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Exhibit 4-3: Proposed Site Plan (bicycle facilities)

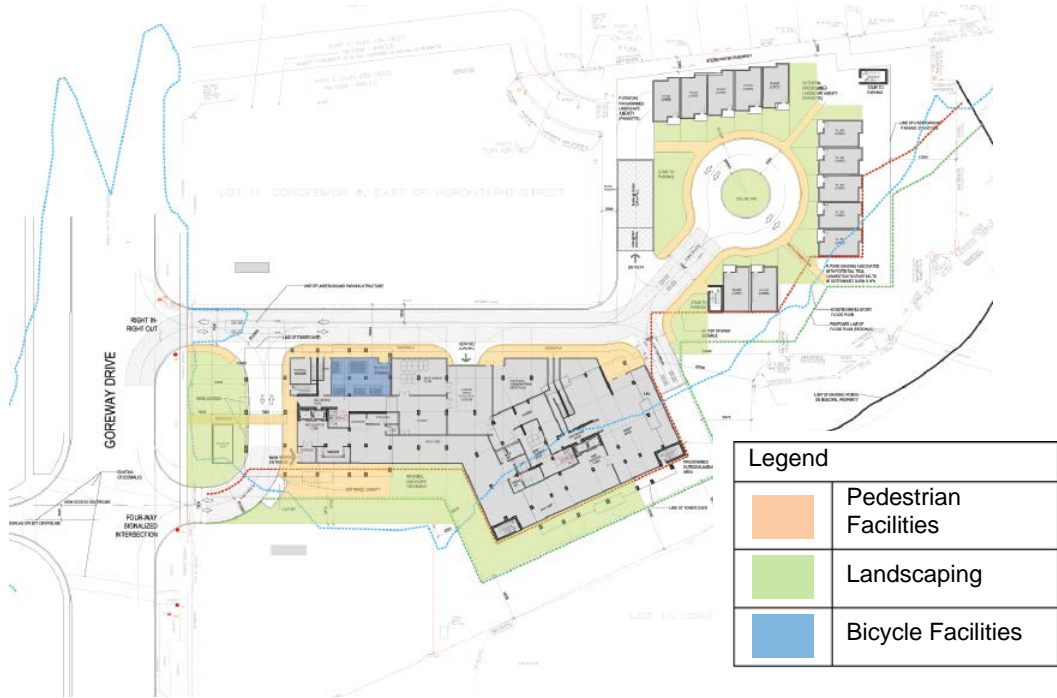


Exhibit 4-4: 2nd Floor Podium Plan



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Exhibit 4-5: Parking 1-3 Plan**4.3 Transit**

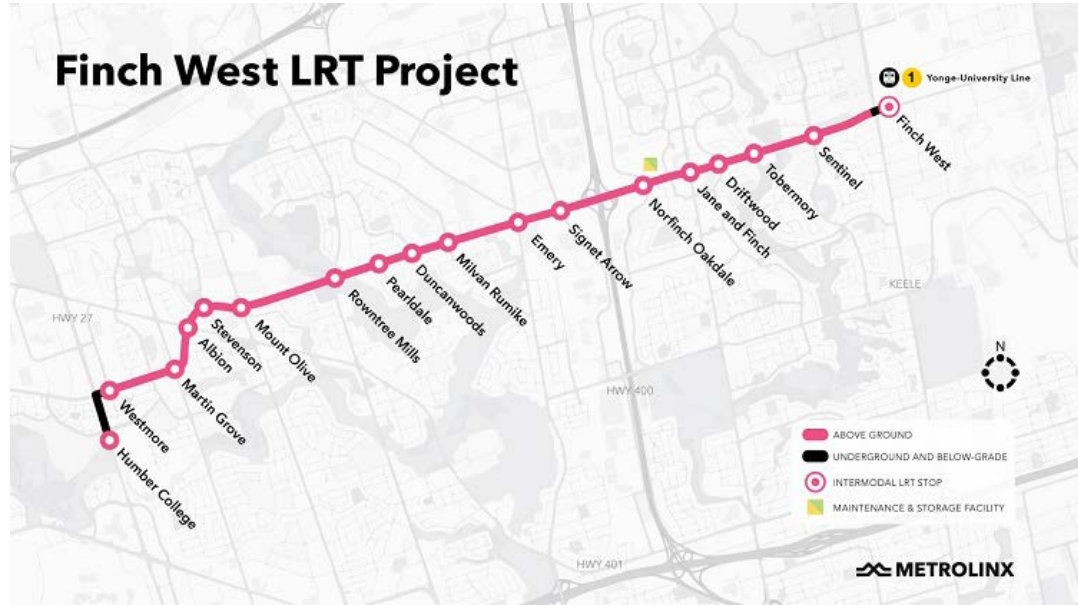
The proposed development has access to multiple local and regional transit options connecting to major transit hubs.

The Malton GO Station, part of the Kitchener Line, already has high AM peak boardings with four weekday morning and four weekday return rail trips between Kitchener and Union Station. Planned future two-way all-day service every 15 minutes between Bramalea Terminal and Union Station will continue to increase ridership and further connect the area regionally.

