# Dorchester Road at Oldfield Road Residential Development

Traffic Impact Study

Final

**August 9, 2024**

Prepared for:
1070146 ON Ltd.

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## Traffic Impact Study

## Final

1070146 ON Ltd.

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**RVA 226650**

**August 9, 2024**

# Dorchester Road and Oldfield Road
# Residential Development
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# 1.0 Introduction

## 1.1 Study Objective

R.V. Anderson Associates Inc. (RVA) was retained by 1070146 ON Ltd. to complete a Traffic Impact Study (TIS) for a proposed residential development located in the southwest corner of Dorchester Road and Oldfield Road intersection in the City of Niagara Falls, Ontario. The residential development is expected to be built in a single phase, with an anticipated opening year of 2026.

## 1.2 Site Location

The proposed residential development is to be situated at the southwest corner of Dorchester Road and Oldfield Road intersection, which is a parcel of land bounded by Dorchester Road to the north and west and Oldfield Road to the east. There are existing residential land uses to the north and east, as well as commercial and light industrial uses to the north and west of the site along Dorchester Road.

The surrounding road network is comprised primarily of arterial and collector roads, with connections to various higher order roads such as McLeod Road to the north and the Queen Elizabeth Way Highway to the northeast.

The development site location and the surrounding area roadway network is shown in **Figure 1.1**.

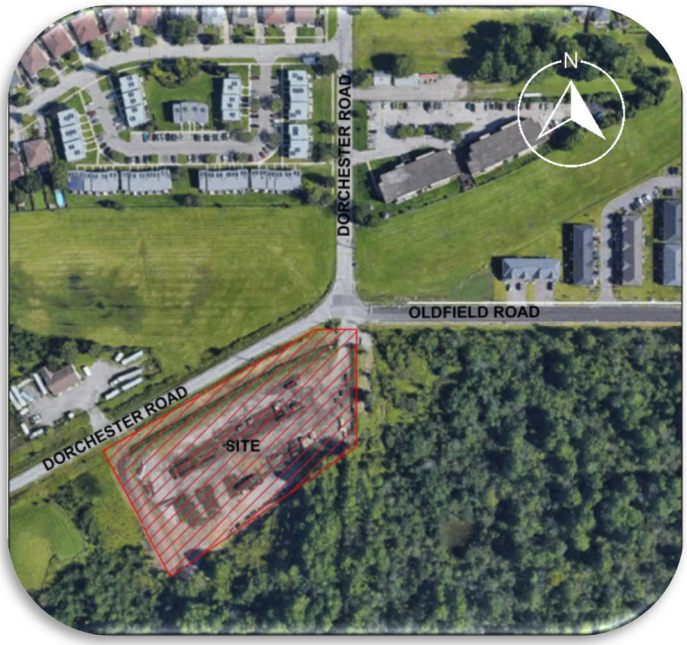



Figure 1.1: Site Location

## 1.3 Study Area

Based on consultation with City staff, the study intersections considered for traffic impact analysis are listed below:

- Dorchester Road and Oldfield Road; and
- Dorchester Road and the proposed site accesses.

## 1.4 Transit

There are two City of Niagara Falls Transit Service routes which operate along the study area roadways adjacent the proposed site as follows:

- **Route 103:** is a daytime route that operates Monday to Saturday from 6:00 a.m. to 10:00 a.m. and 3:00 p.m. to 7:00 p.m. (every 60 minutes), connecting the Main Street Hub to Canadian Drive Hub. Route 103 operates along both Dorchester Road and Oldfield Road with the closest stop located approximately 150 metres north of the subject site at Dorchester Road and Jubilee Drive.
- **Route 203:** is an evening route that operates Monday to Saturday from 7:00PM to 11:50PM (every 30 minutes), connecting the Main Street hub to Canadian Drive Hub. Route 203 operates along both Dorchester Road and Oldfield Road with the closest stop located approximately 150 metres north of the subject site at Dorchester Road and Jubilee Drive.

Both transit routes are presented in **Figure 1.2.**

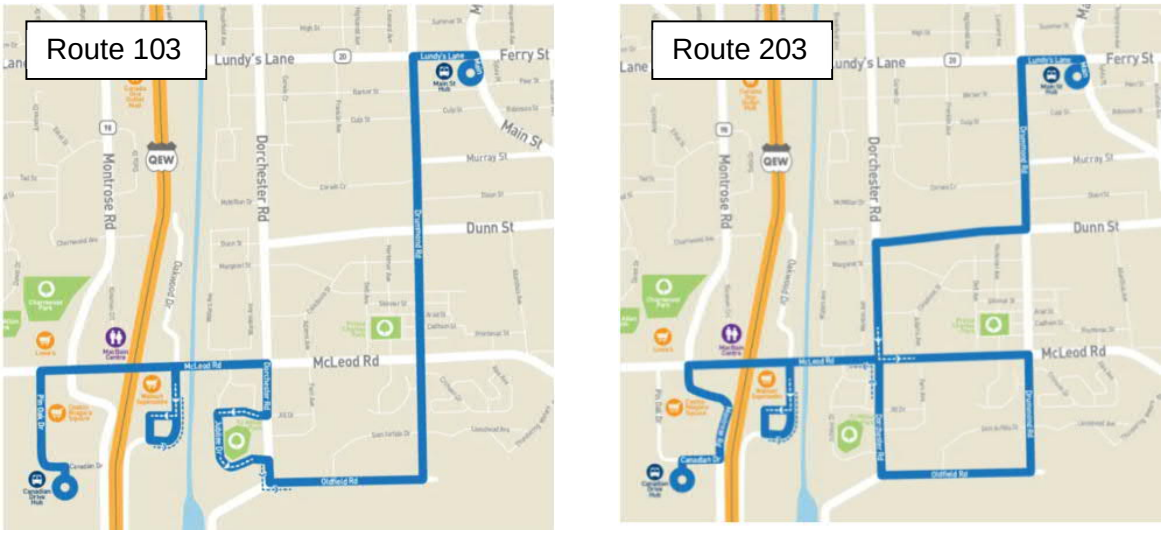



Figure 1.2: Niagara Falls Transit - Routes 103 & 203

## 1.5 Active Transportation

### 1.5.1 Pedestrian Facilities

In the immediate vicinity of the site, there are no sidewalks provided on Dorchester Road. Sidewalks are provided along Dorchester Road on the west side of the road, approximately 70 metres north from the site. Sidewalks are provided along Oldfield Road on the north side only, starting approximately 40 metres east of the site.

### 1.5.2 Cycling Facilities

At the time of this study, there are conventional on-road bike lanes on both sides of Oldfield Road, east of Dorchester Road.

## 1.6 Study Methodology

### 1.6.1 Intersection Operation Analysis

#### 1.6.1.1 Signalized & Unsignalized Intersections

The industry standard Synchro macroscopic traffic analysis software was utilized to analyse the study intersections. Key performance measures such as Level of Service (LOS), volume-to-capacity ratio (v/c ratio), and 95$^{th}$ percentile queuing was reported, and are defined below:

- Average vehicle control delay is used to characterize LOS for the entire intersection, an approach, or movement. Delay quantifies the variations in travel time and is also a surrogate measure of driver discomfort and fuel consumption.
- V/c ratio quantifies the degree to which the capacity of each signal phase is utilized by a defined lane group.
- 95$^{th}$ percentile queue is the queue length which is expected to be exceeded only 5% of the time; it is common practice to identify preferred storage length requirements for auxiliary turn lanes at signalized intersections based on estimated peak hour 95$^{th}$ percentile queueing.

Table 1.1 identifies the control delay thresholds (seconds of delay per vehicle) for each LOS based on Highway Capacity Manual (HCM 2000) methodology.

Table 1.1 – Characteristics of Level of Service at Intersections

| Level of Service (LOS) | Control Delay (seconds / vehicle) | |
|---|---|---|
| | Signalized Intersection | Unsignalized Intersection |
| A | ≤ 10 | ≤ 10 |
| B | > 10 to 20 | > 10 to 15 |
| C | > 20 to 35 | > 15 to 25 |
| D | > 35 to 55 | > 25 to 35 |
| E | > 55 to 80 | > 35 to 50 |
| F | > 80 | > 50 |

#### 1.6.1.2 Roundabouts

All roundabout analysis was completed using Arcady Junctions 10 software developed by TRL.

### 1.6.2 City of Niagara Falls TIS Guidelines

Based on the *City of Niagara Falls Guidelines for Transportation Impact Studies, November 2011*, the following additional software analysis parameters were utilized as part of this study:

Synchro

- Saturation flow rate of 1750 was used for Traffic Signal Control analysis.

The following intersection capacity and level of service thresholds were followed:

Signalized Intersections

- V/c ratios for overall operations, through movements, or shared through/turning movements increased to 0.85 or above;
- V/c ratios for exclusive left turn or right turn movements increased to 0.95 or above;
- 95$^{th}$ percentile queues for an individual movement are projected to exceed available turning lane storage.

Unsignalized Intersections

- Level of Service (LOS) based on average delay per vehicle, on individual movements exceeds LOS “E”.
- The estimated 95$^{th}$ percentile queue length for an individual movement exceeds the available queue storage.

# 2.0 EXISTING CONDITIONS

## 2.1 Existing Road Network

The study area road network primarily consists of arterial corridors, with roadways under the jurisdiction of the City of Niagara Falls.

Dorchester Road is an east-west and north-south arterial and collector road, respectively, under the jurisdiction of the City of Niagara Falls. Dorchester Road meets Oldfield Road to form a Y-intersection. In the vicinity of the proposed development, the corridor consists of a two-lane cross-section with a posted speed of 50km/hr north of the site and 60km/hr west of the site.

The north portion of the road is classified as a collector road and consists of pedestrian facilities staggered on both sides throughout. The road is generally surrounded by residential land uses, with several connections to residential driveways and local road networks throughout.

The west portion of the road is classified as an arterial road and is generally surrounded by commercial and light industrial uses, with driveway connections to the adjacent uses. This portion of the road has an unpaved shoulder, thus it does not consist of any pedestrian or cycling facilities.

Oldfield Road is an east-west arterial road that is under the jurisdiction of the City of Niagara Falls within the study area. The corridor consists of a two-lane cross-section posted at 50km/hr, with pedestrian facilities on the north side of the road only and on-road cycling facilities on both sides of the road. The road is generally surrounded by residential land uses, with several connections to residential driveways and local road networks throughout.

## 2.2 Existing 2022 Traffic Data

Currently the City is undertaking a Municipal Class Environmental Assessment (MCEA) to identify needs and opportunities and develop preliminary design improvements for the intersection of Dorchester Road and Oldfield Road. As part of this study a Transportation Assessment Report dated January 2022 was prepared and provided to RVA by the City. In this study, existing turning movement count (TMC) data for the intersection was collected on September 10$^{th}$, 2019. As agreed, upon with the City at the outset of this study, this count was adopted for use in establishing the existing traffic volumes. As this count was conducted in 2019, a 1% per annum growth rate was used to establish the existing 2022 traffic volumes.

An analysis of the data determined that the weekday a.m. peak hour occurred from 8:00 a.m. to 9:00 a.m. and the weekday p.m. peak hour occurred between 4:00 p.m. to 5:00 p.m.

The existing (2022) intersection volumes for the weekday a.m. peak hour and weekday p.m. peak hours are presented in Figure 2.1. The raw traffic count taken from the EA Transportation report is provided in Appendix A.

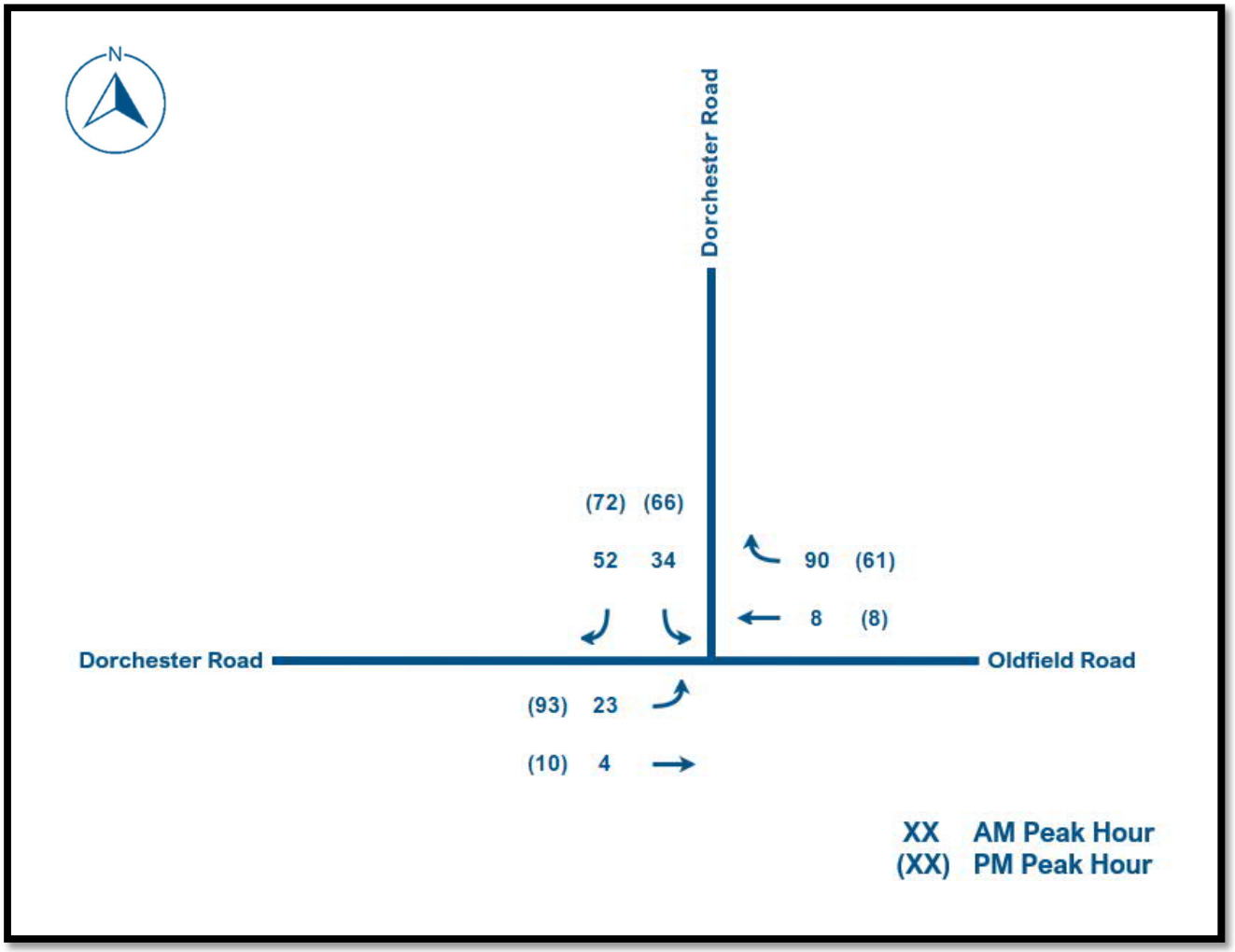



Figure 2.1: Existing (2022) Traffic Volumes

## 2.3 Existing Intersection Operation Analysis

Table 1.2 presents the results of the intersection operation analysis completed for the Dorchester Road and Oldfield Road intersection under existing (2022) traffic conditions. The Synchro HCM analysis reports can be found in Appendix B.

Table 1.2 – Existing (2022) Intersection Operational Analysis Results

| Scenario | Move. | Weekday AM Peak Hour | | | Weekday PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | V/C | LOS | 95th% Queue (M) | V/C | LOS | 95th% Queue (M) |
| **AWSC – Existing 2022** | EBLTR | 0.03 | A | <1 veh | 0.14 | A | <1 veh |
| | WBLTR | 0.11 | A | <1 veh | 0.08 | A | <1 veh |
| | SBLTR | 0.10 | A | <1 veh | 0.17 | A | <1 veh |
| | **Overall** | **-** | **A** | **-** | **-** | **A** | **-** |

As presented in Table 1.2, all the intersection movements at Dorchester Road and Oldfield Road are currently operating at an LOS "A" with substantial reserve capacity, nominal delay, and no queueing concerns.

# 3.0 FUTURE BACKGROUND TRAFFIC CONDITIONS

## 3.1 Study Horizon Years

As per the *City of Niagara Falls for Transportation Impact Studies*, the analysis adopts future planning horizons of 2026 for expected full build-out of the development, with 2031 for five (5) years post full build-out.

## 3.2 Study Area Transportation Network Improvements

As mentioned previously, the City of Niagara Falls is currently in the process of completing an MCEA for the intersection of Dorchester Road and Oldfield Road. The study examined operations of the intersection for two planning horizons (2031 and 2041) under three different traffic control options including traffic signal control and roundabout control in addition to the existing All Way Stop Control (AWSC). At the time of this study the preferred intersection control option has not been chosen. Therefore, for the purpose of this study we have evaluated three set of analyses assuming AWSC, traffic signals and roundabout in the future traffic conditions.

## 3.3 Future Background Development Traffic

As per consultation with City staff, the Riverfront Community Phase 1 development, located south of Oldfield Road, consists of 879 residential units, 450 hotel rooms, 238 rooms in continuing care/retirement facility and 280,000 $ft^2$ of commercial space. This development is anticipated to be complete by 2031. As a result, the forecasted site generated traffic for this development has been added to the study area intersections for 2031 horizon year analysis in this study. The site traffic volumes associated with this development can be found in Appendix C.

## 3.4 Future Background Corridor Growth

As confirmed with City staff, a 1% per annum growth rate has been applied to all intersection turning movements.

## 3.5 Future Background (2026 & 2031) Traffic Volumes

The future background 2026 and 2031 traffic volumes were established by combining the aforementioned background development traffic with the background corridor growth volumes. The resulting 2026 and 2031 future background traffic volumes for the weekday a.m. peak hour and weekday p.m. peak hour are displayed in Figures 3.1 and 3.2, respectively.