The proposed Finch West LRT (refer to **Exhibit 4-6**) at Humber College is accessible via MiWay and is within cycling distance (refer to **Exhibit 4-7**). The Finch West LRT is expected to be completed in 2023. The LRT will provide essential links to local and regional transit systems including TTC, GO Transit, MiWay, York Region Transit, VIVA, Brampton Transit, and ZUM services and give residents the opportunity to live, work, study, and play across these regions. The Finch West LRT will provide frequent, convenient, and reliable transit, service to support growth in northwest Toronto. The LRT will have dedicated tracks along Finch Avenue and will run every 5-7 minutes during peak hours, seamlessly connecting Humber College to TTC Finch West Subway Station in approximately 40 minutes. The new infrastructure will be accessible to carpoolers, transit riders, cyclists and pedestrians. With the completion of the Finch West LRT, a corresponding reduction in automobile dependence and usage is anticipated in the area.

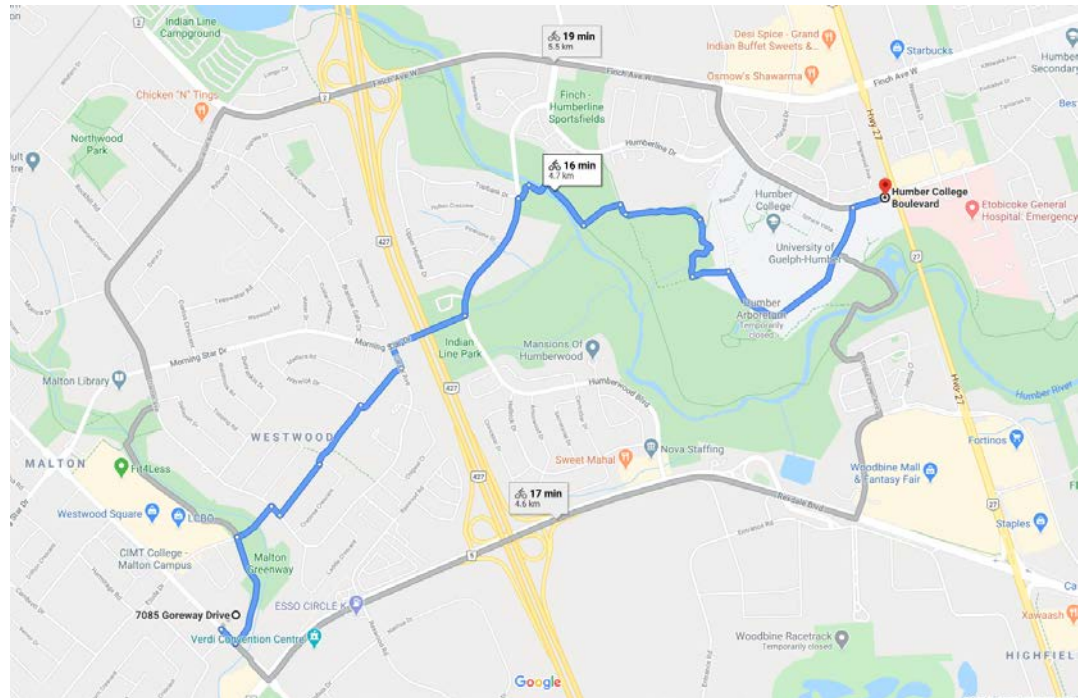
City of Mississauga – May 27, 2020

Exhibit 4-6: Proposed Finch West LRT



Source: Metrolinx.com

Exhibit 4-7: Distance from subject lands to the Finch West LRT by bike



Source: Google Maps

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Existing transit service (Route 104) within the area will feed into the proposed Hurontario LRT corridor, to be completed late 2024. The LRT system will connect Mississauga and Brampton from Port Credit to Brampton Terminal and provide high-quality transit service with the capacity to accommodate Mississauga’s growth. **Exhibit 4-8** shows the proposed Hurontario LRT Line and other proposed transit lines.

Residents of the proposed development will also have access to Zum Transitway, Mississauga Transitway, and future 407 Transitway via connecting local routes, supporting vital connections to York Region, City of Brampton, and the City of Toronto.

Furthermore, fare integration between MiWay, Brampton Transit and York Region Transit allows for seamless travel with no additional cost. In addition, transferring from GO Transit these transit agencies allows riders to pay a reduced fare. Seamless travel between different transit systems contributes to the creation of a regional transit network.

Information regarding transit routes, schedules, connections, and other information regarding transit will be provided in print within the proposed development. Tenants of the development will also receive transit information in real-time via digital displays in shared amenities within the development such as lobbies, elevators, common areas, etc. Providing this real time information will encourage the use of the mode share because it is up-to-date and convenient.

Exhibit 4-8: Proposed Hurontario LRT Line



Source: Metrolinx.com

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4.4 Parking

There are three pedestrian access points to the underground parking near the proposed townhomes. There is also pedestrian access to the underground parking from the main buildings. There is one vehicle access point to the underground parking.