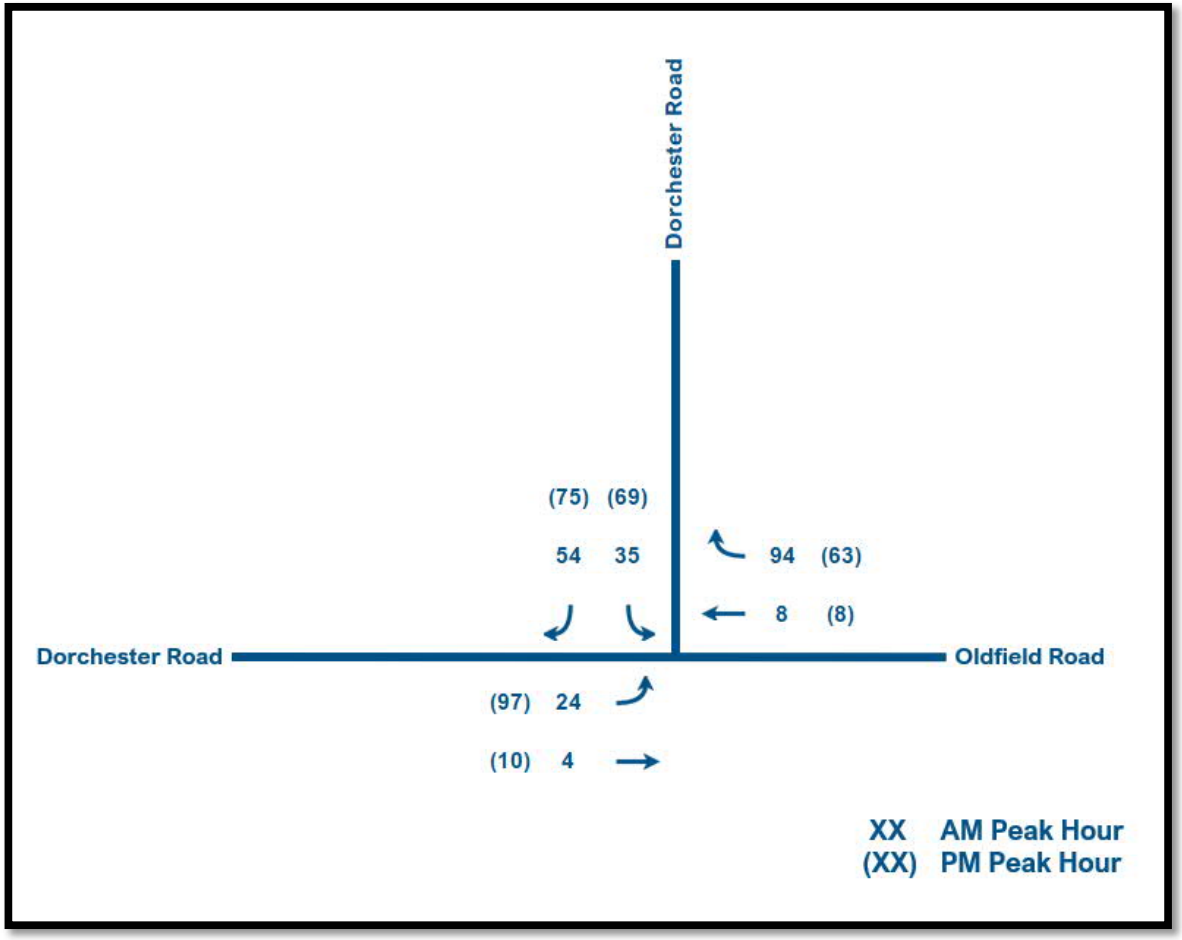



Figure 3.1: Future (2026) Background Traffic Volumes

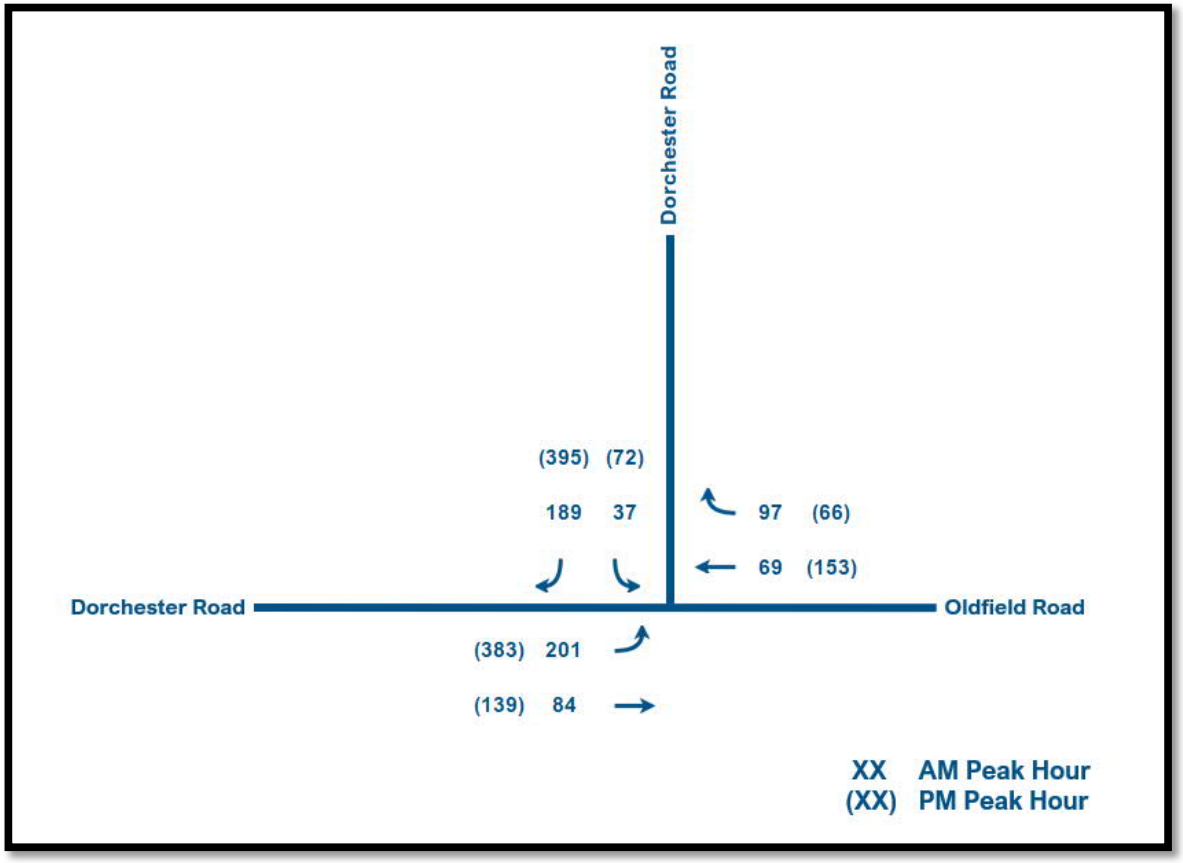



Figure 3.2: Future (2031) Background Traffic Volumes

## 3.6 Future Background (2026 & 2031) Intersection Operation Analysis

Table 1.3 presents the results of the intersection operation analysis completed for the Dorchester Road and Oldfield Road intersection under future 2026 and 2031 traffic conditions. In addition, a left-turn lane was analyzed for the eastbound, westbound, and southbound approaches. The analysis was completed under the existing All-Way Stop Control plus the proposed Traffic Signal Control and Roundabout control.

Under the Traffic Signal Control option analyzed, the signal timing parameters used in the MCEA Transportation report were utilized as a base and further optimized where required. In addition, dedicated left turn lanes were introduced for all approaches. For the roundabout analysis conducted, the default roundabout analysis parameters within Arcady software were utilized.

All Synchro HCM analysis reports and Arcady roundabout reports can be found in Appendix C and D.

Table 1.3: Future Background (2026 & 2031) Operational Analysis Results

| Scenario | Move. | Weekday AM Peak Hour | | | Weekday PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | V/C | LOS | 95th% Queue (M) | V/C | LOS | 95th% Queue (M) |
| **AWSC – Future Background 2026** | EBLTR | 0.04 | A | <1 veh | 0.14 | A | <1 veh |
| | WBLTR | 0.11 | A | <1 veh | 0.08 | A | <1 veh |
| | SBLTR | 0.10 | A | <1 veh | 0.18 | A | <1 veh |
| | **Overall** | **-** | **A** | **-** | **-** | **A** | **-** |
| **Signal – Future Background 2026** | EBL | 0.21 | B | <1 veh | 0.65 | C | 18 |
| | EBTR | 0.03 | B | <1 veh | 0.05 | B | <1 veh |
| | WBL | - | - | - | - | - | - |
| | WBTR | 0.13 | B | 10 | 0.09 | B | 8 |
| | SBL | 0.05 | A | <1 veh | 0.09 | A | 9 |
| | SBTR | 0.04 | A | <1 veh | 0.06 | A | <1 veh |
| | NBLTR | - | - | - | - | - | - |
| | **Overall** | **0.07** | **B** | **-** | **0.19** | **B** | **-** |
| **Roundabout – Future Background 2026** | EBLTR | 0.04 | A | <1 veh | 0.16 | A | <1 veh |
| | WBLTR | 0.15 | A | <1 veh | 0.11 | A | <1 veh |
| | SBLTR | 0.13 | A | <1 veh | 0.21 | A | <1 veh |
| | **Overall** | **-** | **A** | **-** | **-** | **A** | **-** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **AWSC – Future Background 2031** | EBLTR | 0.42 | B | <1 veh | 0.97 | F | 14 |
| | WBLTR | 0.22 | A | <1 veh | 0.42 | B | <1 veh |
| | SBLTR | 0.31 | A | <1 veh | 0.82 | D | 9 |
| | **Overall** | **-** | **B** | **-** | **-** | **E** | **-** |
| **Signals – Future Background 2031** | EBL | 0.76 | C | 41 | 1.00 | E | 100 |
| | EBTR | 0.21 | B | 15 | 0.22 | B | 22 |
| | WBL | - | - | - | - | - | - |
| | WBTR | 0.23 | B | 16 | 0.32 | B | 30 |
| | SBL | 0.07 | A | 8 | 0.15 | B | 12 |
| | SBTR | 0.15 | A | <1 veh | 0.30 | B | <1 veh |
| | NBLTR | - | - | - | - | - | - |
| | **Overall** | **0.39** | **B** | **-** | **0.65** | **C** | **-** |
| **Roundabout – Future Background 2031** | EBLTR | 0.43 | A | <1 veh | 0.80 | C | 26 |
| | WBLTR | 0.28 | A | <1 veh | 0.42 | B | <1 veh |
| | SBLTR | 0.35 | A | <1veh | 0.75 | C | 20 |
| | **Overall** | **-** | **A** | **-** | **-** | **C** | **-** |

*EBLTR = eastbound shared with left and right lane, EBL = eastbound left turn lane*

### 3.6.1 All Way Stop Control (AWSC) Analysis:

As presented in Table 1.3, with the addition of background corridor growth in the 2026 horizon year, all movements are expected to operate at an LOS "A" under the conditions of an All Way Stop Control. However, with the addition of site generated traffic from the adjacent developments the eastbound approach will experience over capacity and operate at an LOS "F", as well as increases to the v/c ratios, and queueing for the Westbound and Southbound movements. The intersection will operate and LOS "E" during the 2031 P.M. Peak Hour.

### 3.6.2 Signal Control Analysis:

As presented in Table 1.3, in the horizon year 2026, the intersection will remain operating at an LOS "B", with marginal increases to the v/c ratios, and queueing for all approaches. In the horizon year 2031, the eastbound approach in both the A.M. and P.M. peak hours will experience an increase to the v/c ratios, and queueing, operating an LOS "C" in the P.M. Peak Hour. The eastbound left-turn lane operates at an LOS "E" without a protective/permissive phase.

### 3.6.3 Roundabout Analysis:

As presented in Table 1.3, in the horizon year 2026, the intersection will remain operating at an LOS "A" for the both the A.M. and P.M. peak hours. In the horizon year 2031, the roundabout control operates at an LOS "A" for the A.M. peak hours and an LOS "C" for the P.M. peak hours.

# 4.0 SITE GENERATED TRAFFIC

## 4.1 Site Plan Layout

The proposed site plan, as shown in **Figure 4.1**, prepared by Upper Canada Consultants, and dated June 2022, consists of the following key features relevant to this study:

- Two six-storey residential buildings (54 units each), totalling 108 residential units;
- Two proposed driveway accesses and a surface parking lot containing 164 parking spaces.

There are two proposed driveway accesses for the proposed development. The east site access will be located at the intersection of Dorchester Road and Oldfield Road, to form a fourth leg of the existing intersection. The west site access will be approximately 95 metres west of the intersection of Dorchester Road and Oldfield Road along Dorchester Road. Both the east and west accesses will be 6.3 metres wide.

## 4.2 Access Management – Assessment of Proposed Site Accesses

The development build-out will result in two new accesses along Dorchester Road. The east access will be situated directly adjacent to the intersection of Dorchester Road and Oldfield Road and create the fourth leg of the intersection. This access will be approximately 6.3 metres wide. The west access will be located west of the existing intersection and will be approximately 6.3 metres wide.

The west access is located approximately 92 metres from the east access at the intersection of Dorchester Road and Oldfield Road (from centre of west access to centre of east access). Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads indicates that the minimum distance an access can be located from an intersection is 25 metres from a stop sign control intersection and 70 metres from a signal control intersection. Thus, the proposed east access falls within the recommended limits set by TAC.

Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads limits a maximum of 3 accesses per frontage of 51 to 130 meters. Given the proposed site plan indicates a lot frontage of 122 metres with two (2) accesses proposed along Dorchester Road, the proposed number of accesses falls within the recommended limits set by TAC.

Furthermore, based on the capacity analysis results for a signal control at the subject intersection, along Dorchester Road (eastbound) during the P.M. peak hour in the ultimate horizon year (2031), the eastbound 95$^{th}$ percentile queue length for Dorchester Road/Oldfield Road will extend beyond the west site access.

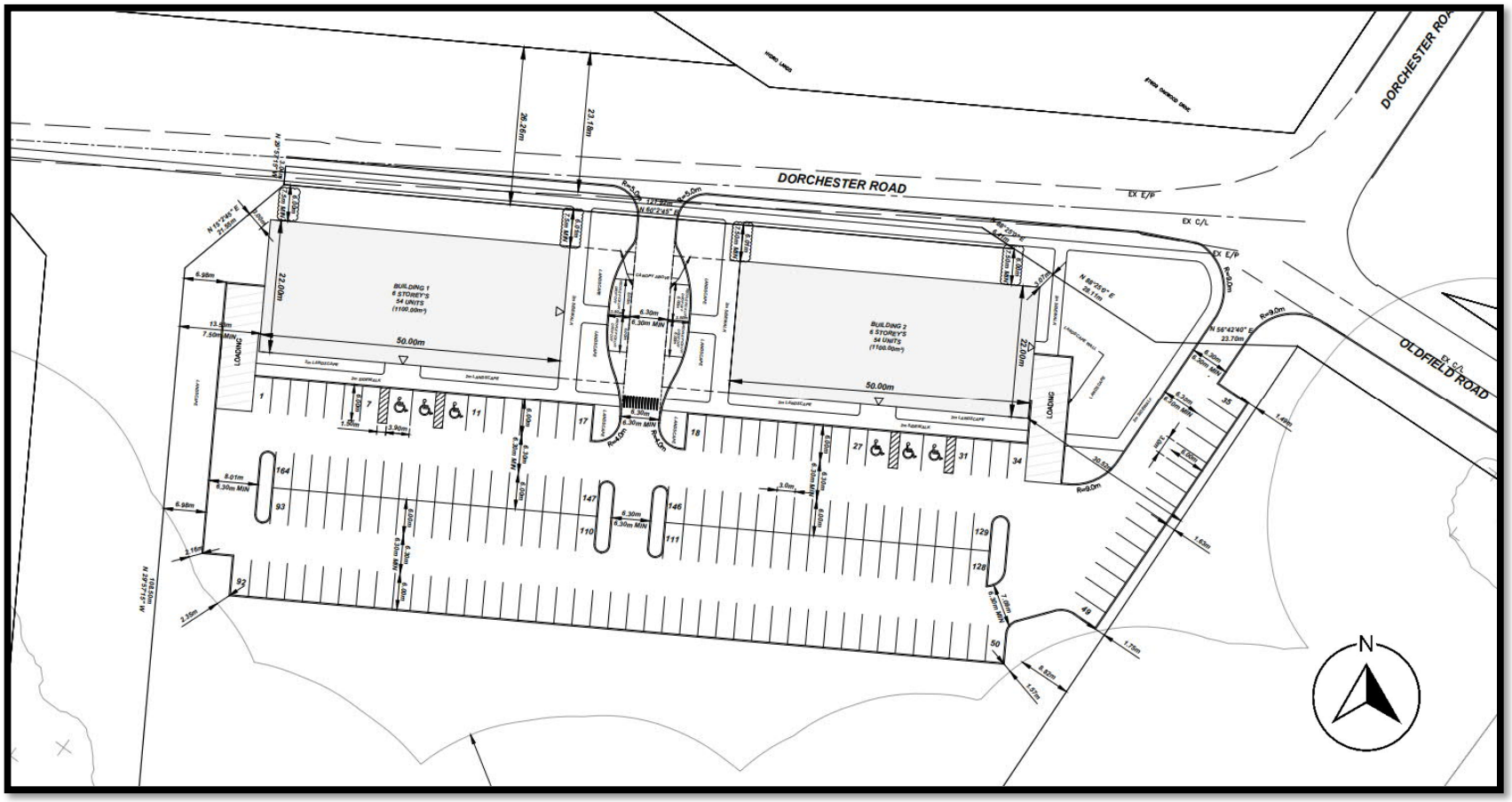



Figure 4.1: Proposed Development Site Plan

## 4.3 Site Trip Generation

Site generated traffic for the proposed residential development during peak periods of the adjacent street traffic were estimated using the Institute of Transportation Engineer's (ITE)*Trip Generation Manual (11th edition)* methodology, referencing ITE Land Use Codes (LUC) for Multifamily Housing Mid-Rise (LUC 221).

As presented in Table 1.4, the estimated vehicular trip generation for the subject site is approximately 36 total two-way trips (8 inbound and 28 outbound) during the weekday a.m. peak hour, and 42 total two-way trips (26 inbound and 16 outbound) during the weekday p.m. peak hour.

Table 1.4: Trip Generation

| Land Use Code (LUC) | Peak Hour | Units | Trip Equation | Total Trips | Inbound % / Outbound % | Inbound / Outbound |
|---|---|---|---|---|---|---|
| **Multifamily Housing** | Weekday a.m. | 108 | Ln(Trips) = 0.44 Ln(Units) – 11.61 | 36 | 23 / 77 | 8 /28 |
| **Mid-Rise (LUC 221)** | Weekday p.m. | | Ln(Trips) = 0.39 Ln(Units) + 0.34 | 42 | 61 / 39 | 26 / 16 |

## 4.4 Site Trip Distribution

Given the residential nature of the development, it can be reasonably assumed that the majority of the trips generated by the site during the weekday a.m. and p.m. peak hours will be commuter trips. Therefore, 2016 Transportation Tomorrow Survey (TTS) commuter data was reviewed to estimate the distribution of the site generated traffic to the surrounding road network.

Table 1.5: Trip Distribution Assumptions

| Direction | Direction Percentages |
|---|---|
| Dorchester Road (West) | 3% |
| Dorchester Road (East) | 97% |
| **Total** | 100% |

Table 1.5 outlines the estimated trip distribution assumptions for the site generated trips, which is based on the analyzed TTS data provided in Appendix E.

## 4.5 Site Trip Assignment

The site generated traffic has been assigned to the study area intersections based on the trip generation estimates and the trip distribution assumptions discussed in the previous sections. For the purpose of this study, a 70/30 split was utilized for assigning trip to the two proposed accesses, meaning 70% of vehicles will use the east access (at the intersection of Dorchester Road and Oldfield Road) and 30% will use the west access. The resulting site trip assignment for each block is shown in Figure 5.1.

# 5.0 FUTURE TOTAL 2026 & 2031 TRAFFIC CONDITIONS

The future total intersection volumes for each future horizon year were projected by combining the estimated site generated traffic from the subject development with the future background traffic projections for each horizon year. The resulting 2026 and 2031 future total intersection volumes for the weekday a.m. and p.m. peak hours are shown in Figures 5.2 and 5.3, respectively.