The proposed development provides 372 parking spaces, included 318 resident spaces and 54 visitor spaces.

Providing unbundled parking ensures parking is not an automatic requirement with the sale of the unit, reducing the need for excessive parking beyond the minimum requirement. Providing TDM measures in lieu of parking will ensure tenants consider sustainable transportation as a feasible option.

Designating some of the visitor parking spaces for carsharing vehicles will be investigated.

4.5 Carpooling

Residents of the development have access to the Smart Commute tool as a member of the public. The carpool ride-matching tool is a convenient online tool that matches users with other people in the Smart Commute network that are looking for a carpool rider, driver, or both by matching where people live and work. Information about the tool will be provided to tenants. Carpooling and carsharing reduces the load on the transportation network during peak periods, while increasing system efficiency.

4.6 Wayfinding and Travel Planning

Information regarding the suite of transportation options in the area will be available to residents at the concierge desk, property management office, mailroom, and daycare/community program area. Tenants will have access to bike maps, trail maps, bus route maps and schedules, and online resources in their resident welcome package.

In addition, the development will provide sustainable transportation information in real-time regarding (i.e. transit schedules) via digital displays in shared amenities such as lobbies, elevators, common spaces, etc. This real-time information provides up-to-date and a convenient method to encourage the use of sustainable modes as they pose as constant reminders.

Residents of the development will also have access to the Smart Commute website which allows citizens to explore their sustainable transportation options. In addition to providing public transit options and routes, it provides access to carpool ride-mating programs, information on active transportation, emergency ride home programs, workplace programs, and discounted transit pass programs amongst other fun events and promotions. There are two Smart Commute associations that serve in the City of Mississauga: Smart Commute Pearson Airport Area (SCPAA) and Smart Commute Mississauga (SCM).

4.7 Education/Promotion and Incentives

Existing residents, tenants, and employees of the building have access to the Smart Commute website which includes trip planning resources, online tools, and information on various promotions and incentives as a member of the public. As a member of the public, residents of the development are eligible to receive incentives and participate during various promotional campaigns such as Smart Commute Month, Carpool Week, Bike to Work Day, and Bike Month.

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The development will also investigate potential partnership opportunities with the municipality to deliver transportation education programs, transportation fairs, training programs and community-based social marketing and travel planning programs.

5.0 Conclusion

Based on the existing and proposed TDM measures noted in this memo, the Redwood Properties project is well suited to serve pedestrians, cyclists, and transit users. We trust the above will satisfy the requirements of the TDM plan.

Due to the existing and proposed TDM measures noted within this memo, the proposed development at 7085 Goreway Drive supports the City of Mississauga's TDM goals. Whether it is cycling, walking, taking the bus, or taking the future LRT system, there is ample opportunity for future residents to choose sustainable transportation modes.

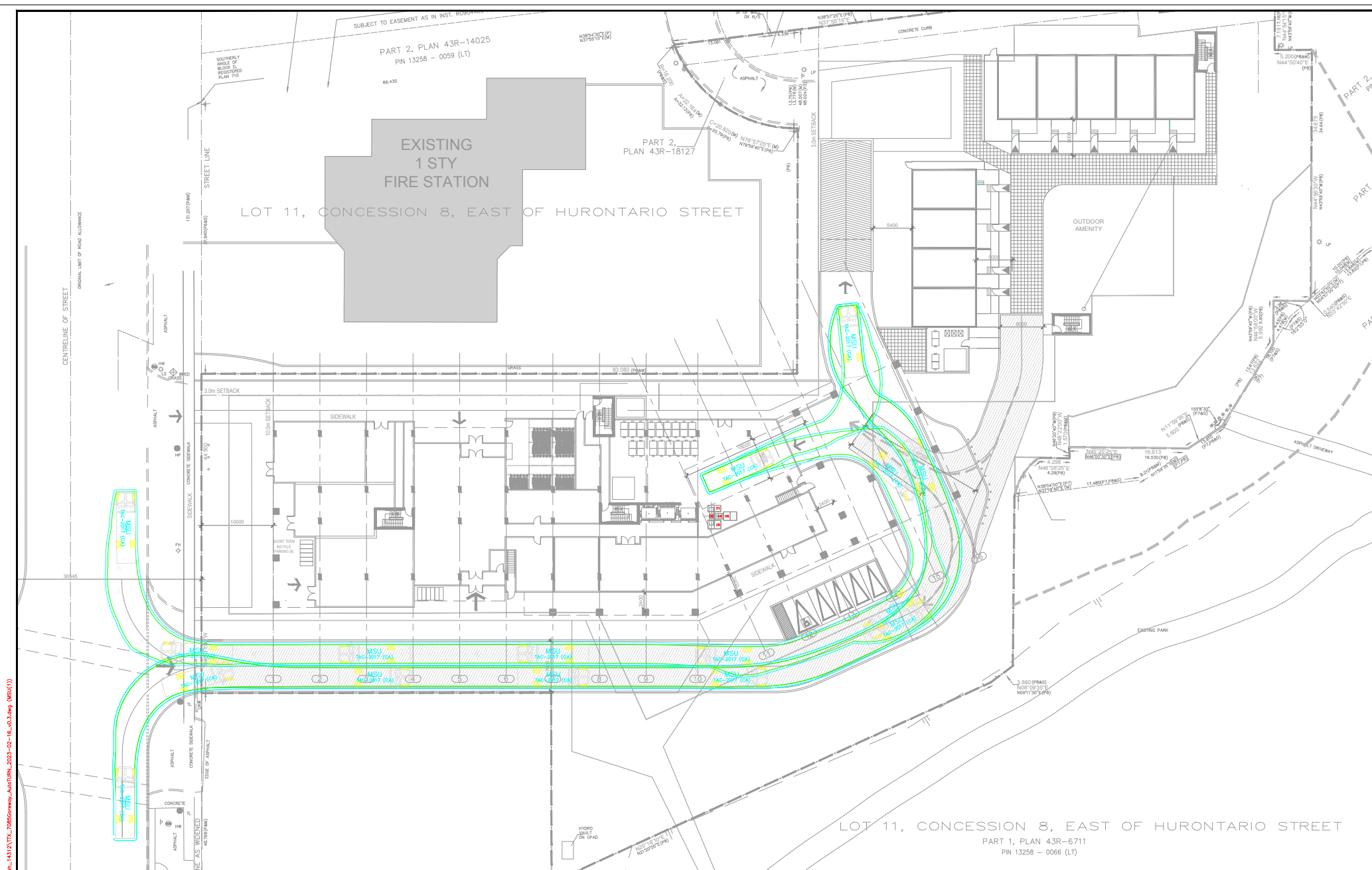
6.0 Recommendations

The following recommendations are highlighted throughout the memo, providing these measures will ensure the development will be well suited to serve sustainable transportation users.

- The proposed site will have concrete sidewalks surrounding the high-rise residential buildings with landscaped and amenity areas near the main entrance providing a pleasant pedestrian experience.
- The proposed sidewalks will have pedestrian amenities that provide safe and convenient pedestrian access to all entrances. Pedestrian amenities include benches, textured surfaces, and planters and will be complimented by landscaping.
- Signage should be provided for clear wayfinding to all active transportation facilities.
- The development will have 6 short-term bike parking facilities located securely near the entrance of the main building and other convenient locations throughout the site to accommodate visitors.
- The development will have a designated bike parking room on the ground floor with 74 bike parking spaces and there are storage lockers on each level of underground parking and on the second-floor podium, that can be used as bike lockers. In total, approximately 292 bicycle parking spaces will be provided on site.
- Information regarding transit routes, schedules, connections, and other information regarding transit will be provided in the resident welcome package.
- Tenants of the development will also receive transit information in real-time via digital displays in shared amenities within the development such as lobbies, elevators, common areas, etc.
- Parking spaces will be unbundled from the sale of the unit.
- Designating some of the visitor parking spaces for carsharing vehicles will be investigated.
- The development will investigate potential partnership opportunities with the municipality to deliver transportation education programs, transportation fairs, training programs and community-based social marketing and travel planning programs.

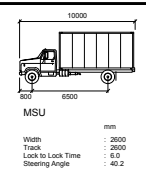
Appendix I

Vehicle Swept Path Analysis



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| No. | REVISION | DATE |
|-----|--|------------|
| 1 | VEHICLE SWEEP PATH ANALYSIS | 2021/11/23 |
| 2 | VEHICLE SWEEP PATH ANALYSIS SECOND DRAFT | 2022/03/16 |
| 3 | VEHICLE SWEEP PATH ANALYSIS THIRD DRAFT | 2022/06/07 |
| 4 | VEHICLE SWEEP PATH ANALYSIS FOURTH DRAFT | 2023/02/16 |