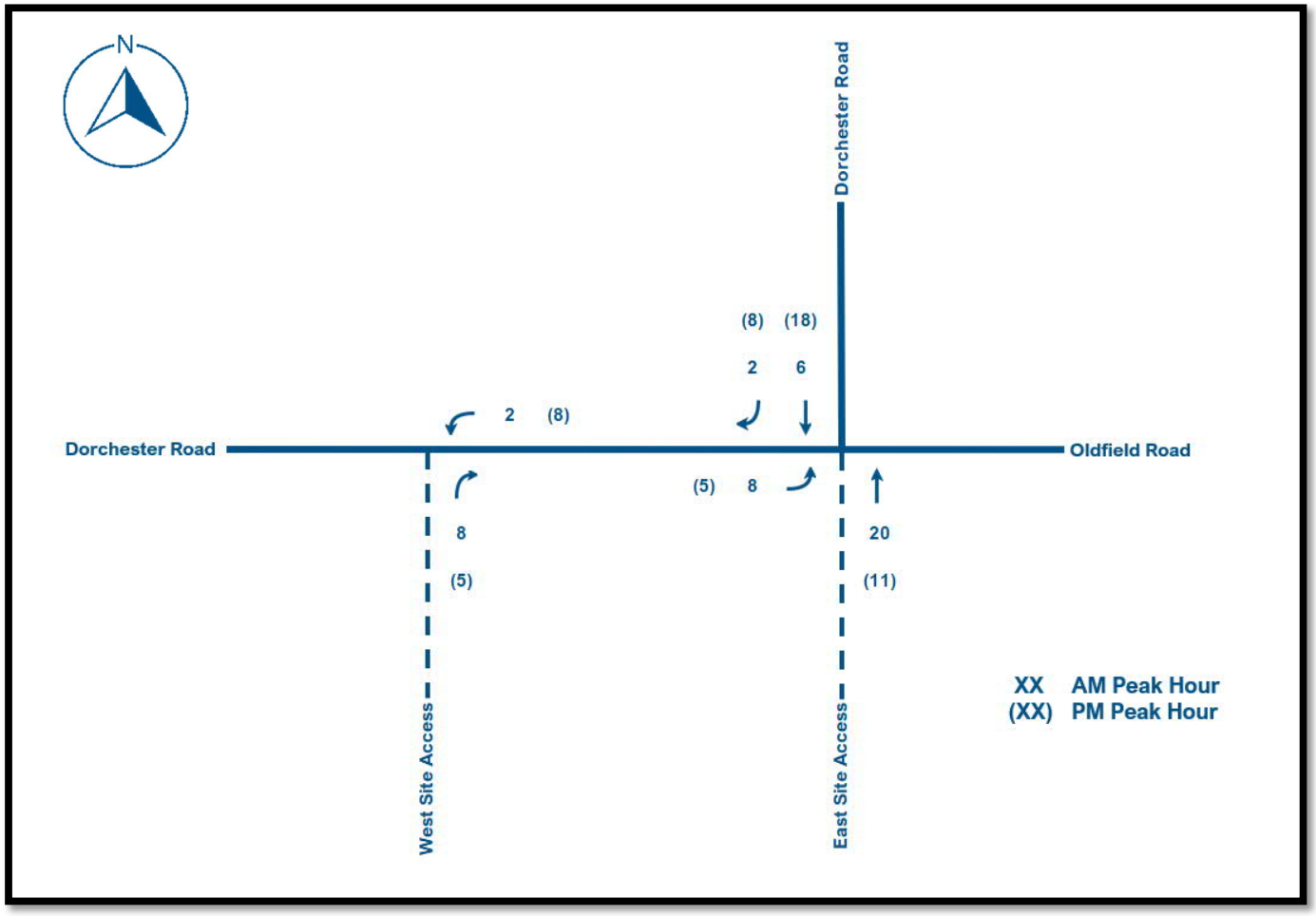



Figure 5.1: Site Trip Assignment

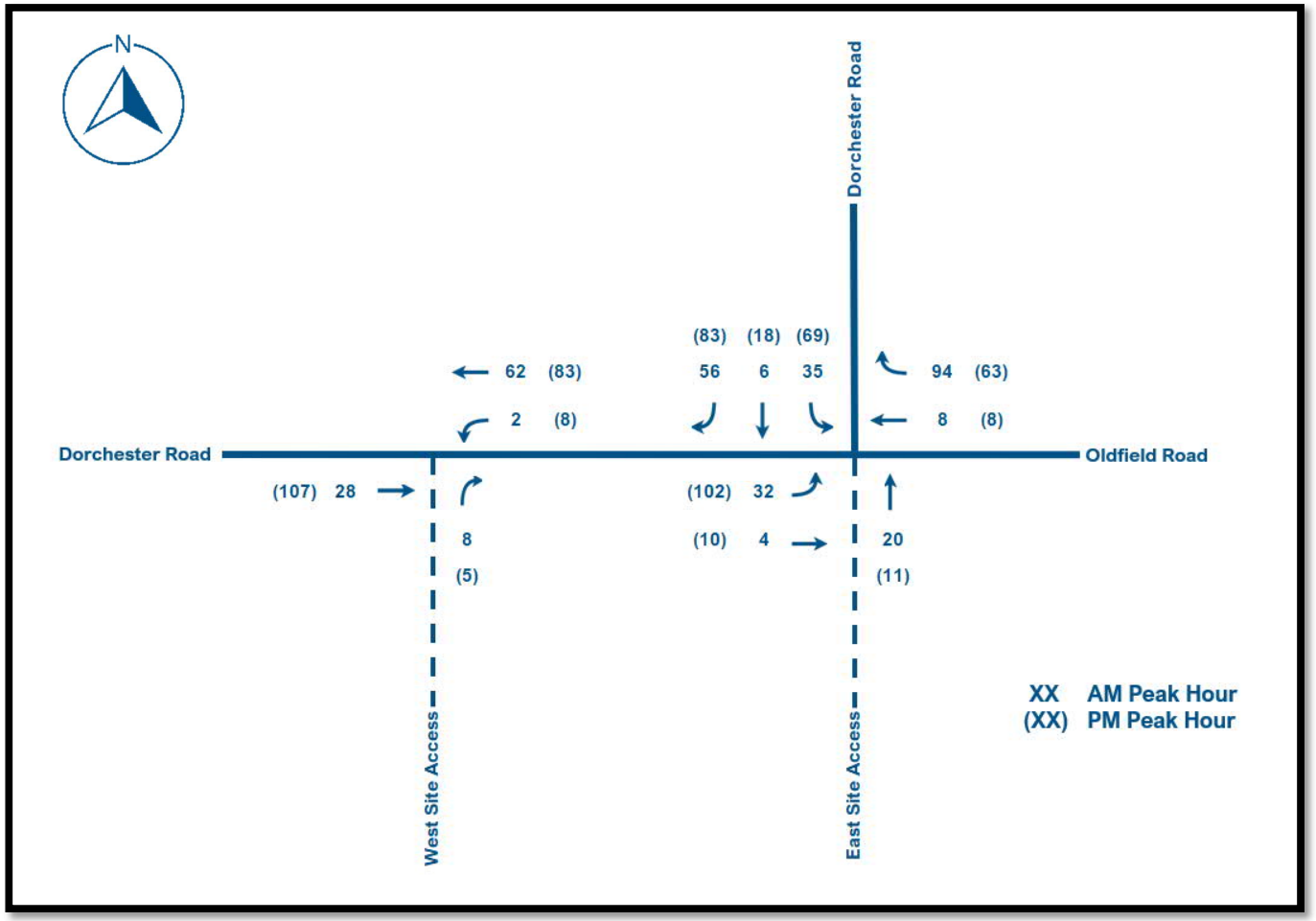



Figure 5.2: Future (2026) Total Traffic Volumes

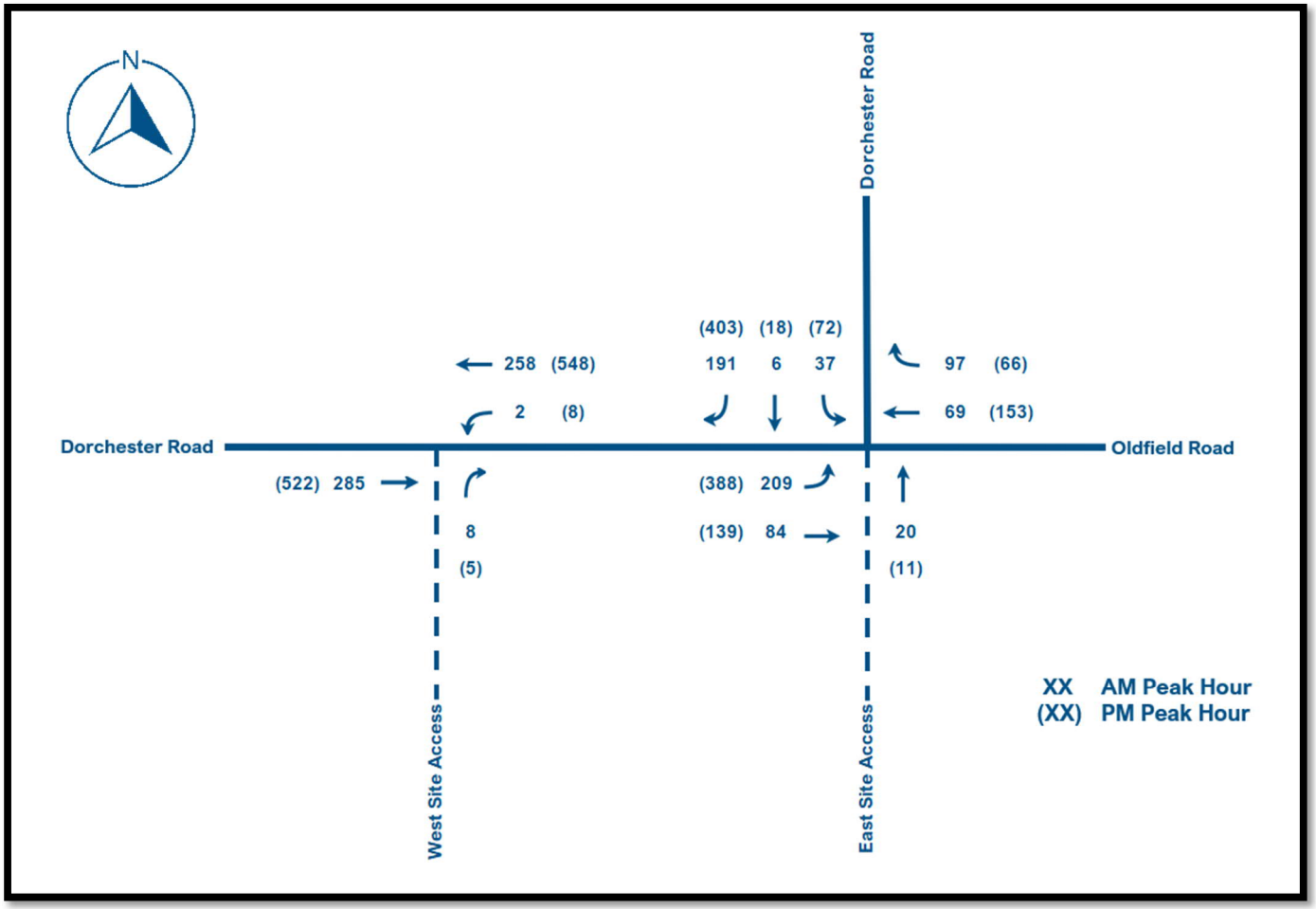



Figure 5.3: Future (2031) Total Traffic Volumes

## 5.1 Future Total (2026 & 2031) Intersection Operation Analysis

The following sections present the results of the intersection capacity analysis completed for the Dorchester Road and Oldfield Road intersection with the inclusion of the proposed East Site Access as the new south leg of the intersection, along with the proposed West Site Access with Dorchester Road. In addition, a left-turn lane was analyzed for the eastbound, westbound and southbound approaches, with a permissive/protective left-turn phase for the eastbound left-turn movement.

### 5.1.1 Dorchester Road and Oldfield Road

Table 1.6 presents the results of the intersection operational analysis completed for Dorchester Road and Oldfield Road under AWSC, Traffic Signal Control and Roundabout control for future total 2026 and 2031 traffic conditions. All Synchro HCM analysis reports and Arcady roundabout reports can be found in Appendix F and G.

Table 1.6: Future Total (2026 & 2031) Intersection Operational Analysis Results – Dorchester Rd. at Oldfield Rd.

| Scenario | Move. | Weekday AM Peak Hour | | | Weekday PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | V/C | LOS | 95th% Queue (M) | V/C | LOS | 95th% Queue (M) |
| **AWSC - Future Total 2026** | EBLTR | 0.04 | A | <1 veh | 0.15 | A | <1 veh |
| | WBLTR | 0.11 | A | <1 veh | 0.08 | A | <1 veh |
| | SBLTR | 0.11 | A | <1 veh | 0.21 | A | <1 veh |
| | NBLTR | 0.02 | A | <1 veh | 0.01 | A | <1 veh |
| | **Overall** | **-** | **A** | **-** | **-** | **A** | **-** |
| **Signal – Future Total 2026** | EBL | 0.26 | C | 8 | 0.54 | C | 19 |
| | EBTR | 0.02 | B | <1 veh | 0.04 | B | <1 veh |
| | WBL | - | - | - | - | - | - |
| | WBTR | 0.12 | B | 10 | 0.08 | B | 8 |
| | SBL | 0.05 | A | <1 veh | 0.10 | A | 9 |
| | SBTR | 0.05 | A | <1 veh | 0.08 | A | 1 |
| | NBLTR | 0.02 | A | <1 veh | 0.01 | A | <1 veh |
| | **Overall** | **0.09** | **B** | **-** | **0.20** | **B** | **-** |
| **Roundabout – Future Total 2026** | EBLTR | 0.05 | A | <1 veh | 0.17 | A | <1 veh |
| | WBLTR | 0.15 | A | <1 veh | 0.11 | A | <1 veh |
| | SBLTR | 0.14 | A | <1 veh | 0.25 | A | <1 veh |
| | NBLTR | 0.03 | A | <1 veh | 0.02 | A | <1 veh |
| | **Overall** | **-** | **A** | **-** | **-** | **A** | **-** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **AWSC – Future Total 2031** | EBLTR | 0.44 | B | <1 veh | 1.01 | F | 15 |
| | WBLTR | 0.23 | A | <1 veh | 0.44 | C | < 1 veh |
| | SBLTR | 0.33 | B | <1 veh | 0.89 | E | 11 |
| | NBLTR | 0.03 | A | <1 veh | 0.02 | B | < 1 veh |
| | **Overall** | **-** | **B** | **-** | **-** | **E** | **-** |
| **Signal – Future Total 2031** | EBL | 0.77 | C | 45 | 0.93 | D | 70 |
| | EBTR | 0.20 | B | 15 | 0.20 | A | 18 |
| | WBL | - | - | - | - | - | - |
| | WBTR | 0.22 | B | 16 | 0.58 | C | 38 |
| | SBL | 0.07 | A | 8 | 0.17 | B | 16 |
| | SBLTR | 0.16 | A | 12 | 0.34 | B | 21 |
| | NBLTR | 0.03 | A | <1 veh | 0.02 | B | <1 veh |
| | **Overall** | **0.41** | **B** | **-** | **0.72** | **C** | **-** |
| **Roundabout – Future Total 2031** | EBLTR | 0.44 | A | <1 veh | 0.82 | D | 29 |
| | WBLTR | 0.28 | A | <1 veh | 0.42 | B | <1 veh |
| | SBLTR | 0.36 | A | <1 veh | 0.80 | D | 26 |
| | NBLTR | 0.04 | A | <1 veh | 0.03 | A | <1 veh |
| | **Overall** | **-** | **A** | **-** | **-** | **C** | **-** |

### 6.1.1 All Way Stop Control (AWSC) Analysis:

As presented in Table 1.6, in the 2026 horizon year, all movements are expected to operate at an LOS “A” under the conditions of an All Way Stop Control. However, in the p.m. peak hour, the overall capacity at the intersection will operate at an LOS “E”, resulting in increases to the v/c ratios, and queueing for the eastbound and southbound movements. In the 2031 horizon year, the eastbound left-turn lane will operate at an LOS “F”.

### 6.1.2 Signal Control Analysis:

As presented in Table 1.6, in the horizon year 2026, the intersection will remain operating at an LOS “B”, with marginal increases to the v/c ratios, and queueing for all approaches. In the horizon year 2031, the eastbound approach in both the A.M. and P.M. peak hours will experience an increase to the v/c ratios, and queueing, operating an LOS “F” in the P.M. peak hour. With the addition of the protected/permissive left-turn phase for the eastbound left-turn lane, the movement operates at a better LOS with decreases to the v/c ratios and queueing.

### 6.1.3 Roundabout Analysis:

As presented in Table 1.6, in the horizon year 2026, the intersection will remain operating at an LOS “A” for both the A.M. and P.M. peak hours. In the horizon year 2031, the roundabout control operates at an LOS “A” during the A.M. peak hours and an LOS “C” during the P.M. peak hours.

### 5.1.2 Dorchester Road & West Site Access

Table 1.7 presents the results of the intersection operational analysis completed for Dorchester Road and the proposed West Site Access under future total 2026 and 2031 traffic conditions. All Synchro HCM analysis reports can be found in Appendix F.

Table 1.7: Future Total (2026 & 2031) Intersection Operational Results – Dorchester Road & Proposed West Site Access

| Scenario | Move. | Weekday AM Peak Hour | | | Weekday PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | V/C | LOS | 95$^{th}$% Queue (M) | V/C | LOS | 95$^{th}$% Queue (M) |
| **Future Total 2026** | EBLTR | 0.02 | A | <1 veh | 0.07 | A | <1 veh |
| | WBLTR | 0.00 | A | <1 veh | 0.01 | A | <1 veh |
| | NBLTR | 0.01 | A | <1 veh | 0.01 | A | <1 veh |
| **Future Total 2031** | EBLTR | 0.18 | A | <1 veh | 0.33 | A | <1 veh |
| | WBLTR | 0.00 | A | <1 veh | 0.01 | A | <1 veh |
| | NBLTR | 0.02 | B | <1 veh | 0.01 | B | <1 veh |

The capacity results for the proposed site access west of Dorchester Road and Oldfield Road are displayed in Table 1.7. The free-flow approaches along Dorchester Road are forecast to operate with substantial reserve capacity, minimal delays, and no queueing concerns through the ultimate 2031 horizon year. There are therefore no mitigation measures recommended for this access.

# 6.0 SUMMARY OF FINDINGS AND CONCLUSIONS

The results of the traffic impact study can be summarized as follows:

- The proposed residential development will contain two six storey buildings (54 units each building) totalling 108 units, two proposed driveway accesses and 164 surface parking spaces.
- Under current traffic conditions, the intersection of Dorchester Road and Oldfield Road operates satisfactory with all individual movements operating at an LOS "A".
- Under future background traffic conditions, the intersection of Dorchester Road and Oldfield Road operates as such:
    - Under an All Way Stop Control, the intersection operates satisfactory in the 2026 horizon year under an All Way Stop Control, with all movements operating at an LOS 'A". However, in the 2031 horizon year, all movements at the intersection operate at an LOS "E" or better, except the eastbound left-turn movement that operates at an LOS "F".
    - Under a signal control, with the implementation of a left-turn lane for the southbound, eastbound, and westbound movements, all movements at the intersection operate at an LOS "C" or better in the 2026 and 2031 horizon years, except the eastbound left-turn movement that operates at an LOS "E" in the 2031 horizon year.
    - Under a roundabout control, all movements at the intersection operate at an LOS "C" or better for both the 2026 and 2031 horizon years.
- The proposed residential development is estimated to generate approximately 36 total two-way trips (8 inbound and 28 outbound) during the weekday a.m. peak hour, and 42 total two-way trips (26 inbound and 16 outbound) during the weekday p.m. peak hour.
- Under future total traffic conditions, the intersection of Dorchester Road and Oldfield Road operates as such:
    - Under an All Way Stop Control satisfactory in the 2026 horizon year, with all movements operating at an LOS 'A". However, in the 2031 horizon year, all movements at the intersection operate at an LOS "E" or better, except the eastbound left-turn movement that operates at an LOS "F".