PROPOSED RESIDENTIAL DEVELOPMENT
7085 GOREWAY DRIVE, MISSISSAUGA

COMMERCIAL LOADING TRUCK

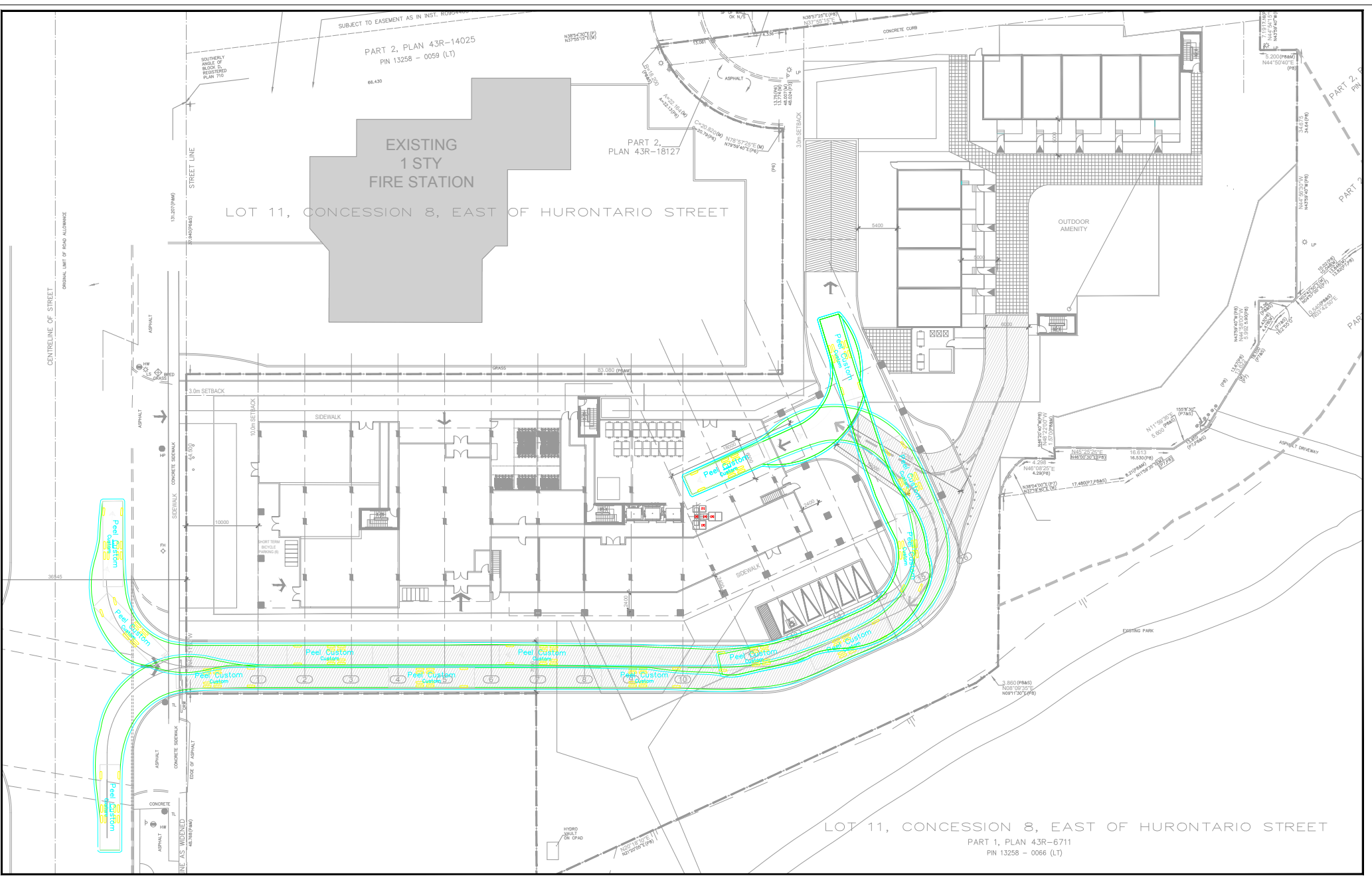
SITE CIRCULATION

| | |
|--------------|------|
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| DESIGNED BY: | - |
| CHECKED BY: | A.G. |
| APPROVED BY: | - |

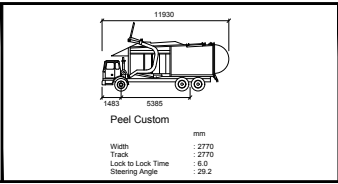
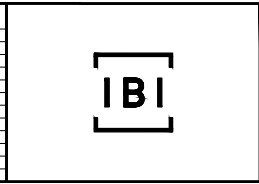
| | |
|--------|---------------|
| DATE: | March 2, 2023 |
| SCALE: | 1:700 |

DRAWING No.
1

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| No. | REVISION | DATE |
|-----|--|------------|
| 1 | VEHICLE SWEEP PATH ANALYSIS | 2021/11/23 |
| 2 | VEHICLE SWEEP PATH ANALYSIS SECOND DRAFT | 2022/03/16 |
| 3 | VEHICLE SWEEP PATH ANALYSIS THIRD DRAFT | 2022/06/07 |
| 4 | VEHICLE SWEEP PATH ANALYSIS FOURTH DRAFT | 2023/02/16 |