  - Under a signal control, with the implementation of a left-turn lane for the southbound, eastbound, and westbound movements, and a protective/permissive phase for the eastbound left movements, all movements at the intersection operate at an LOS “D” or better in the 2026 and 2031 horizon years.
  - Under a roundabout control, all movements at the intersection operate at an LOS “D” or better for both the 2026 and 2031 horizon years.

- The proposed site access intersections are expected to operate sufficiently with substantial reserve capacity, minimal delays, and no queueing concerns through the 2031 horizon year.
- The City of Niagara Falls should consider a signalized traffic control at the intersection of Dorchester Road and Oldfield Road to accommodate the future traffic growth as the current AWSC will not be able to sustain the network growth and a roundabout control could require a substantial amount of land to be implemented.

Based on the traffic analysis completed in this study, it is concluded that the proposed development can be accommodated by implementing a traffic signal or roundabout at the intersection of Dorchester Road and Oldfield Road. If the city proceeds with the installation of a traffic signal, the implementation of a left-turn lane with a protective/permissive phase should be considered for the eastbound left-turn movement, to achieve an efficient overall Level of Service at the intersection through the 2031 horizon year.

# APPENDIX A

## TURNING MOVEMENT COUNTS & SIGNAL TIMING

# *Dorchester Rd @ Oldfield Rd*

## Afternoon Peak Diagram

**Specified Period**
**From:** 15:00:00
**To:** 18:00:00

**One Hour Peak**
**From:** 16:00:00
**To:** 17:00:00

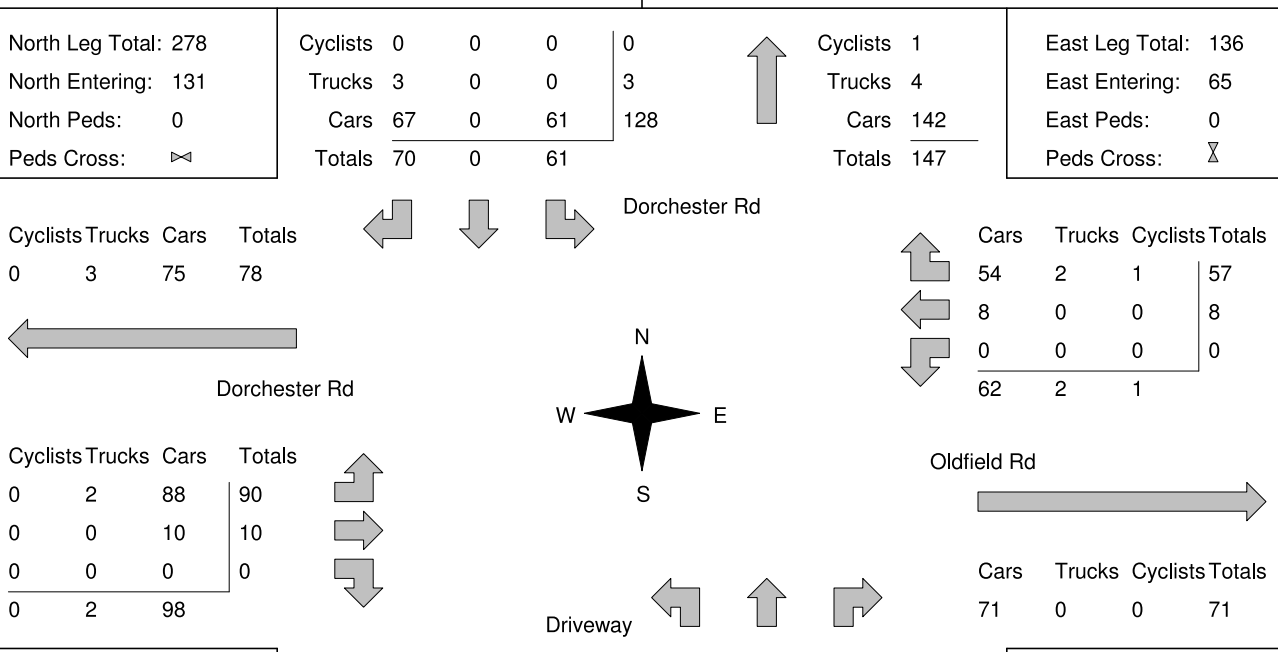
**Municipality:** Niagara Falls
**Site #:** 0000000007
**Intersection:** Oldfield Rd & Dorchester Rd
**TFR File #:** 7
**Count date:** 10-Sep-2019

**Weather conditions:**
Clear/Dry

**Person(s) who counted:**
Cam

**** Non-Signalized Intersection ****

**Major Road:** Oldfield Rd runs W/E




## Comments

# *Dorchester Rd @ Oldfield Rd*

## Morning Peak Diagram

**Specified Period**
**From:** 8:00:00
**To:** 10:00:00

**One Hour Peak**
**From:** 8:00:00
**To:** 9:00:00

**Municipality:** Niagara Falls
**Site #:** 0000000007
**Intersection:** Oldfield Rd & Dorchester Rd
**TFR File #:** 7
**Count date:** 10-Sep-2019

**Weather conditions:**
Clear/Dry

**Person(s) who counted:**
Cam

**** Non-Signalized Intersection ****

**Major Road:** Oldfield Rd runs W/E

North Leg Total: 188
North Entering: 82
North Peds: 1
Peds Cross: ⋈

| | | | | |
|---|---|---|---|---|
| Cyclists | 1 | 0 | 1 | 2 |
| Trucks | 4 | 0 | 1 | 5 |
| Cars | 45 | 1 | 29 | 75 |
| Totals | 50 | 1 | 31 | |

| | |
|---|---|
| Cyclists | 1 |
| Trucks | 11 |
| Cars | 94 |
| Totals | 106 |

East Leg Total: 126
East Entering: 91
East Peds: 0
Peds Cross: ⧖

Dorchester Rd

| Cyclists | Trucks | Cars | Totals |
|---|---|---|---|
| 1 | 5 | 52 | 58 |

| Cars | Trucks | Cyclists | Totals |
|---|---|---|---|
| 75 | 6 | 1 | 82 |
| 7 | 1 | 0 | 8 |
| 0 | 1 | 0 | 1 |
| 82 | 8 | 1 | |

Dorchester Rd

N
W E
S

| Cyclists | Trucks | Cars | Totals |
|---|---|---|---|
| 0 | 5 | 18 | 23 |
| 0 | 1 | 3 | 4 |
| 0 | 0 | 0 | 0 |
| 0 | 6 | 21 | |

Oldfield Rd

| Cars | Trucks | Cyclists | Totals |
|---|---|---|---|
| 32 | 2 | 1 | 35 |

Driveway

Peds Cross: ⧖
West Peds: 0
West Entering: 27
West Leg Total: 85

| | |
|---|---|
| Cars | 1 |
| Trucks | 1 |
| Cyclists | 0 |
| Totals | 2 |

| | | | | |
|---|---|---|---|---|
| Cars | 0 | 1 | 0 | 1 |
| Trucks | 0 | 0 | 0 | 0 |
| Cyclists | 0 | 0 | 0 | 0 |
| Totals | 0 | 1 | 0 | |

Peds Cross: ⋈
South Peds: 0
South Entering: 1
South Leg Total: 3

## Comments

- Where the v/c ratio exceeds 0.95 for exclusive turning movements; or
- Where the 95th percentile queues exceed available turning lane storage for individual movements.

For unsignalized intersections:

- Where the LOS exceeds E for individual movements; or
- Where the 95th percentile queues exceed available turning lane storage for individual movements.

Three intersection control alternatives were evaluated: all-way stop control (AWSC); roundabout; and traffic signals. As a starting point, a basic lane configuration and signal timing plan is considered in this assessment, that is all approaches are shared through/turning lanes and no protected turn phases. The signal timing plan adheres to the Niagara Region Traffic Signal Standards, 2014. The signal timing plan parameters are outlined in Table 2-4.

Table 2-4
Signal Timing Plan Parameters

| Parameters | Niagara Region Minimum Standard | Dorchester Road & Oldfield Road |
|---|---|---|
| Green Time (sec) | 8.0 | 8.0 |
| Yellow Time (sec) | 4.1 | 4.1 |
| All-Red Time (sec) | 2.0 | 2.0 |
| Walk Time (sec) | 7.0 | 7.0 |
| Flash Don't Walk Time (sec) | 7.0 | 11.0 |
| Cycle Length (sec) | 50.0 | 60.0 |

The capacity analysis was conducted for the weekday AM and PM peak periods. The results of the capacity analysis for the base year 2021 is summarized in Table 2-5. All Synchro output reports are provided in Appendix B.

Table 2-5
Existing / Base Year 2021 Capacity Results

| Scenario/Period | Performance | Lane Group | | |
|---|---|---|---|---|
| | | EB L/T | WB T/R | SB L/R |
| AWSC – AM Peak | LOS | A | A | A |
| | Delay (sec) | 7.9 | 7.1 | 7.4 |
| | Queue (m) | n/a | n/a | n/a |
| | v/c | 0.04 | 0.10 | 0.10 |
| AWSC – PM Peak | LOS | A | A | A |
| | Delay (sec) | 8.2 | 7.2 | 7.9 |
| | Queue (m) | n/a | n/a | n/a |
| | v/c | 0.14 | 0.08 | 0.16 |
| Roundabout – | LOS | A | A | A |

# APPENDIX B

## HCM REPORTS – BASELINE SCENARIOS

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 7.2 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 23 | 4 | 0 | 0 | 8 | 90 | 0 | 0 | 0 | 34 | 0 | 52 |
| Future Vol, veh/h | 23 | 4 | 0 | 0 | 8 | 90 | 0 | 0 | 0 | 34 | 0 | 52 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 25 | 4 | 0 | 0 | 9 | 98 | 0 | 0 | 0 | 37 | 0 | 57 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |

| Approach | EB | WB | SB |
|---|---|---|---|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | SB | | WB |
| Conflicting Lanes Left | 1 | 0 | 1 |
| Conflicting Approach Right | | SB | EB |
| Conflicting Lanes Right | 0 | 1 | 1 |
| HCM Control Delay | 7.6 | 7 | 7.4 |
| HCM LOS | A | A | A |

| Lane | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|
| Vol Left, % | 85% | 0% | 40% |
| Vol Thru, % | 15% | 8% | 0% |
| Vol Right, % | 0% | 92% | 60% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 27 | 98 | 86 |
| LT Vol | 23 | 0 | 34 |
| Through Vol | 4 | 8 | 0 |
| RT Vol | 0 | 90 | 52 |
| Lane Flow Rate | 29 | 107 | 93 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.035 | 0.106 | 0.101 |
| Departure Headway (Hd) | 4.351 | 3.568 | 3.884 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 819 | 998 | 919 |
| Service Time | 2.397 | 1.612 | 1.923 |
| HCM Lane V/C Ratio | 0.035 | 0.107 | 0.101 |
| HCM Control Delay | 7.6 | 7 | 7.4 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.1 | 0.4 | 0.3 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 7.9 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 93 | 10 | 0 | 0 | 8 | 61 | 0 | 0 | 0 | 66 | 0 | 72 |
| Future Vol, veh/h | 93 | 10 | 0 | 0 | 8 | 61 | 0 | 0 | 0 | 66 | 0 | 72 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 101 | 11 | 0 | 0 | 9 | 66 | 0 | 0 | 0 | 72 | 0 | 78 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |

| Approach | EB | WB | SB |
|---|---|---|---|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | SB | | WB |
| Conflicting Lanes Left | 1 | 0 | 1 |
| Conflicting Approach Right | | SB | EB |
| Conflicting Lanes Right | 0 | 1 | 1 |
| HCM Control Delay | 8.2 | 7.2 | 8 |
| HCM LOS | A | A | A |

| Lane | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|
| Vol Left, % | 90% | 0% | 48% |
| Vol Thru, % | 10% | 12% | 0% |
| Vol Right, % | 0% | 88% | 52% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 103 | 69 | 138 |
| LT Vol | 93 | 0 | 66 |
| Through Vol | 10 | 8 | 0 |
| RT Vol | 0 | 61 | 72 |
| Lane Flow Rate | 112 | 75 | 150 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.138 | 0.08 | 0.168 |
| Departure Headway (Hd) | 4.437 | 3.857 | 4.038 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 798 | 935 | 873 |
| Service Time | 2.519 | 1.857 | 2.134 |
| HCM Lane V/C Ratio | 0.14 | 0.08 | 0.172 |
| HCM Control Delay | 8.2 | 7.2 | 8 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.5 | 0.3 | 0.6 |

# APPENDIX C

## HCM REPORTS – FUTURE BACKGROUND SCENARIOS

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 7.3 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 24 | 4 | 0 | 0 | 8 | 94 | 0 | 0 | 0 | 35 | 0 | 54 |
| Future Vol, veh/h | 24 | 4 | 0 | 0 | 8 | 94 | 0 | 0 | 0 | 35 | 0 | 54 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 26 | 4 | 0 | 0 | 9 | 102 | 0 | 0 | 0 | 38 | 0 | 59 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |

| Approach | EB | WB | SB |
|---|---|---|---|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | SB | | WB |
| Conflicting Lanes Left | 1 | 0 | 1 |
| Conflicting Approach Right | | SB | EB |
| Conflicting Lanes Right | 0 | 1 | 1 |
| HCM Control Delay | 7.6 | 7.1 | 7.4 |
| HCM LOS | A | A | A |

| Lane | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|
| Vol Left, % | 86% | 0% | 39% |
| Vol Thru, % | 14% | 8% | 0% |
| Vol Right, % | 0% | 92% | 61% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 28 | 102 | 89 |
| LT Vol | 24 | 0 | 35 |
| Through Vol | 4 | 8 | 0 |
| RT Vol | 0 | 94 | 54 |
| Lane Flow Rate | 30 | 111 | 97 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.037 | 0.11 | 0.105 |
| Departure Headway (Hd) | 4.362 | 3.573 | 3.892 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 817 | 997 | 917 |
| Service Time | 2.41 | 1.619 | 1.932 |
| HCM Lane V/C Ratio | 0.037 | 0.111 | 0.106 |
| HCM Control Delay | 7.6 | 7.1 | 7.4 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.1 | 0.4 | 0.4 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 8 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 97 | 10 | 0 | 0 | 8 | 63 | 0 | 0 | 0 | 69 | 0 | 75 |
| Future Vol, veh/h | 97 | 10 | 0 | 0 | 8 | 63 | 0 | 0 | 0 | 69 | 0 | 75 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 105 | 11 | 0 | 0 | 9 | 68 | 0 | 0 | 0 | 75 | 0 | 82 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |

| Approach | EB | WB | SB |
|---|---|---|---|
| Opposing Approach | WB | EB | |
| Opposing Lanes | 1 | 1 | 0 |
| Conflicting Approach Left | SB | | WB |
| Conflicting Lanes Left | 1 | 0 | 1 |
| Conflicting Approach Right | | SB | EB |
| Conflicting Lanes Right | 0 | 1 | 1 |
| HCM Control Delay | 8.3 | 7.2 | 8.1 |
| HCM LOS | A | A | A |

| Lane | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|
| Vol Left, % | 91% | 0% | 48% |
| Vol Thru, % | 9% | 11% | 0% |
| Vol Right, % | 0% | 89% | 52% |
| Sign Control | Stop | Stop | Stop |
| Traffic Vol by Lane | 107 | 71 | 144 |
| LT Vol | 97 | 0 | 69 |
| Through Vol | 10 | 8 | 0 |
| RT Vol | 0 | 63 | 75 |
| Lane Flow Rate | 116 | 77 | 157 |
| Geometry Grp | 1 | 1 | 1 |
| Degree of Util (X) | 0.144 | 0.083 | 0.181 |
| Departure Headway (Hd) | 4.452 | 3.877 | 4.152 |
| Convergence, Y/N | Yes | Yes | Yes |
| Cap | 793 | 928 | 869 |
| Service Time | 2.549 | 1.887 | 2.152 |
| HCM Lane V/C Ratio | 0.146 | 0.083 | 0.181 |
| HCM Control Delay | 8.3 | 7.2 | 8.1 |
| HCM Lane LOS | A | A | A |
| HCM 95th-tile Q | 0.5 | 0.3 | 0.7 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 10.3 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 201 | 84 | 0 | 0 | 69 | 97 | 0 | 0 | 0 | 37 | 0 | 189 |
| Future Vol, veh/h | 201 | 84 | 0 | 0 | 69 | 97 | 0 | 0 | 0 | 37 | 0 | 189 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 218 | 91 | 0 | 0 | 75 | 105 | 0 | 0 | 0 | 40 | 0 | 205 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay | 11.4 | 8.9 | 0 | 9.8 |
| HCM LOS | B | A | - | A |

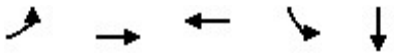
| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|---|
| Vol Left, % | 0% | 71% | 0% | 16% |
| Vol Thru, % | 100% | 29% | 42% | 0% |
| Vol Right, % | 0% | 0% | 58% | 84% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 0 | 285 | 166 | 226 |
| LT Vol | 0 | 201 | 0 | 37 |
| Through Vol | 0 | 84 | 69 | 0 |
| RT Vol | 0 | 0 | 97 | 189 |
| Lane Flow Rate | 0 | 310 | 180 | 246 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0 | 0.418 | 0.227 | 0.314 |
| Departure Headway (Hd) | 5.424 | 4.857 | 4.539 | 4.601 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 0 | 737 | 785 | 776 |
| Service Time | 3.512 | 2.915 | 2.603 | 2.655 |
| HCM Lane V/C Ratio | 0 | 0.421 | 0.229 | 0.317 |
| HCM Control Delay | 8.5 | 11.4 | 8.9 | 9.8 |
| HCM Lane LOS | N | B | A | A |
| HCM 95th-tile Q | 0 | 2.1 | 0.9 | 1.3 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 39.4 |
| Intersection LOS | E |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 383 | 139 | 0 | 0 | 153 | 66 | 0 | 0 | 0 | 72 | 0 | 395 |
| Future Vol, veh/h | 383 | 139 | 0 | 0 | 153 | 66 | 0 | 0 | 0 | 72 | 0 | 395 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 416 | 151 | 0 | 0 | 166 | 72 | 0 | 0 | 0 | 78 | 0 | 429 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