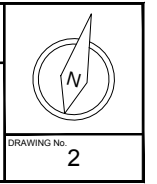


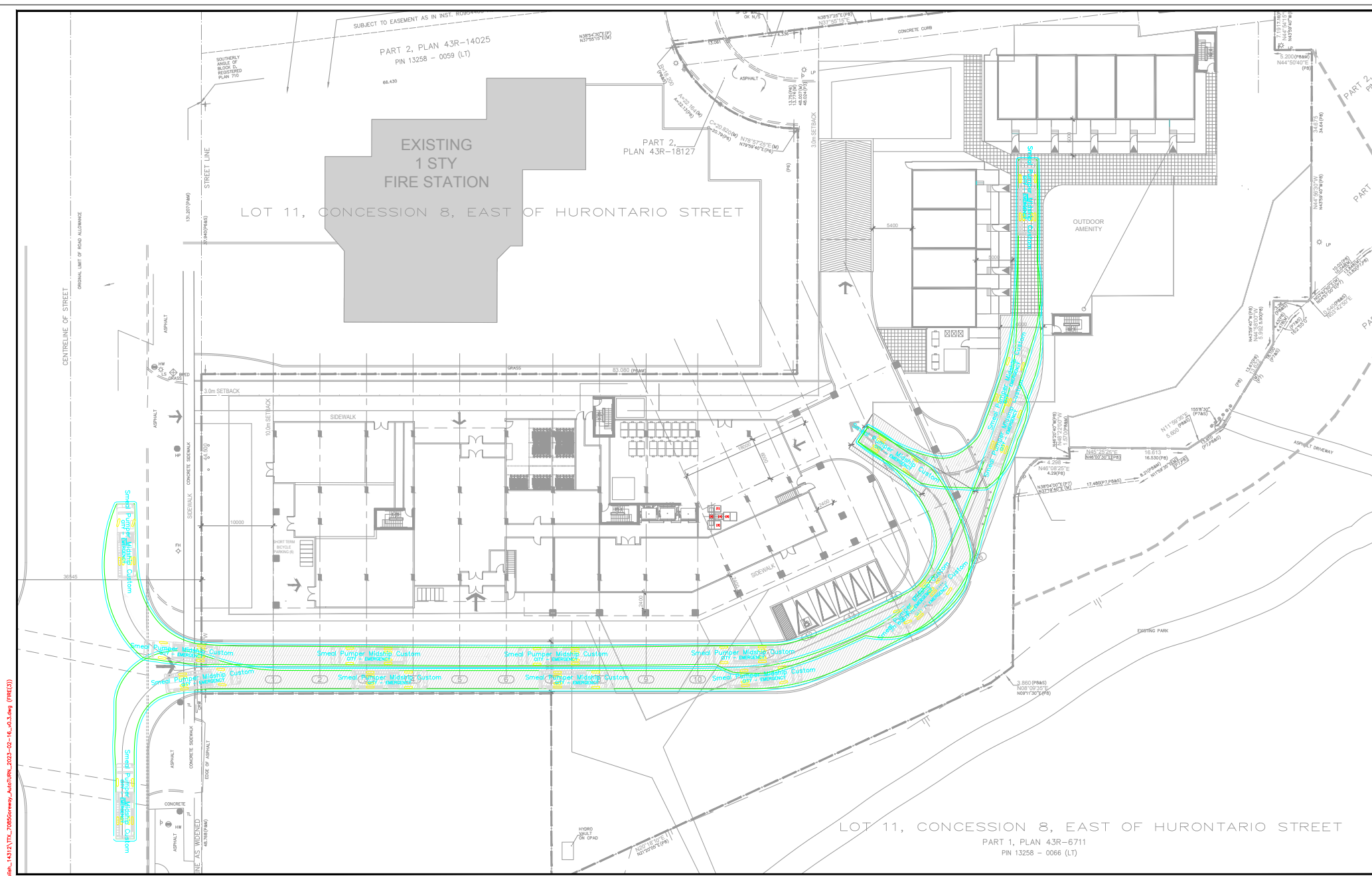
PROPOSED RESIDENTIAL DEVELOPMENT
7085 GOREWAY DRIVE, MISSISSAUGA

FRONT LOADING WASTE COLLECTION

SITE CIRCULATION

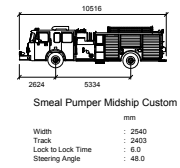
| | |
|---------------------|------------------------|
| DRAWN BY: I.D. | DATE: March 2, 2023 |
| DESIGNED BY: - | SCALE: 1:700 |
| CHECKED BY: A.G. | |
| APPROVED BY: - | |





C:\Users\Van.dender\AppData\Local\Temp\VF\p\p\p_14312\TY_7085Goreway_Auto\DRN_2023-02-16_00.00.dwg (PRE(0))

| No. | REVISION | DATE |
|-----|--|------------|
| 1 | VEHICLE SWEEP PATH ANALYSIS | 2021/11/23 |
| 2 | VEHICLE SWEEP PATH ANALYSIS SECOND DRAFT | 2022/03/16 |
| 3 | VEHICLE SWEEP PATH ANALYSIS THIRD DRAFT | 2022/06/07 |
| 4 | VEHICLE SWEEP PATH ANALYSIS FOURTH DRAFT | 2023/02/16 |



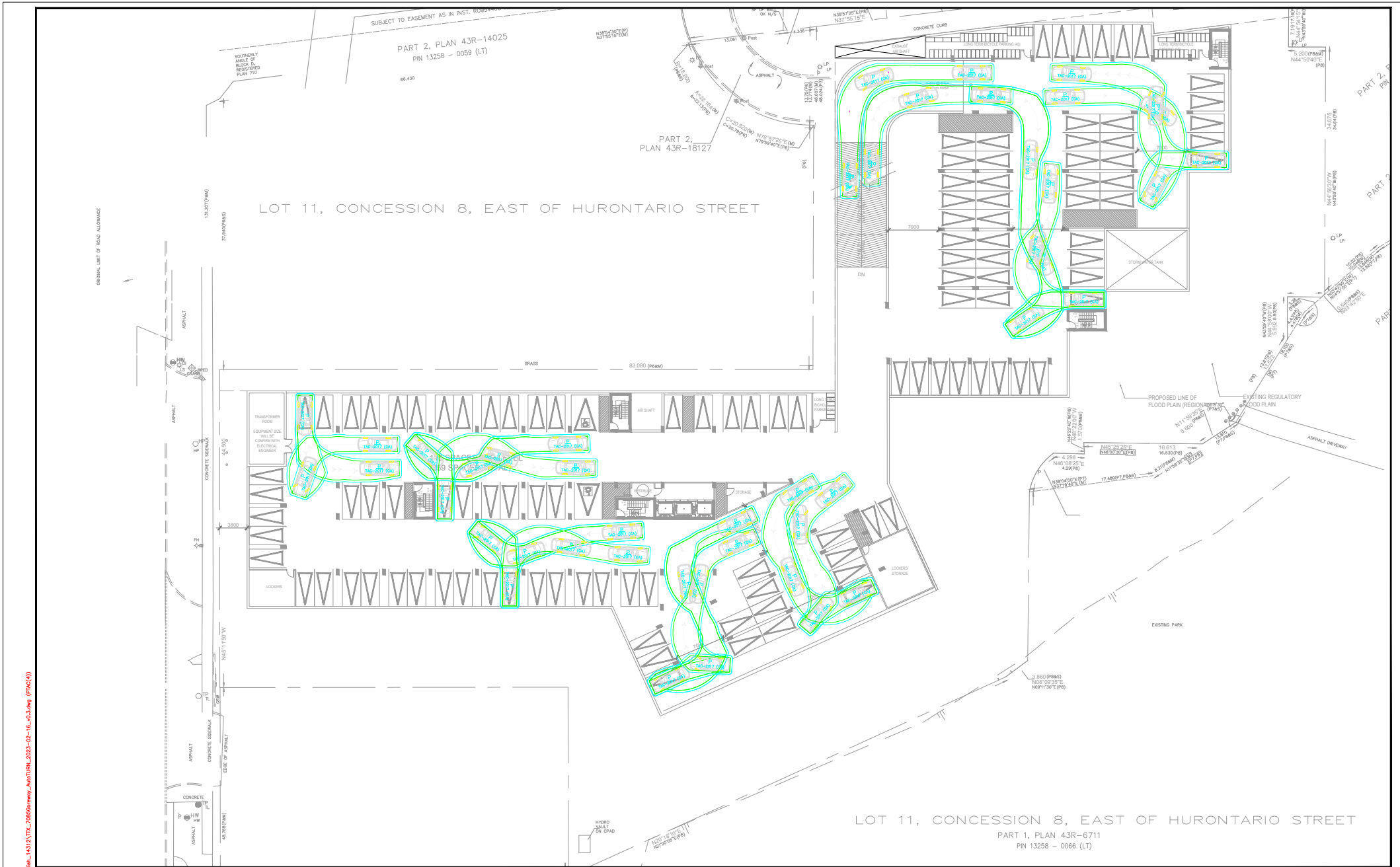
PROPOSED RESIDENTIAL DEVELOPMENT
7085 GOREWAY DRIVE, MISSISSAUGA

FIRE ENGINE
FIRE ROUTE CIRCULATION

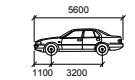
| | |
|--------------|------|
| DRAWN BY: | I.D. |
| DESIGNED BY: | - |
| CHECKED BY: | A.G. |
| APPROVED BY: | - |

| | |
|--------|---------------|
| DATE: | March 2, 2023 |
| SCALE: | 1:700 |

DRAWING No.
3



| No. | REVISION | DATE |
|-----|-----------------------------|------------|
| 1 | VEHICLE SWEEP PATH ANALYSIS | 2023/02/16 |
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| | | |
| | | |