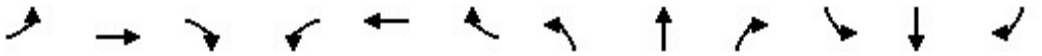
| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay | 57.5 | 14.4 | 0 | 30.9 |
| HCM LOS | F | B | - | D |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|---|
| Vol Left, % | 0% | 73% | 0% | 15% |
| Vol Thru, % | 100% | 27% | 70% | 0% |
| Vol Right, % | 0% | 0% | 30% | 85% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 0 | 522 | 219 | 467 |
| LT Vol | 0 | 383 | 0 | 72 |
| Through Vol | 0 | 139 | 153 | 0 |
| RT Vol | 0 | 0 | 66 | 395 |
| Lane Flow Rate | 0 | 567 | 238 | 508 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0 | 0.981 | 0.429 | 0.827 |
| Departure Headway (Hd) | 7.939 | 6.224 | 6.481 | 5.866 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 0 | 584 | 555 | 614 |
| Service Time | 5.939 | 4.224 | 4.543 | 3.914 |
| HCM Lane V/C Ratio | 0 | 0.971 | 0.429 | 0.827 |
| HCM Control Delay | 10.9 | 57.5 | 14.4 | 30.9 |
| HCM Lane LOS | N | F | B | D |
| HCM 95th-tile Q | 0 | 13.9 | 2.1 | 8.7 |



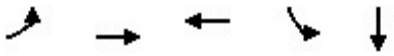
| Lane Group | EBL | EBT | WBT | SBL | SBT |
|---|---|---|---|---|---|
| Lane Group Flow (vph) | 26 | 4 | 111 | 38 | 59 |
| v/c Ratio | 0.12 | 0.02 | 0.32 | 0.04 | 0.05 |
| Control Delay | 15.9 | 14.0 | 7.7 | 5.2 | 0.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 15.9 | 14.0 | 7.7 | 5.2 | 0.1 |
| Queue Length 50th (m) | 1.9 | 0.3 | 0.7 | 1.2 | 0.0 |
| Queue Length 95th (m) | 6.4 | 2.0 | 9.8 | 4.4 | 0.0 |
| Internal Link Dist (m) | | 29.7 | 51.9 | | 61.5 |
| Turn Bay Length (m) | 15.0 | | | 15.0 | |
| Base Capacity (vph) | 685 | 836 | 886 | 923 | 1288 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.04 | 0.00 | 0.13 | 0.04 | 0.05 |

Intersection Summary



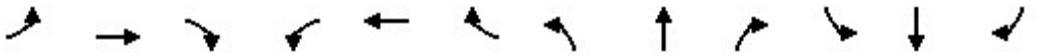
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 24 | 4 | 0 | 0 | 8 | 94 | 0 | 0 | 0 | 35 | 0 | 54 |
| Future Volume (vph) | 24 | 4 | 0 | 0 | 8 | 94 | 0 | 0 | 0 | 35 | 0 | 54 |
| Ideal Flow (vphpl) | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 |
| Total Lost time (s) | 6.1 | 6.1 | | | 6.1 | | | | | 6.1 | 6.1 | |
| Lane Util. Factor | 1.00 | 1.00 | | | 1.00 | | | | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | | | 0.86 | | | | | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | | | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1363 | 1400 | | | 1417 | | | | | 1614 | 1377 | |
| Flt Permitted | 0.80 | 1.00 | | | 1.00 | | | | | 0.76 | 1.00 | |
| Satd. Flow (perm) | 1148 | 1400 | | | 1417 | | | | | 1287 | 1377 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 26 | 4 | 0 | 0 | 9 | 102 | 0 | 0 | 0 | 38 | 0 | 59 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 91 | 0 | 0 | 0 | 0 | 0 | 22 | 0 |
| Lane Group Flow (vph) | 26 | 4 | 0 | 0 | 20 | 0 | 0 | 0 | 0 | 38 | 37 | 0 |
| Heavy Vehicles (%) | 22% | 25% | 0% | 0% | 1% | 7% | 2% | 2% | 2% | 3% | 0% | 8% |
| Turn Type | Perm | NA | | Perm | NA | | | | | Perm | NA | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | | 8 | | | 2 | | | 6 | | |
| Actuated Green, G (s) | 5.0 | 5.0 | | | 5.0 | | | | | 28.7 | 28.7 | |
| Effective Green, g (s) | 5.0 | 5.0 | | | 5.0 | | | | | 28.7 | 28.7 | |
| Actuated g/C Ratio | 0.11 | 0.11 | | | 0.11 | | | | | 0.63 | 0.63 | |
| Clearance Time (s) | 6.1 | 6.1 | | | 6.1 | | | | | 6.1 | 6.1 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | | | | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 125 | 152 | | | 154 | | | | | 804 | 861 | |
| v/s Ratio Prot | | 0.00 | | | 0.01 | | | | | | 0.03 | |
| v/s Ratio Perm | c0.02 | | | | | | | | | c0.03 | | |
| v/c Ratio | 0.21 | 0.03 | | | 0.13 | | | | | 0.05 | 0.04 | |
| Uniform Delay, d1 | 18.6 | 18.3 | | | 18.5 | | | | | 3.3 | 3.3 | |
| Progression Factor | 1.00 | 1.00 | | | 1.00 | | | | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 0.8 | 0.1 | | | 0.4 | | | | | 0.1 | 0.1 | |
| Delay (s) | 19.5 | 18.3 | | | 18.9 | | | | | 3.4 | 3.4 | |
| Level of Service | B | B | | | B | | | | | A | A | |
| Approach Delay (s) | | 19.3 | | | 18.9 | | | 0.0 | | | 3.4 | |
| Approach LOS | | B | | | B | | | A | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 12.6 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.07 | | |
| Actuated Cycle Length (s) | 45.9 | Sum of lost time (s) | 12.2 |
| Intersection Capacity Utilization | 24.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |



| Lane Group | EBL | EBT | WBT | SBL | SBT |
|---|---|---|---|---|---|
| Lane Group Flow (vph) | 26 | 4 | 111 | 38 | 59 |
| v/c Ratio | 0.12 | 0.02 | 0.32 | 0.04 | 0.05 |
| Control Delay | 15.9 | 14.0 | 7.7 | 5.2 | 0.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 15.9 | 14.0 | 7.7 | 5.2 | 0.1 |
| Queue Length 50th (m) | 1.9 | 0.3 | 0.7 | 1.2 | 0.0 |
| Queue Length 95th (m) | 6.4 | 2.0 | 9.8 | 4.4 | 0.0 |
| Internal Link Dist (m) | | 29.7 | 51.9 | | 61.5 |
| Turn Bay Length (m) | 15.0 | | | 15.0 | |
| Base Capacity (vph) | 685 | 836 | 886 | 923 | 1288 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.04 | 0.00 | 0.13 | 0.04 | 0.05 |

Intersection Summary



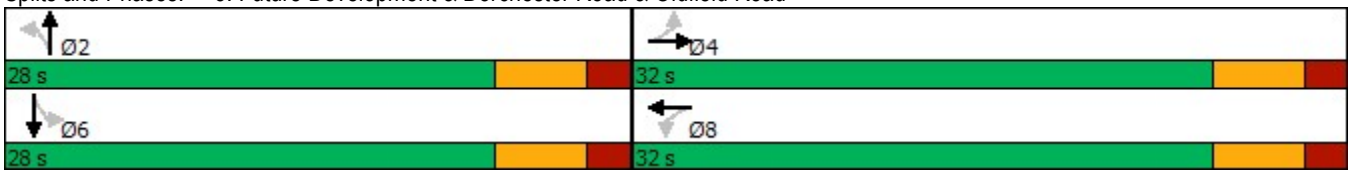
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 24 | 4 | 0 | 0 | 8 | 94 | 0 | 0 | 0 | 35 | 0 | 54 |
| Future Volume (vph) | 24 | 4 | 0 | 0 | 8 | 94 | 0 | 0 | 0 | 35 | 0 | 54 |
| Ideal Flow (vphpl) | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 |
| Total Lost time (s) | 6.1 | 6.1 | | | 6.1 | | | | | 6.1 | 6.1 | |
| Lane Util. Factor | 1.00 | 1.00 | | | 1.00 | | | | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | | | 0.86 | | | | | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | | | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1363 | 1400 | | | 1417 | | | | | 1614 | 1377 | |
| Flt Permitted | 0.80 | 1.00 | | | 1.00 | | | | | 0.76 | 1.00 | |
| Satd. Flow (perm) | 1148 | 1400 | | | 1417 | | | | | 1287 | 1377 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 26 | 4 | 0 | 0 | 9 | 102 | 0 | 0 | 0 | 38 | 0 | 59 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 91 | 0 | 0 | 0 | 0 | 0 | 22 | 0 |
| Lane Group Flow (vph) | 26 | 4 | 0 | 0 | 20 | 0 | 0 | 0 | 0 | 38 | 37 | 0 |
| Heavy Vehicles (%) | 22% | 25% | 0% | 0% | 1% | 7% | 2% | 2% | 2% | 3% | 0% | 8% |
| Turn Type | Perm | NA | | Perm | NA | | Perm | | | Perm | NA | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | | 8 | | | 2 | | | 6 | | |
| Actuated Green, G (s) | 5.0 | 5.0 | | | 5.0 | | | | | 28.7 | 28.7 | |
| Effective Green, g (s) | 5.0 | 5.0 | | | 5.0 | | | | | 28.7 | 28.7 | |
| Actuated g/C Ratio | 0.11 | 0.11 | | | 0.11 | | | | | 0.63 | 0.63 | |
| Clearance Time (s) | 6.1 | 6.1 | | | 6.1 | | | | | 6.1 | 6.1 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | | | | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 125 | 152 | | | 154 | | | | | 804 | 861 | |
| v/s Ratio Prot | | 0.00 | | | 0.01 | | | | | | 0.03 | |
| v/s Ratio Perm | c0.02 | | | | | | | | | c0.03 | | |
| v/c Ratio | 0.21 | 0.03 | | | 0.13 | | | | | 0.05 | 0.04 | |
| Uniform Delay, d1 | 18.6 | 18.3 | | | 18.5 | | | | | 3.3 | 3.3 | |
| Progression Factor | 1.00 | 1.00 | | | 1.00 | | | | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 0.8 | 0.1 | | | 0.4 | | | | | 0.1 | 0.1 | |
| Delay (s) | 19.5 | 18.3 | | | 18.9 | | | | | 3.4 | 3.4 | |
| Level of Service | B | B | | | B | | | | | A | A | |
| Approach Delay (s) | | 19.3 | | | 18.9 | | | 0.0 | | | 3.4 | |
| Approach LOS | | B | | | B | | | A | | | A | |

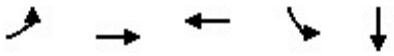
| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 12.6 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.07 | | |
| Actuated Cycle Length (s) | 45.9 | Sum of lost time (s) | 12.2 |
| Intersection Capacity Utilization | 24.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Phase Number | 2 | 4 | 6 | 8 |
|---|---|---|---|---|
| Movement | NBTL | EBTL | SBTL | WBTL |
| Lead/Lag | | | | |
| Lead-Lag Optimize | | | | |
| Recall Mode | Max | None | Max | None |
| Maximum Split (s) | 28 | 32 | 28 | 32 |
| Maximum Split (%) | 46.7% | 53.3% | 46.7% | 53.3% |
| Minimum Split (s) | 24.1 | 24.1 | 24.1 | 24.1 |
| Yellow Time (s) | 4.1 | 4.1 | 4.1 | 4.1 |
| All-Red Time (s) | 2 | 2 | 2 | 2 |
| Minimum Initial (s) | 8 | 8 | 8 | 8 |
| Vehicle Extension (s) | 3 | 3 | 3 | 3 |
| Minimum Gap (s) | 3 | 3 | 3 | 3 |
| Time Before Reduce (s) | 0 | 0 | 0 | 0 |
| Time To Reduce (s) | 0 | 0 | 0 | 0 |
| Walk Time (s) | 7 | 7 | 7 | 7 |
| Flash Dont Walk (s) | 11 | 11 | 11 | 11 |
| Dual Entry | Yes | Yes | Yes | Yes |
| Inhibit Max | Yes | Yes | Yes | Yes |
| Start Time (s) | 0 | 28 | 0 | 28 |
| End Time (s) | 28 | 0 | 28 | 0 |
| Yield/Force Off (s) | 21.9 | 53.9 | 21.9 | 53.9 |
| Yield/Force Off 170(s) | 10.9 | 42.9 | 10.9 | 42.9 |
| Local Start Time (s) | 0 | 28 | 0 | 28 |
| Local Yield (s) | 21.9 | 53.9 | 21.9 | 53.9 |
| Local Yield 170(s) | 10.9 | 42.9 | 10.9 | 42.9 |

| Intersection Summary | |
|---|---|
| Cycle Length | 60 |
| Control Type | Actuated-Uncoordinated |
| Natural Cycle | 50 |

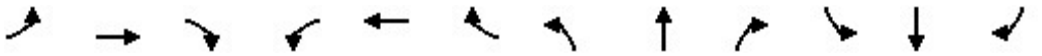
Splits and Phases: 3: Future Development & Dorchester Road & Oldfield Road





| Lane Group | EBL | EBT | WBT | SBL | SBT |
|---|---|---|---|---|---|
| Lane Group Flow (vph) | 105 | 11 | 77 | 75 | 82 |
| v/c Ratio | 0.41 | 0.03 | 0.21 | 0.08 | 0.06 |
| Control Delay | 20.7 | 13.9 | 7.1 | 6.2 | 0.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 20.7 | 13.9 | 7.1 | 6.2 | 0.1 |
| Queue Length 50th (m) | 7.7 | 0.8 | 0.6 | 2.7 | 0.0 |
| Queue Length 95th (m) | 18.4 | 3.6 | 8.1 | 8.9 | 0.0 |
| Internal Link Dist (m) | | 29.7 | 51.9 | | 61.5 |
| Turn Bay Length (m) | 15.0 | | | 15.0 | |
| Base Capacity (vph) | 626 | 904 | 790 | 933 | 1320 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.17 | 0.01 | 0.10 | 0.08 | 0.06 |

Intersection Summary



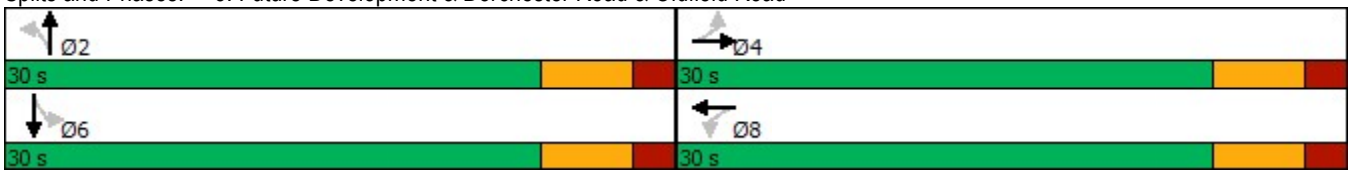
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 97 | 10 | 0 | 0 | 8 | 63 | 0 | 0 | 0 | 69 | 0 | 75 |
| Future Volume (vph) | 97 | 10 | 0 | 0 | 8 | 63 | 0 | 0 | 0 | 69 | 0 | 75 |
| Ideal Flow (vphpl) | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 |
| Total Lost time (s) | 6.1 | 6.1 | | | 6.1 | | | | | 6.1 | 6.1 | |
| Lane Util. Factor | 1.00 | 1.00 | | | 1.00 | | | | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | | | 0.87 | | | | | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | | | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1630 | 1750 | | | 1466 | | | | | 1662 | 1430 | |
| Flt Permitted | 0.71 | 1.00 | | | 1.00 | | | | | 0.76 | 1.00 | |
| Satd. Flow (perm) | 1213 | 1750 | | | 1466 | | | | | 1325 | 1430 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 105 | 11 | 0 | 0 | 9 | 68 | 0 | 0 | 0 | 75 | 0 | 82 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 59 | 0 | 0 | 0 | 0 | 0 | 31 | 0 |
| Lane Group Flow (vph) | 105 | 11 | 0 | 0 | 18 | 0 | 0 | 0 | 0 | 75 | 51 | 0 |
| Heavy Vehicles (%) | 2% | 0% | 0% | 0% | 0% | 4% | 2% | 2% | 2% | 0% | 0% | 4% |
| Turn Type | Perm | NA | | Perm | NA | | Perm | | | Perm | NA | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | | 8 | | | 2 | | | 6 | | |
| Actuated Green, G (s) | 6.5 | 6.5 | | | 6.5 | | | | | 30.1 | 30.1 | |
| Effective Green, g (s) | 6.5 | 6.5 | | | 6.5 | | | | | 30.1 | 30.1 | |
| Actuated g/C Ratio | 0.13 | 0.13 | | | 0.13 | | | | | 0.62 | 0.62 | |
| Clearance Time (s) | 6.1 | 6.1 | | | 6.1 | | | | | 6.1 | 6.1 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | | | | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 161 | 233 | | | 195 | | | | | 817 | 882 | |
| v/s Ratio Prot | | 0.01 | | | 0.01 | | | | | | 0.04 | |
| v/s Ratio Perm | c0.09 | | | | | | | | | c0.06 | | |
| v/c Ratio | 0.65 | 0.05 | | | 0.09 | | | | | 0.09 | 0.06 | |
| Uniform Delay, d1 | 20.1 | 18.4 | | | 18.6 | | | | | 3.8 | 3.7 | |
| Progression Factor | 1.00 | 1.00 | | | 1.00 | | | | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 9.1 | 0.1 | | | 0.2 | | | | | 0.2 | 0.1 | |
| Delay (s) | 29.2 | 18.5 | | | 18.8 | | | | | 4.0 | 3.8 | |
| Level of Service | C | B | | | B | | | | | A | A | |
| Approach Delay (s) | | 28.2 | | | 18.8 | | | 0.0 | | | 3.9 | |
| Approach LOS | | C | | | B | | | A | | | A | |

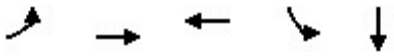
| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 15.2 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.19 | | |
| Actuated Cycle Length (s) | 48.8 | Sum of lost time (s) | 12.2 |
| Intersection Capacity Utilization | 29.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Phase Number | 2 | 4 | 6 | 8 |
|---|---|---|---|---|
| Movement | NBTL | EBTL | SBTL | WBTL |
| Lead/Lag | | | | |
| Lead-Lag Optimize | | | | |
| Recall Mode | Max | None | Max | None |
| Maximum Split (s) | 30 | 30 | 30 | 30 |
| Maximum Split (%) | 50.0% | 50.0% | 50.0% | 50.0% |
| Minimum Split (s) | 24.1 | 24.1 | 24.1 | 24.1 |
| Yellow Time (s) | 4.1 | 4.1 | 4.1 | 4.1 |
| All-Red Time (s) | 2 | 2 | 2 | 2 |
| Minimum Initial (s) | 8 | 8 | 8 | 8 |
| Vehicle Extension (s) | 3 | 3 | 3 | 3 |
| Minimum Gap (s) | 3 | 3 | 3 | 3 |
| Time Before Reduce (s) | 0 | 0 | 0 | 0 |
| Time To Reduce (s) | 0 | 0 | 0 | 0 |
| Walk Time (s) | 7 | 7 | 7 | 7 |
| Flash Dont Walk (s) | 11 | 11 | 11 | 11 |
| Dual Entry | Yes | Yes | Yes | Yes |
| Inhibit Max | Yes | Yes | Yes | Yes |
| Start Time (s) | 0 | 30 | 0 | 30 |
| End Time (s) | 30 | 0 | 30 | 0 |
| Yield/Force Off (s) | 23.9 | 53.9 | 23.9 | 53.9 |
| Yield/Force Off 170(s) | 12.9 | 42.9 | 12.9 | 42.9 |
| Local Start Time (s) | 0 | 30 | 0 | 30 |
| Local Yield (s) | 23.9 | 53.9 | 23.9 | 53.9 |
| Local Yield 170(s) | 12.9 | 42.9 | 12.9 | 42.9 |

| Intersection Summary | |
|---|---|
| Cycle Length | 60 |
| Control Type | Actuated-Uncoordinated |
| Natural Cycle | 50 |

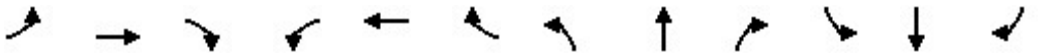
Splits and Phases: 3: Future Development & Dorchester Road & Oldfield Road





| Lane Group | EBL | EBT | WBT | SBL | SBT |
|---|---|---|---|---|---|
| Lane Group Flow (vph) | 218 | 91 | 180 | 40 | 205 |
| v/c Ratio | 0.76 | 0.21 | 0.33 | 0.07 | 0.19 |
| Control Delay | 34.2 | 13.8 | 7.7 | 10.8 | 0.4 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 34.2 | 13.8 | 7.7 | 10.8 | 0.4 |
| Queue Length 50th (m) | 19.1 | 6.5 | 5.3 | 2.2 | 0.0 |
| Queue Length 95th (m) | 40.5 | 14.9 | 16.4 | 8.0 | 0.0 |
| Internal Link Dist (m) | | 29.7 | 51.9 | | 61.5 |
| Turn Bay Length (m) | 15.0 | | | 15.0 | |
| Base Capacity (vph) | 404 | 612 | 727 | 600 | 1100 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.54 | 0.15 | 0.25 | 0.07 | 0.19 |

Intersection Summary



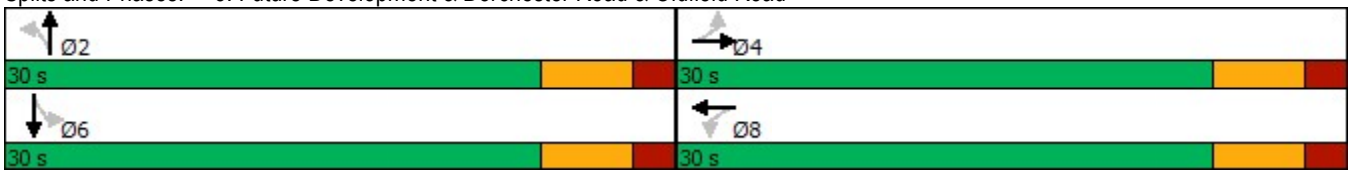
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 201 | 84 | 0 | 0 | 69 | 97 | 0 | 0 | 0 | 37 | 0 | 189 |
| Future Volume (vph) | 201 | 84 | 0 | 0 | 69 | 97 | 0 | 0 | 0 | 37 | 0 | 189 |
| Ideal Flow (vphpl) | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 |
| Total Lost time (s) | 6.1 | 6.1 | | | 6.1 | | | | | 6.1 | 6.1 | |
| Lane Util. Factor | 1.00 | 1.00 | | | 1.00 | | | | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | | | 0.91 | | | | | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | | | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1363 | 1400 | | | 1528 | | | | | 1614 | 1377 | |
| Flt Permitted | 0.64 | 1.00 | | | 1.00 | | | | | 0.76 | 1.00 | |
| Satd. Flow (perm) | 923 | 1400 | | | 1528 | | | | | 1287 | 1377 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 218 | 91 | 0 | 0 | 75 | 105 | 0 | 0 | 0 | 40 | 0 | 205 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 72 | 0 | 0 | 0 | 0 | 0 | 109 | 0 |
| Lane Group Flow (vph) | 218 | 91 | 0 | 0 | 108 | 0 | 0 | 0 | 0 | 40 | 96 | 0 |
| Heavy Vehicles (%) | 22% | 25% | 0% | 0% | 1% | 7% | 2% | 2% | 2% | 3% | 0% | 8% |
| Turn Type | Perm | NA | | Perm | NA | | Perm | | | Perm | NA | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | | 8 | | | 2 | | | 6 | | |
| Actuated Green, G (s) | 17.0 | 17.0 | | | 17.0 | | | | | 25.6 | 25.6 | |
| Effective Green, g (s) | 17.0 | 17.0 | | | 17.0 | | | | | 25.6 | 25.6 | |
| Actuated g/C Ratio | 0.31 | 0.31 | | | 0.31 | | | | | 0.47 | 0.47 | |
| Clearance Time (s) | 6.1 | 6.1 | | | 6.1 | | | | | 6.1 | 6.1 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | | | | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 286 | 434 | | | 474 | | | | | 601 | 643 | |
| v/s Ratio Prot | | 0.07 | | | 0.07 | | | | | | c0.07 | |
| v/s Ratio Perm | c0.24 | | | | | | | | | 0.03 | | |
| v/c Ratio | 0.76 | 0.21 | | | 0.23 | | | | | 0.07 | 0.15 | |
| Uniform Delay, d1 | 17.1 | 13.9 | | | 14.0 | | | | | 8.0 | 8.4 | |
| Progression Factor | 1.00 | 1.00 | | | 1.00 | | | | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 11.4 | 0.2 | | | 0.2 | | | | | 0.2 | 0.5 | |
| Delay (s) | 28.5 | 14.2 | | | 14.3 | | | | | 8.2 | 8.9 | |
| Level of Service | C | B | | | B | | | | | A | A | |
| Approach Delay (s) | | 24.3 | | | 14.3 | | | 0.0 | | | 8.8 | |
| Approach LOS | | C | | | B | | | A | | | A | |

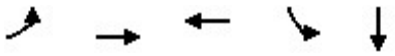
| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 16.6 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.39 | | |
| Actuated Cycle Length (s) | 54.8 | Sum of lost time (s) | 12.2 |
| Intersection Capacity Utilization | 50.4% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Phase Number | 2 | 4 | 6 | 8 |
|---|---|---|---|---|
| Movement | NBTL | EBTL | SBTL | WBTL |
| Lead/Lag | | | | |
| Lead-Lag Optimize | | | | |
| Recall Mode | Max | None | Max | None |
| Maximum Split (s) | 30 | 30 | 30 | 30 |
| Maximum Split (%) | 50.0% | 50.0% | 50.0% | 50.0% |
| Minimum Split (s) | 24.1 | 24.1 | 24.1 | 24.1 |
| Yellow Time (s) | 4.1 | 4.1 | 4.1 | 4.1 |
| All-Red Time (s) | 2 | 2 | 2 | 2 |
| Minimum Initial (s) | 8 | 8 | 8 | 8 |
| Vehicle Extension (s) | 3 | 3 | 3 | 3 |
| Minimum Gap (s) | 3 | 3 | 3 | 3 |
| Time Before Reduce (s) | 0 | 0 | 0 | 0 |
| Time To Reduce (s) | 0 | 0 | 0 | 0 |
| Walk Time (s) | 7 | 7 | 7 | 7 |
| Flash Dont Walk (s) | 11 | 11 | 11 | 11 |
| Dual Entry | Yes | Yes | Yes | Yes |
| Inhibit Max | Yes | Yes | Yes | Yes |
| Start Time (s) | 0 | 30 | 0 | 30 |
| End Time (s) | 30 | 0 | 30 | 0 |
| Yield/Force Off (s) | 23.9 | 53.9 | 23.9 | 53.9 |
| Yield/Force Off 170(s) | 12.9 | 42.9 | 12.9 | 42.9 |
| Local Start Time (s) | 0 | 30 | 0 | 30 |
| Local Yield (s) | 23.9 | 53.9 | 23.9 | 53.9 |
| Local Yield 170(s) | 12.9 | 42.9 | 12.9 | 42.9 |

| Intersection Summary | |
|---|---|
| Cycle Length | 60 |
| Control Type | Actuated-Uncoordinated |
| Natural Cycle | 50 |

Splits and Phases: 3: Future Development & Dorchester Road & Oldfield Road

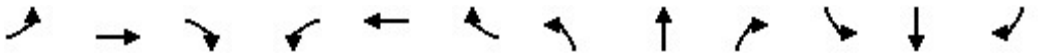




| Lane Group | EBL | EBT | WBT | SBL | SBT |
|---|---|---|---|---|---|
| Lane Group Flow (vph) | 416 | 151 | 238 | 78 | 429 |
| v/c Ratio | 1.00 | 0.22 | 0.35 | 0.15 | 0.45 |
| Control Delay | 66.4 | 13.0 | 12.0 | 12.5 | 1.5 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 66.4 | 13.0 | 12.0 | 12.5 | 1.5 |
| Queue Length 50th (m) | 46.2 | 11.1 | 14.8 | 5.5 | 0.0 |
| Queue Length 95th (m) | #99.5 | 22.0 | 30.0 | 13.2 | 0.0 |
| Internal Link Dist (m) | | 29.7 | 51.9 | | 61.5 |
| Turn Bay Length (m) | 15.0 | | | 15.0 | |
| Base Capacity (vph) | 417 | 697 | 683 | 527 | 954 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 1.00 | 0.22 | 0.35 | 0.15 | 0.45 |

Intersection Summary

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



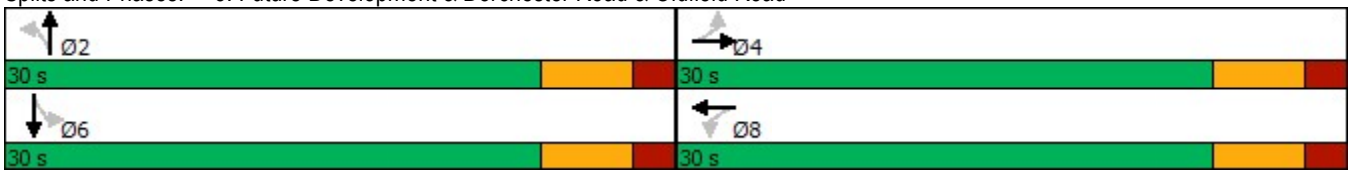
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 383 | 139 | 0 | 0 | 153 | 66 | 0 | 0 | 0 | 72 | 0 | 395 |
| Future Volume (vph) | 383 | 139 | 0 | 0 | 153 | 66 | 0 | 0 | 0 | 72 | 0 | 395 |
| Ideal Flow (vphpl) | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 |
| Total Lost time (s) | 6.1 | 6.1 | | | 6.1 | | | | | 6.1 | 6.1 | |
| Lane Util. Factor | 1.00 | 1.00 | | | 1.00 | | | | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | | | 0.95 | | | | | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | | | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1630 | 1750 | | | 1651 | | | | | 1662 | 1430 | |
| Flt Permitted | 0.61 | 1.00 | | | 1.00 | | | | | 0.76 | 1.00 | |
| Satd. Flow (perm) | 1048 | 1750 | | | 1651 | | | | | 1325 | 1430 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 416 | 151 | 0 | 0 | 166 | 72 | 0 | 0 | 0 | 78 | 0 | 429 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 26 | 0 | 0 | 0 | 0 | 0 | 258 | 0 |
| Lane Group Flow (vph) | 416 | 151 | 0 | 0 | 212 | 0 | 0 | 0 | 0 | 78 | 171 | 0 |
| Heavy Vehicles (%) | 2% | 0% | 0% | 0% | 0% | 4% | 2% | 2% | 2% | 0% | 0% | 4% |
| Turn Type | Perm | NA | | Perm | NA | | Perm | | | Perm | NA | |
| Protected Phases | | 4 | | | 8 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | | 8 | | | 2 | | | 6 | | |
| Actuated Green, G (s) | 23.9 | 23.9 | | | 23.9 | | | | | 23.9 | 23.9 | |
| Effective Green, g (s) | 23.9 | 23.9 | | | 23.9 | | | | | 23.9 | 23.9 | |
| Actuated g/C Ratio | 0.40 | 0.40 | | | 0.40 | | | | | 0.40 | 0.40 | |
| Clearance Time (s) | 6.1 | 6.1 | | | 6.1 | | | | | 6.1 | 6.1 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | | | | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 417 | 697 | | | 657 | | | | | 527 | 569 | |
| v/s Ratio Prot | | 0.09 | | | 0.13 | | | | | | c0.12 | |
| v/s Ratio Perm | c0.40 | | | | | | | | | 0.06 | | |
| v/c Ratio | 1.00 | 0.22 | | | 0.32 | | | | | 0.15 | 0.30 | |
| Uniform Delay, d1 | 18.0 | 11.9 | | | 12.5 | | | | | 11.5 | 12.3 | |
| Progression Factor | 1.00 | 1.00 | | | 1.00 | | | | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 43.1 | 0.2 | | | 0.3 | | | | | 0.6 | 1.4 | |
| Delay (s) | 61.2 | 12.0 | | | 12.8 | | | | | 12.1 | 13.7 | |
| Level of Service | E | B | | | B | | | | | B | B | |
| Approach Delay (s) | | 48.1 | | | 12.8 | | | 0.0 | | | 13.4 | |
| Approach LOS | | D | | | B | | | A | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 28.3 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.65 | | |
| Actuated Cycle Length (s) | 60.0 | Sum of lost time (s) | 12.2 |
| Intersection Capacity Utilization | 77.9% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Phase Number | 2 | 4 | 6 | 8 |
|---|---|---|---|---|
| Movement | NBTL | EBTL | SBTL | WBTL |
| Lead/Lag | | | | |
| Lead-Lag Optimize | | | | |
| Recall Mode | Max | None | Max | None |
| Maximum Split (s) | 30 | 30 | 30 | 30 |
| Maximum Split (%) | 50.0% | 50.0% | 50.0% | 50.0% |
| Minimum Split (s) | 24.1 | 24.1 | 24.1 | 24.1 |
| Yellow Time (s) | 4.1 | 4.1 | 4.1 | 4.1 |
| All-Red Time (s) | 2 | 2 | 2 | 2 |
| Minimum Initial (s) | 8 | 8 | 8 | 8 |
| Vehicle Extension (s) | 3 | 3 | 3 | 3 |
| Minimum Gap (s) | 3 | 3 | 3 | 3 |
| Time Before Reduce (s) | 0 | 0 | 0 | 0 |
| Time To Reduce (s) | 0 | 0 | 0 | 0 |
| Walk Time (s) | 7 | 7 | 7 | 7 |
| Flash Dont Walk (s) | 11 | 11 | 11 | 11 |
| Dual Entry | Yes | Yes | Yes | Yes |
| Inhibit Max | Yes | Yes | Yes | Yes |
| Start Time (s) | 0 | 30 | 0 | 30 |
| End Time (s) | 30 | 0 | 30 | 0 |
| Yield/Force Off (s) | 23.9 | 53.9 | 23.9 | 53.9 |
| Yield/Force Off 170(s) | 12.9 | 42.9 | 12.9 | 42.9 |
| Local Start Time (s) | 0 | 30 | 0 | 30 |
| Local Yield (s) | 23.9 | 53.9 | 23.9 | 53.9 |
| Local Yield 170(s) | 12.9 | 42.9 | 12.9 | 42.9 |

| Intersection Summary | |
|---|---|
| Cycle Length | 60 |
| Control Type | Actuated-Uncoordinated |
| Natural Cycle | 60 |

Splits and Phases: 3: Future Development & Dorchester Road & Oldfield Road



# APPENDIX D

## JUNCTIONS 10 – FUTURE BACKGROUND SCENARIOS

# Junctions 10

## ARCADY 10 - Roundabout Module

Version: 10.0.3.1598
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+44 (0)1344 379777 software@trl.co.uk trlsoftware.com

**The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution**

**Filename:** (new file)
**Path:**
**Report generation date:** 2022-11-11 1:36:56 PM

---

«2026 Future Background, AM
»Junction Network
»Arms
»Traffic Demand
»Origin-Destination Data
»Vehicle Mix
»Results

### Summary of junction performance

| | AM | | | | |
|---|---|---|---|---|---|
| | Set ID | Queue (PCU) | Delay (s) | RFC | LOS |
| | 2026 Future Background | | | | |
| Arm 1 | D3 | 0.2 | 5.73 | 0.15 | A |
| Arm 2 | | 0.2 | 5.54 | 0.13 | A |
| Arm 3 | | 0.0 | 5.11 | 0.04 | A |
| Arm 4 | | 0.0 | 0.00 | 0.00 | A |

*There are warnings associated with this model run - see the 'Data Errors and Warnings' tables.*

*Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle.*

### File summary

#### File Description

| | |
|---|---|
| **Title** | |
| **Location** | |
| **Site number** | |
| **Date** | 2022-11-11 |
| **Version** | |
| **Status** | (new file) |
| **Identifier** | |
| **Client** | |
| **Jobnumber** | |
| **Enumerator** | RVAINT\arcady |
| **Description** | |

### Units

| Distance units | Speed units | Traffic units input | Traffic units results | Flow units | Average delay units | Total delay units | Rate of delay units |
|---|---|---|---|---|---|---|---|
| m | kph | PCU | PCU | perHour | s | -Min | perMin |

## Analysis Options

| Calculate Queue Percentiles | Calculate residual capacity | RFC Threshold | Average Delay threshold (s) | Queue threshold (PCU) |
|---|---|---|---|---|
| | | 0.85 | 36.00 | 20.00 |

## Analysis Set Details

| ID | Network flow scaling factor (%) |
|---|---|
| A1 | 100.000 |

## Demand Set Details

| ID | Scenario name | Time Period name | Traffic profile type | Start time (HH:mm) | Finish time (HH:mm) | Time segment length (min) |
|---|---|---|---|---|---|---|
| D3 | 2026 Future Background | AM | ONE HOUR | 08:00 | 09:30 | 15 |

# 2026 Future Background, AM

### Data Errors and Warnings

| Severity | Area | Item | Description |
|---|---|---|---|
| Warning | Vehicle Mix | | HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning. |

## Junction Network

### Junctions

| Junction | Name | Junction type | Use circulating lanes | Arm order | Junction Delay (s) | Junction LOS |
|---|---|---|---|---|---|---|
| 1 | Dorchester Road at Oldfield Road Residential Development | Standard Roundabout | | 1, 2, 3, 4 | 5.57 | A |

### Junction Network

| Driving side | Lighting | Network delay (s) | Network LOS |
|---|---|---|---|
| Right | Normal/unknown | 5.57 | A |

## Arms

### Arms

| Arm | Name | Description | No give-way line |
|---|---|---|---|
| 1 | Oldfield Road | | |
| 2 | Dorchester Road (North) | | |
| 3 | Dorchester Road (West) | | |
| 4 | Site Access | | |

### Roundabout Geometry

| Arm | V - Approach road half-width (m) | E - Entry width (m) | l' - Effective flare length (m) | R - Entry radius (m) | D - Inscribed circle diameter (m) | PHI - Conflict (entry) angle (deg) | Entry only | Exit only |
|---|---|---|---|---|---|---|---|---|
| 1 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |
| 2 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |
| 3 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |
| 4 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |

### Slope / Intercept / Capacity

#### Roundabout Slope and Intercept used in model

| Arm | Final slope | Final intercept (PCU/hr) |
|---|---|---|
| 1 | 0.416 | 752 |
| 2 | 0.416 | 752 |
| 3 | 0.416 | 752 |
| 4 | 0.416 | 752 |

*The slope and intercept shown above include any corrections and adjustments.*

## Traffic Demand

| Vehicle mix source | PCU Factor for a HV (PCU) |
|---|---|
| HV Percentages | 2.00 |

### Demand overview (Traffic)

| Arm | Linked arm | Use O-D data | Average Demand (PCU/hr) | Scaling Factor (%) |
|---|---|---|---|---|
| 1 | | ✓ | 102 | 100.000 |
| 2 | | ✓ | 89 | 100.000 |
| 3 | | ✓ | 28 | 100.000 |
| 4 | | ✓ | 0 | 100.000 |