P

mm

Width : 2000

Track : 2000

Lock to Lock Time : 6.0

Steering Angle : 35.9

PROPOSED RESIDENTIAL DEVELOPMENT
7085 GOREWAY DRIVE, MISSISSAUGA

PASSENGER CAR P-TAC, P1 & P2

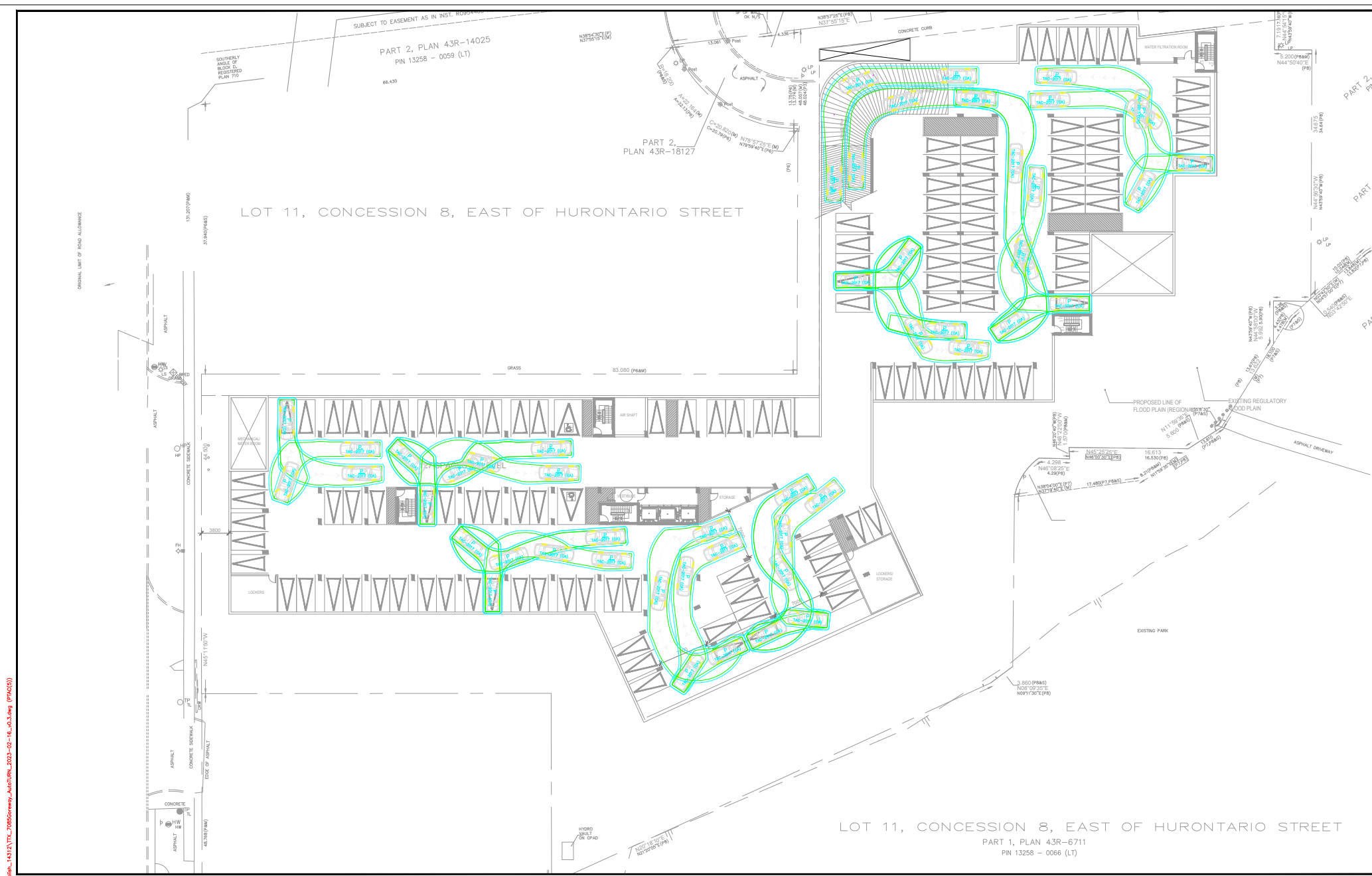
UNDERGROUND PARKING CIRCULATION

| | |
|---------------------|------------------------|
| DRAWN BY: I.D. | DATE: March 2, 2023 |
| DESIGNED BY: - | SCALE: 1:700 |
| CHECKED BY: A.G. | |
| APPROVED BY: - | |



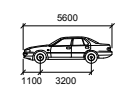
DRAWING No.
4

C:\Users\Van.dersch\AppData\Local\Temp\VF\p\p\p_14312\TT_C_7085Goreway_Auto\DRN_2023-02-16_00.3.dwg (P1)(C4)



C:\Users\Van.dersel\AppData\Local\Temp\AutoCAD_2023-02-16_00.3.dwg (P1AC10)

| No. | REVISION | DATE |
|-----|-----------------------------|------------|
| 1 | VEHICLE SWEEP PATH ANALYSIS | 2023/02/16 |
| | | |
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| | | |
| | | |



P
 Width : 1100 mm
 Track : 3200 mm
 Lock to Lock Time : 6.0
 Steering Angle : 35.9

PROPOSED RESIDENTIAL DEVELOPMENT
 7085 GOREWAY DRIVE, MISSISSAUGA

PASSENGER CAR P-TAC, P3

UNDERGROUND PARKING CIRCULATION

| | |
|--------------|------|
| DRAWN BY: | I.D. |
| DESIGNED BY: | - |
| CHECKED BY: | A.G. |
| APPROVED BY: | - |

| | |
|--------|---------------|
| DATE: | March 2, 2023 |
| SCALE: | 1:700 |

DRAWING No. 5