## Origin-Destination Data

#### Demand (PCU/hr)

| | | To | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| From | 1 | 0 | 94 | 8 | 0 |
| | 2 | 35 | 0 | 54 | 0 |
| | 3 | 4 | 24 | 0 | 0 |
| | 4 | 0 | 0 | 0 | 0 |

## Vehicle Mix

#### Heavy Vehicle Percentages

| | | To | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| From | 1 | 0 | 0 | 0 | 0 |
| | 2 | 0 | 0 | 0 | 0 |
| | 3 | 0 | 0 | 0 | 0 |
| | 4 | 0 | 0 | 0 | 0 |

## Results

### Results Summary for whole modelled period

| Arm | Max RFC | Max Delay (s) | Max Queue (PCU) | Max LOS |
|---|---|---|---|---|
| 1 | 0.15 | 5.73 | 0.2 | A |
| 2 | 0.13 | 5.54 | 0.2 | A |
| 3 | 0.04 | 5.11 | 0.0 | A |
| 4 | 0.00 | 0.00 | 0.0 | A |

### Main Results for each time segment

#### 08:00 - 08:15

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 77 | 18 | 744 | 0.103 | 76 | 0.1 | 5.386 | A |
| 2 | 67 | 6 | 749 | 0.089 | 67 | 0.1 | 5.272 | A |
| 3 | 21 | 26 | 741 | 0.028 | 21 | 0.0 | 5.001 | A |
| 4 | 0 | 47 | 732 | 0.000 | 0 | 0.0 | 0.000 | A |

**08:15 - 08:30**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 92 | 22 | 743 | 0.123 | 92 | 0.1 | 5.528 | A |
| 2 | 80 | 7 | 749 | 0.107 | 80 | 0.1 | 5.382 | A |
| 3 | 25 | 31 | 739 | 0.034 | 25 | 0.0 | 5.044 | A |
| 4 | 0 | 57 | 728 | 0.000 | 0 | 0.0 | 0.000 | A |

**08:30 - 08:45**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 112 | 26 | 741 | 0.152 | 112 | 0.2 | 5.725 | A |
| 2 | 98 | 9 | 748 | 0.131 | 98 | 0.1 | 5.537 | A |
| 3 | 31 | 38 | 736 | 0.042 | 31 | 0.0 | 5.106 | A |
| 4 | 0 | 69 | 723 | 0.000 | 0 | 0.0 | 0.000 | A |

**08:45 - 09:00**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 112 | 26 | 741 | 0.152 | 112 | 0.2 | 5.727 | A |
| 2 | 98 | 9 | 748 | 0.131 | 98 | 0.2 | 5.537 | A |
| 3 | 31 | 39 | 736 | 0.042 | 31 | 0.0 | 5.106 | A |
| 4 | 0 | 69 | 723 | 0.000 | 0 | 0.0 | 0.000 | A |

**09:00 - 09:15**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 92 | 22 | 743 | 0.123 | 92 | 0.1 | 5.533 | A |
| 2 | 80 | 7 | 749 | 0.107 | 80 | 0.1 | 5.384 | A |
| 3 | 25 | 32 | 739 | 0.034 | 25 | 0.0 | 5.047 | A |
| 4 | 0 | 57 | 728 | 0.000 | 0 | 0.0 | 0.000 | A |

**09:15 - 09:30**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 77 | 18 | 744 | 0.103 | 77 | 0.1 | 5.397 | A |
| 2 | 67 | 6 | 749 | 0.089 | 67 | 0.1 | 5.279 | A |
| 3 | 21 | 26 | 741 | 0.028 | 21 | 0.0 | 5.003 | A |
| 4 | 0 | 47 | 732 | 0.000 | 0 | 0.0 | 0.000 | A |

# Junctions 10

## ARCADY 10 - Roundabout Module

Version: 10.0.3.1598
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**Filename:** (new file)
**Path:**
**Report generation date:** 2022-11-11 1:37:59 PM

---

«2026 Future Background, PM
»Junction Network
»Arms
»Traffic Demand
»Origin-Destination Data
»Vehicle Mix
»Results

### Summary of junction performance

| | PM | | | | |
|---|---|---|---|---|---|
| | Set ID | Queue (PCU) | Delay (s) | RFC | LOS |
| | 2026 Future Background | | | | |
| **Arm 1** | D4 | 0.1 | 5.72 | 0.11 | A |
| **Arm 2** | | 0.3 | 6.11 | 0.21 | A |
| **Arm 3** | | 0.2 | 5.98 | 0.16 | A |
| **Arm 4** | | 0.0 | 0.00 | 0.00 | A |

*There are warnings associated with this model run - see the 'Data Errors and Warnings' tables.*

*Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle.*

### File summary

#### File Description

| | |
|---|---|
| **Title** | |
| **Location** | |
| **Site number** | |
| **Date** | 2022-11-11 |
| **Version** | |
| **Status** | (new file) |
| **Identifier** | |
| **Client** | |
| **Jobnumber** | |
| **Enumerator** | RVAINT\arcady |
| **Description** | |

### Units

| Distance units | Speed units | Traffic units input | Traffic units results | Flow units | Average delay units | Total delay units | Rate of delay units |
|---|---|---|---|---|---|---|---|
| m | kph | PCU | PCU | perHour | s | -Min | perMin |

## Analysis Options

| Calculate Queue Percentiles | Calculate residual capacity | RFC Threshold | Average Delay threshold (s) | Queue threshold (PCU) |
|---|---|---|---|---|
| | | 0.85 | 36.00 | 20.00 |

## Analysis Set Details

| ID | Network flow scaling factor (%) |
|---|---|
| A1 | 100.000 |

## Demand Set Details

| ID | Scenario name | Time Period name | Traffic profile type | Start time (HH:mm) | Finish time (HH:mm) | Time segment length (min) |
|---|---|---|---|---|---|---|
| D4 | 2026 Future Background | PM | ONE HOUR | 08:00 | 09:30 | 15 |

# 2026 Future Background, PM

### Data Errors and Warnings

| Severity | Area | Item | Description |
|---|---|---|---|
| Warning | Vehicle Mix | | HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning. |

## Junction Network

### Junctions

| Junction | Name | Junction type | Use circulating lanes | Arm order | Junction Delay (s) | Junction LOS |
|---|---|---|---|---|---|---|
| 1 | Dorchester Road at Oldfield Road Residential Development | Standard Roundabout | | 1, 2, 3, 4 | 5.98 | A |

### Junction Network

| Driving side | Lighting | Network delay (s) | Network LOS |
|---|---|---|---|
| Right | Normal/unknown | 5.98 | A |

## Arms

### Arms

| Arm | Name | Description | No give-way line |
|---|---|---|---|
| 1 | Oldfield Road | | |
| 2 | Dorchester Road (North) | | |
| 3 | Dorchester Road (West) | | |
| 4 | Site Access | | |

### Roundabout Geometry

| Arm | V - Approach road half-width (m) | E - Entry width (m) | l' - Effective flare length (m) | R - Entry radius (m) | D - Inscribed circle diameter (m) | PHI - Conflict (entry) angle (deg) | Entry only | Exit only |
|---|---|---|---|---|---|---|---|---|
| 1 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |
| 2 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |
| 3 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |
| 4 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |

### Slope / Intercept / Capacity

#### Roundabout Slope and Intercept used in model

| Arm | Final slope | Final intercept (PCU/hr) |
|---|---|---|
| 1 | 0.416 | 752 |
| 2 | 0.416 | 752 |
| 3 | 0.416 | 752 |
| 4 | 0.416 | 752 |

*The slope and intercept shown above include any corrections and adjustments.*

## Traffic Demand

| Vehicle mix source | PCU Factor for a HV (PCU) |
|---|---|
| HV Percentages | 2.00 |

### Demand overview (Traffic)

| Arm | Linked arm | Use O-D data | Average Demand (PCU/hr) | Scaling Factor (%) |
|---|---|---|---|---|
| 1 | | ✓ | 71 | 100.000 |
| 2 | | ✓ | 144 | 100.000 |
| 3 | | ✓ | 107 | 100.000 |
| 4 | | ✓ | 0 | 100.000 |

## Origin-Destination Data

#### Demand (PCU/hr)

| | | To | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| From | 1 | 0 | 63 | 8 | 0 |
| | 2 | 69 | 0 | 75 | 0 |
| | 3 | 10 | 97 | 0 | 0 |
| | 4 | 0 | 0 | 0 | 0 |

## Vehicle Mix

#### Heavy Vehicle Percentages

| | | To | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| From | 1 | 0 | 0 | 0 | 0 |
| | 2 | 0 | 0 | 0 | 0 |
| | 3 | 0 | 0 | 0 | 0 |
| | 4 | 0 | 0 | 0 | 0 |

## Results

### Results Summary for whole modelled period

| Arm | Max RFC | Max Delay (s) | Max Queue (PCU) | Max LOS |
|---|---|---|---|---|
| 1 | 0.11 | 5.72 | 0.1 | A |
| 2 | 0.21 | 6.11 | 0.3 | A |
| 3 | 0.16 | 5.98 | 0.2 | A |
| 4 | 0.00 | 0.00 | 0.0 | A |

### Main Results for each time segment

#### 08:00 - 08:15

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 53 | 73 | 722 | 0.074 | 53 | 0.1 | 5.383 | A |
| 2 | 108 | 6 | 749 | 0.145 | 108 | 0.2 | 5.606 | A |
| 3 | 81 | 52 | 730 | 0.110 | 80 | 0.1 | 5.533 | A |
| 4 | 0 | 132 | 697 | 0.000 | 0 | 0.0 | 0.000 | A |

**08:15 - 08:30**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 64 | 87 | 716 | 0.089 | 64 | 0.1 | 5.523 | A |
| 2 | 129 | 7 | 749 | 0.173 | 129 | 0.2 | 5.810 | A |
| 3 | 96 | 62 | 726 | 0.132 | 96 | 0.2 | 5.715 | A |
| 4 | 0 | 158 | 686 | 0.000 | 0 | 0.0 | 0.000 | A |

**08:30 - 08:45**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 78 | 107 | 707 | 0.111 | 78 | 0.1 | 5.720 | A |
| 2 | 159 | 9 | 748 | 0.212 | 158 | 0.3 | 6.100 | A |
| 3 | 118 | 76 | 720 | 0.164 | 118 | 0.2 | 5.972 | A |
| 4 | 0 | 193 | 671 | 0.000 | 0 | 0.0 | 0.000 | A |

**08:45 - 09:00**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 78 | 107 | 707 | 0.111 | 78 | 0.1 | 5.721 | A |
| 2 | 159 | 9 | 748 | 0.212 | 159 | 0.3 | 6.105 | A |
| 3 | 118 | 76 | 720 | 0.164 | 118 | 0.2 | 5.975 | A |
| 4 | 0 | 194 | 671 | 0.000 | 0 | 0.0 | 0.000 | A |

**09:00 - 09:15**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 64 | 87 | 715 | 0.089 | 64 | 0.1 | 5.528 | A |
| 2 | 129 | 7 | 749 | 0.173 | 130 | 0.2 | 5.819 | A |
| 3 | 96 | 62 | 726 | 0.133 | 96 | 0.2 | 5.721 | A |
| 4 | 0 | 158 | 686 | 0.000 | 0 | 0.0 | 0.000 | A |

**09:15 - 09:30**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 53 | 73 | 721 | 0.074 | 54 | 0.1 | 5.390 | A |
| 2 | 108 | 6 | 749 | 0.145 | 109 | 0.2 | 5.622 | A |
| 3 | 81 | 52 | 730 | 0.110 | 81 | 0.1 | 5.543 | A |
| 4 | 0 | 133 | 697 | 0.000 | 0 | 0.0 | 0.000 | A |

# Junctions 10

## ARCADY 10 - Roundabout Module

Version: 10.0.3.1598
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**Filename:** (new file)
**Path:**
**Report generation date:** 2022-11-11 1:48:16 PM

---

«2031 Future Background, AM
»Junction Network
»Arms
»Traffic Demand
»Origin-Destination Data
»Vehicle Mix
»Results

### Summary of junction performance

| | AM | | | | |
|---|---|---|---|---|---|
| | Set ID | Queue (PCU) | Delay (s) | RFC | LOS |
| | 2031 Future Background | | | | |
| Arm 1 | D7 | 0.4 | 7.55 | 0.28 | A |
| Arm 2 | | 0.5 | 7.64 | 0.35 | A |
| Arm 3 | | 0.7 | 8.55 | 0.43 | A |
| Arm 4 | | 0.0 | 0.00 | 0.00 | A |

*There are warnings associated with this model run - see the 'Data Errors and Warnings' tables.*

*Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle.*

### File summary

#### File Description

| | |
|---|---|
| **Title** | |
| **Location** | |
| **Site number** | |
| **Date** | 2022-11-11 |
| **Version** | |
| **Status** | (new file) |
| **Identifier** | |
| **Client** | |
| **Jobnumber** | |
| **Enumerator** | RVAINT\arcady |
| **Description** | |

### Units

| Distance units | Speed units | Traffic units input | Traffic units results | Flow units | Average delay units | Total delay units | Rate of delay units |
|---|---|---|---|---|---|---|---|
| m | kph | PCU | PCU | perHour | s | -Min | perMin |

## Analysis Options

| Calculate Queue Percentiles | Calculate residual capacity | RFC Threshold | Average Delay threshold (s) | Queue threshold (PCU) |
|---|---|---|---|---|
| | | 0.85 | 36.00 | 20.00 |

## Analysis Set Details

| ID | Network flow scaling factor (%) |
|---|---|
| A1 | 100.000 |

## Demand Set Details

| ID | Scenario name | Time Period name | Traffic profile type | Start time (HH:mm) | Finish time (HH:mm) | Time segment length (min) |
|---|---|---|---|---|---|---|
| D7 | 2031 Future Background | AM | ONE HOUR | 08:00 | 09:30 | 15 |

# 2031 Future Background, AM

### Data Errors and Warnings

| Severity | Area | Item | Description |
|---|---|---|---|
| Warning | Vehicle Mix | | HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning. |

## Junction Network

### Junctions

| Junction | Name | Junction type | Use circulating lanes | Arm order | Junction Delay (s) | Junction LOS |
|---|---|---|---|---|---|---|
| 1 | Dorchester Road at Oldfield Road Residential Development | Standard Roundabout | | 1, 2, 3, 4 | 8.00 | A |

### Junction Network

| Driving side | Lighting | Network delay (s) | Network LOS |
|---|---|---|---|
| Right | Normal/unknown | 8.00 | A |

## Arms

### Arms

| Arm | Name | Description | No give-way line |
|---|---|---|---|
| 1 | Oldfield Road | | |
| 2 | Dorchester Road (North) | | |
| 3 | Dorchester Road (West) | | |
| 4 | Site Access | | |

### Roundabout Geometry

| Arm | V - Approach road half-width (m) | E - Entry width (m) | l' - Effective flare length (m) | R - Entry radius (m) | D - Inscribed circle diameter (m) | PHI - Conflict (entry) angle (deg) | Entry only | Exit only |
|---|---|---|---|---|---|---|---|---|
| 1 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |
| 2 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |
| 3 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |
| 4 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |

### Slope / Intercept / Capacity

#### Roundabout Slope and Intercept used in model

| Arm | Final slope | Final intercept (PCU/hr) |
|---|---|---|
| 1 | 0.416 | 752 |
| 2 | 0.416 | 752 |
| 3 | 0.416 | 752 |
| 4 | 0.416 | 752 |

*The slope and intercept shown above include any corrections and adjustments.*

## Traffic Demand

| Vehicle mix source | PCU Factor for a HV (PCU) |
|---|---|
| HV Percentages | 2.00 |

### Demand overview (Traffic)

| Arm | Linked arm | Use O-D data | Average Demand (PCU/hr) | Scaling Factor (%) |
|---|---|---|---|---|
| 1 | | ✓ | 166 | 100.000 |
| 2 | | ✓ | 226 | 100.000 |
| 3 | | ✓ | 285 | 100.000 |
| 4 | | ✓ | 0 | 100.000 |

## Origin-Destination Data

#### Demand (PCU/hr)

| | | To | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| From | 1 | 0 | 97 | 69 | 0 |
| | 2 | 37 | 0 | 189 | 0 |
| | 3 | 84 | 201 | 0 | 0 |
| | 4 | 0 | 0 | 0 | 0 |

## Vehicle Mix

#### Heavy Vehicle Percentages

| | | To | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| From | 1 | 0 | 0 | 0 | 0 |
| | 2 | 0 | 0 | 0 | 0 |
| | 3 | 0 | 0 | 0 | 0 |
| | 4 | 0 | 0 | 0 | 0 |

## Results

### Results Summary for whole modelled period

| Arm | Max RFC | Max Delay (s) | Max Queue (PCU) | Max LOS |
|---|---|---|---|---|
| 1 | 0.28 | 7.55 | 0.4 | A |
| 2 | 0.35 | 7.64 | 0.5 | A |
| 3 | 0.43 | 8.55 | 0.7 | A |
| 4 | 0.00 | 0.00 | 0.0 | A |

### Main Results for each time segment

#### 08:00 - 08:15

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 125 | 150 | 689 | 0.181 | 124 | 0.2 | 6.360 | A |
| 2 | 170 | 52 | 730 | 0.233 | 169 | 0.3 | 6.400 | A |
| 3 | 215 | 28 | 740 | 0.290 | 213 | 0.4 | 6.807 | A |
| 4 | 0 | 241 | 652 | 0.000 | 0 | 0.0 | 0.000 | A |

**08:15 - 08:30**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 149 | 180 | 677 | 0.221 | 149 | 0.3 | 6.817 | A |
| 2 | 203 | 62 | 726 | 0.280 | 203 | 0.4 | 6.876 | A |
| 3 | 256 | 33 | 738 | 0.347 | 256 | 0.5 | 7.457 | A |
| 4 | 0 | 289 | 632 | 0.000 | 0 | 0.0 | 0.000 | A |

**08:30 - 08:45**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 183 | 221 | 660 | 0.277 | 182 | 0.4 | 7.530 | A |
| 2 | 249 | 76 | 720 | 0.345 | 248 | 0.5 | 7.617 | A |
| 3 | 314 | 41 | 735 | 0.427 | 313 | 0.7 | 8.516 | A |
| 4 | 0 | 354 | 605 | 0.000 | 0 | 0.0 | 0.000 | A |

**08:45 - 09:00**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 183 | 221 | 660 | 0.277 | 183 | 0.4 | 7.545 | A |
| 2 | 249 | 76 | 720 | 0.346 | 249 | 0.5 | 7.636 | A |
| 3 | 314 | 41 | 735 | 0.427 | 314 | 0.7 | 8.548 | A |
| 4 | 0 | 355 | 604 | 0.000 | 0 | 0.0 | 0.000 | A |

**09:00 - 09:15**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 149 | 181 | 676 | 0.221 | 150 | 0.3 | 6.837 | A |
| 2 | 203 | 62 | 726 | 0.280 | 204 | 0.4 | 6.900 | A |
| 3 | 256 | 33 | 738 | 0.347 | 257 | 0.5 | 7.498 | A |
| 4 | 0 | 290 | 631 | 0.000 | 0 | 0.0 | 0.000 | A |

**09:15 - 09:30**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 125 | 152 | 689 | 0.181 | 125 | 0.2 | 6.390 | A |
| 2 | 170 | 52 | 730 | 0.233 | 170 | 0.3 | 6.438 | A |
| 3 | 215 | 28 | 740 | 0.290 | 215 | 0.4 | 6.864 | A |
| 4 | 0 | 243 | 651 | 0.000 | 0 | 0.0 | 0.000 | A |

# Junctions 10

## ARCADY 10 - Roundabout Module

Version: 10.0.3.1598
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**Filename:** (new file)
**Path:**
**Report generation date:** 2022-11-11 1:52:06 PM

---

«2031 Future Background , PM
»Junction Network
»Arms
»Traffic Demand
»Origin-Destination Data
»Vehicle Mix
»Results

### Summary of junction performance

| | PM | | | | |
|---|---|---|---|---|---|
| | Set ID | Queue (PCU) | Delay (s) | RFC | LOS |
| | 2031 Future Background | | | | |
| Arm 1 | D8 | 0.7 | 10.72 | 0.42 | B |
| Arm 2 | | 2.9 | 21.27 | 0.75 | C |
| Arm 3 | | 3.7 | 24.52 | 0.80 | C |
| Arm 4 | | 0.0 | 0.00 | 0.00 | A |

*There are warnings associated with this model run - see the 'Data Errors and Warnings' tables.*

*Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle.*

### File summary

#### File Description

| | |
|---|---|
| **Title** | |
| **Location** | |
| **Site number** | |
| **Date** | 2022-11-11 |
| **Version** | |
| **Status** | (new file) |
| **Identifier** | |
| **Client** | |
| **Jobnumber** | |
| **Enumerator** | RVAINT\arcady |
| **Description** | |

### Units

| Distance units | Speed units | Traffic units input | Traffic units results | Flow units | Average delay units | Total delay units | Rate of delay units |
|---|---|---|---|---|---|---|---|
| m | kph | PCU | PCU | perHour | s | -Min | perMin |

## Analysis Options

| Calculate Queue Percentiles | Calculate residual capacity | RFC Threshold | Average Delay threshold (s) | Queue threshold (PCU) |
|---|---|---|---|---|
| | | 0.85 | 36.00 | 20.00 |

## Analysis Set Details

| ID | Network flow scaling factor (%) |
|---|---|
| A1 | 100.000 |

## Demand Set Details

| ID | Scenario name | Time Period name | Traffic profile type | Start time (HH:mm) | Finish time (HH:mm) | Time segment length (min) |
|---|---|---|---|---|---|---|
| D8 | 2031 Future Background | PM | ONE HOUR | 08:00 | 09:30 | 15 |

# 2031 Future Background , PM

### Data Errors and Warnings

| Severity | Area | Item | Description |
|---|---|---|---|
| Warning | Vehicle Mix | | HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning. |

## Junction Network

### Junctions

| Junction | Name | Junction type | Use circulating lanes | Arm order | Junction Delay (s) | Junction LOS |
|---|---|---|---|---|---|---|
| 1 | Dorchester Road at Oldfield Road Residential Development | Standard Roundabout | | 1, 2, 3, 4 | 20.76 | C |

### Junction Network

| Driving side | Lighting | Network delay (s) | Network LOS |
|---|---|---|---|
| Right | Normal/unknown | 20.76 | C |

## Arms

### Arms

| Arm | Name | Description | No give-way line |
|---|---|---|---|
| 1 | Oldfield Road | | |
| 2 | Dorchester Road (North) | | |
| 3 | Dorchester Road (West) | | |
| 4 | Site Access | | |

### Roundabout Geometry

| Arm | V - Approach road half-width (m) | E - Entry width (m) | l' - Effective flare length (m) | R - Entry radius (m) | D - Inscribed circle diameter (m) | PHI - Conflict (entry) angle (deg) | Entry only | Exit only |
|---|---|---|---|---|---|---|---|---|
| 1 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |
| 2 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |
| 3 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |
| 4 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |

### Slope / Intercept / Capacity

#### Roundabout Slope and Intercept used in model

| Arm | Final slope | Final intercept (PCU/hr) |
|---|---|---|
| 1 | 0.416 | 752 |
| 2 | 0.416 | 752 |
| 3 | 0.416 | 752 |
| 4 | 0.416 | 752 |

*The slope and intercept shown above include any corrections and adjustments.*

## Traffic Demand

| Vehicle mix source | PCU Factor for a HV (PCU) |
|---|---|
| HV Percentages | 2.00 |

### Demand overview (Traffic)

| Arm | Linked arm | Use O-D data | Average Demand (PCU/hr) | Scaling Factor (%) |
|---|---|---|---|---|
| 1 | | ✓ | 219 | 100.000 |
| 2 | | ✓ | 467 | 100.000 |
| 3 | | ✓ | 522 | 100.000 |
| 4 | | ✓ | 0 | 100.000 |

## Origin-Destination Data

### Demand (PCU/hr)

| | | To | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| From | 1 | 0 | 66 | 153 | 0 |
| | 2 | 72 | 0 | 395 | 0 |
| | 3 | 139 | 383 | 0 | 0 |
| | 4 | 0 | 0 | 0 | 0 |

## Vehicle Mix

### Heavy Vehicle Percentages

| | | To | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| From | 1 | 0 | 0 | 0 | 0 |
| | 2 | 0 | 0 | 0 | 0 |
| | 3 | 0 | 0 | 0 | 0 |
| | 4 | 0 | 0 | 0 | 0 |

## Results

### Results Summary for whole modelled period

| Arm | Max RFC | Max Delay (s) | Max Queue (PCU) | Max LOS |
|---|---|---|---|---|
| 1 | 0.42 | 10.72 | 0.7 | B |
| 2 | 0.75 | 21.27 | 2.9 | C |
| 3 | 0.80 | 24.52 | 3.7 | C |
| 4 | 0.00 | 0.00 | 0.0 | A |

### Main Results for each time segment

#### 08:00 - 08:15

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 165 | 285 | 633 | 0.260 | 163 | 0.3 | 7.641 | A |
| 2 | 352 | 114 | 704 | 0.499 | 348 | 1.0 | 9.991 | A |
| 3 | 393 | 54 | 729 | 0.539 | 388 | 1.1 | 10.424 | B |
| 4 | 0 | 442 | 568 | 0.000 | 0 | 0.0 | 0.000 | A |

**08:15 - 08:30**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 197 | 342 | 609 | 0.323 | 196 | 0.5 | 8.705 | A |
| 2 | 420 | 137 | 695 | 0.604 | 418 | 1.5 | 12.902 | B |
| 3 | 469 | 64 | 725 | 0.647 | 467 | 1.8 | 13.802 | B |
| 4 | 0 | 531 | 531 | 0.000 | 0 | 0.0 | 0.000 | A |

**08:30 - 08:45**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 241 | 416 | 579 | 0.417 | 240 | 0.7 | 10.605 | B |
| 2 | 514 | 168 | 682 | 0.754 | 509 | 2.8 | 20.168 | C |
| 3 | 575 | 78 | 719 | 0.799 | 568 | 3.6 | 22.700 | C |
| 4 | 0 | 646 | 483 | 0.000 | 0 | 0.0 | 0.000 | A |

**08:45 - 09:00**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 241 | 421 | 577 | 0.418 | 241 | 0.7 | 10.721 | B |
| 2 | 514 | 168 | 682 | 0.754 | 514 | 2.9 | 21.272 | C |
| 3 | 575 | 79 | 719 | 0.800 | 574 | 3.7 | 24.521 | C |
| 4 | 0 | 653 | 480 | 0.000 | 0 | 0.0 | 0.000 | A |

**09:00 - 09:15**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 197 | 350 | 606 | 0.325 | 198 | 0.5 | 8.829 | A |
| 2 | 420 | 138 | 694 | 0.605 | 425 | 1.6 | 13.634 | B |
| 3 | 469 | 66 | 724 | 0.648 | 477 | 1.9 | 14.922 | B |
| 4 | 0 | 542 | 526 | 0.000 | 0 | 0.0 | 0.000 | A |

**09:15 - 09:30**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 165 | 290 | 631 | 0.261 | 165 | 0.4 | 7.741 | A |
| 2 | 352 | 116 | 704 | 0.500 | 354 | 1.0 | 10.353 | B |
| 3 | 393 | 55 | 729 | 0.539 | 396 | 1.2 | 10.896 | B |
| 4 | 0 | 450 | 565 | 0.000 | 0 | 0.0 | 0.000 | A |

# APPENDIX E

## TTS DATA

Mon Oct 17 2022 11:26:10 GMT-0400 (Eastern Daylight Time) - Run Time: 1867ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of household - pd_hhld
Column: Planning district of employment - pd_emp

Filters:
Regional mu

Trip 2016
Table:

| | Mississauga | Oakville | Burlington | Hamilton | Grimsby | Lincoln | Pelham | Niagara-on-the-Lake | St. Catharines | Thorold | Niagara Falls | Welland | Fort Erie | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Niagara Falls Trips** | **560** | **641** | **638** | **3666** | **592** | **968** | **773** | **7022** | **14500** | **3322** | **65933** | **2987** | **2760** | **104362** |
| **Percentage** | 1% | 1% | 1% | 4% | 1% | 1% | 1% | 7% | 14% | 3% | 63% | 3% | 3% | **100%** |
| **Direction** | **North** | **North** | **North** | **North** | **North** | **North** | **North** | **North** | **North** | **North** | **North** | **North** | **South** | |

| Direction | Percentages |
|---|---|
| Dorchester Road (West) | 3% |
| Dorchester Road (East) | 97% |
| Total | 100% |

**APPENDIX F**

# HCM REPORTS – FUTURE TOTAL SCENARIOS

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 7.4 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 32 | 4 | 0 | 0 | 8 | 94 | 0 | 20 | 0 | 35 | 6 | 56 |
| Future Vol, veh/h | 32 | 4 | 0 | 0 | 8 | 94 | 0 | 20 | 0 | 35 | 6 | 56 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 35 | 4 | 0 | 0 | 9 | 102 | 0 | 22 | 0 | 38 | 7 | 61 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay | 7.7 | 7.2 | 7.5 | 7.5 |
| HCM LOS | A | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|---|
| Vol Left, % | 0% | 89% | 0% | 36% |
| Vol Thru, % | 100% | 11% | 8% | 6% |
| Vol Right, % | 0% | 0% | 92% | 58% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 20 | 36 | 102 | 97 |
| LT Vol | 0 | 32 | 0 | 35 |
| Through Vol | 20 | 4 | 8 | 6 |
| RT Vol | 0 | 0 | 94 | 56 |
| Lane Flow Rate | 22 | 39 | 111 | 105 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0.026 | 0.048 | 0.112 | 0.115 |
| Departure Headway (Hd) | 4.278 | 4.42 | 3.631 | 3.936 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 828 | 803 | 976 | 904 |
| Service Time | 2.348 | 2.487 | 1.697 | 1.993 |
| HCM Lane V/C Ratio | 0.027 | 0.049 | 0.114 | 0.116 |
| HCM Control Delay | 7.5 | 7.7 | 7.2 | 7.5 |
| HCM Lane LOS | A | A | A | A |
| HCM 95th-tile Q | 0.1 | 0.2 | 0.4 | 0.4 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 8.2 |
| Intersection LOS | A |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 102 | 10 | 0 | 0 | 8 | 63 | 0 | 11 | 0 | 69 | 18 | 83 |
| Future Vol, veh/h | 102 | 10 | 0 | 0 | 8 | 63 | 0 | 11 | 0 | 69 | 18 | 83 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 111 | 11 | 0 | 0 | 9 | 68 | 0 | 12 | 0 | 75 | 20 | 90 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay | 8.5 | 7.4 | 7.7 | 8.3 |
| HCM LOS | A | A | A | A |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|---|
| Vol Left, % | 0% | 91% | 0% | 41% |
| Vol Thru, % | 100% | 9% | 11% | 11% |
| Vol Right, % | 0% | 0% | 89% | 49% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 11 | 112 | 71 | 170 |
| LT Vol | 0 | 102 | 0 | 69 |
| Through Vol | 11 | 10 | 8 | 18 |
| RT Vol | 0 | 0 | 63 | 83 |
| Lane Flow Rate | 12 | 122 | 77 | 185 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0.015 | 0.157 | 0.085 | 0.215 |
| Departure Headway (Hd) | 4.584 | 4.631 | 3.979 | 4.188 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 782 | 777 | 902 | 859 |
| Service Time | 2.604 | 2.645 | 1.994 | 2.201 |
| HCM Lane V/C Ratio | 0.015 | 0.157 | 0.085 | 0.215 |
| HCM Control Delay | 7.7 | 8.5 | 7.4 | 8.3 |
| HCM Lane LOS | A | A | A | A |
| HCM 95th-tile Q | 0 | 0.6 | 0.3 | 0.8 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 10.6 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 209 | 84 | 0 | 0 | 69 | 97 | 0 | 20 | 0 | 37 | 6 | 191 |
| Future Vol, veh/h | 209 | 84 | 0 | 0 | 69 | 97 | 0 | 20 | 0 | 37 | 6 | 191 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 227 | 91 | 0 | 0 | 75 | 105 | 0 | 22 | 0 | 40 | 7 | 208 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay | 11.9 | 9.2 | 8.8 | 10.1 |
| HCM LOS | B | A | A | B |

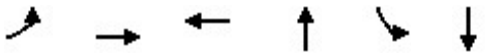
| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|---|
| Vol Left, % | 0% | 71% | 0% | 16% |
| Vol Thru, % | 100% | 29% | 42% | 3% |
| Vol Right, % | 0% | 0% | 58% | 82% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 20 | 293 | 166 | 234 |
| LT Vol | 0 | 209 | 0 | 37 |
| Through Vol | 20 | 84 | 69 | 6 |
| RT Vol | 0 | 0 | 97 | 191 |
| Lane Flow Rate | 22 | 318 | 180 | 254 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0.034 | 0.437 | 0.233 | 0.331 |
| Departure Headway (Hd) | 5.582 | 4.945 | 4.643 | 4.685 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 645 | 723 | 765 | 761 |
| Service Time | 3.582 | 3.019 | 2.726 | 2.755 |
| HCM Lane V/C Ratio | 0.034 | 0.44 | 0.235 | 0.334 |
| HCM Control Delay | 8.8 | 11.9 | 9.2 | 10.1 |
| HCM Lane LOS | A | B | A | B |
| HCM 95th-tile Q | 0.1 | 2.2 | 0.9 | 1.5 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 46.9 |
| Intersection LOS | E |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↕ | | | ↕ | | | ↕ | | | ↕ | |
| Traffic Vol, veh/h | 388 | 139 | 0 | 0 | 153 | 66 | 0 | 11 | 0 | 72 | 18 | 403 |
| Future Vol, veh/h | 388 | 139 | 0 | 0 | 153 | 66 | 0 | 11 | 0 | 72 | 18 | 403 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 422 | 151 | 0 | 0 | 166 | 72 | 0 | 12 | 0 | 78 | 20 | 438 |
| Number of Lanes | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |

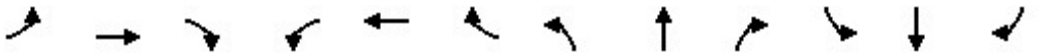
| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 1 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 1 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 1 | 1 |
| HCM Control Delay | 67.1 | 15.2 | 11.4 | 40.2 |
| HCM LOS | F | C | B | E |

| Lane | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|---|---|---|---|---|
| Vol Left, % | 0% | 74% | 0% | 15% |
| Vol Thru, % | 100% | 26% | 70% | 4% |
| Vol Right, % | 0% | 0% | 30% | 82% |
| Sign Control | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 11 | 527 | 219 | 493 |
| LT Vol | 0 | 388 | 0 | 72 |
| Through Vol | 11 | 139 | 153 | 18 |
| RT Vol | 0 | 0 | 66 | 403 |
| Lane Flow Rate | 12 | 573 | 238 | 536 |
| Geometry Grp | 1 | 1 | 1 | 1 |
| Degree of Util (X) | 0.027 | 1.015 | 0.446 | 0.895 |
| Departure Headway (Hd) | 8.19 | 6.381 | 6.744 | 6.015 |
| Convergence, Y/N | Yes | Yes | Yes | Yes |
| Cap | 440 | 567 | 531 | 600 |
| Service Time | 6.19 | 4.437 | 4.817 | 4.065 |
| HCM Lane V/C Ratio | 0.027 | 1.011 | 0.448 | 0.893 |
| HCM Control Delay | 11.4 | 67.1 | 15.2 | 40.2 |
| HCM Lane LOS | B | F | C | E |
| HCM 95th-tile Q | 0.1 | 15.1 | 2.3 | 10.7 |



| Lane Group | EBL | EBT | WBT | NBT | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 35 | 4 | 111 | 22 | 38 | 68 |
| v/c Ratio | 0.20 | 0.02 | 0.34 | 0.02 | 0.05 | 0.07 |
| Control Delay | 19.0 | 15.0 | 8.1 | 5.0 | 5.2 | 2.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 19.0 | 15.0 | 8.1 | 5.0 | 5.2 | 2.3 |
| Queue Length 50th (m) | 2.7 | 0.3 | 0.7 | 0.7 | 1.2 | 0.2 |
| Queue Length 95th (m) | 8.2 | 2.1 | 10.2 | 3.0 | 4.4 | 4.2 |
| Internal Link Dist (m) | | 29.7 | 51.9 | 59.7 | | 61.5 |
| Turn Bay Length (m) | 15.0 | | | | 15.0 | |
| Base Capacity (vph) | 493 | 702 | 761 | 1130 | 831 | 951 |
| 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 | 0.07 | 0.01 | 0.15 | 0.02 | 0.05 | 0.07 |

Intersection Summary



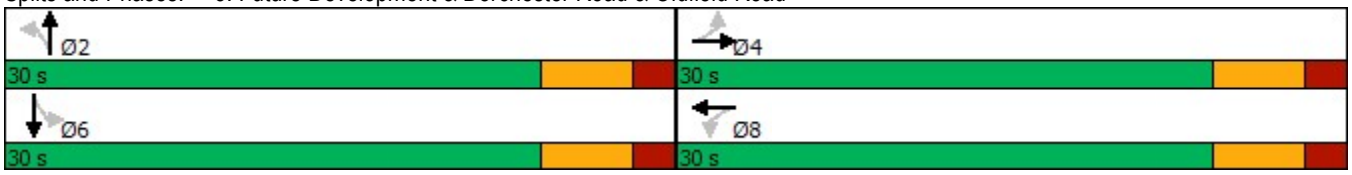
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 32 | 4 | 0 | 0 | 8 | 94 | 0 | 20 | 0 | 35 | 6 | 56 |
| Future Volume (vph) | 32 | 4 | 0 | 0 | 8 | 94 | 0 | 20 | 0 | 35 | 6 | 56 |
| Ideal Flow (vphpl) | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 |
| Total Lost time (s) | 6.1 | 6.1 | | | 6.1 | | | 6.1 | | 6.1 | 6.1 | |
| Lane Util. Factor | 1.00 | 1.00 | | | 1.00 | | | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | | | 0.86 | | | 1.00 | | 1.00 | 0.87 | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1363 | 1400 | | | 1417 | | | 1716 | | 1614 | 1413 | |
| Flt Permitted | 0.69 | 1.00 | | | 1.00 | | | 1.00 | | 0.74 | 1.00 | |
| Satd. Flow (perm) | 983 | 1400 | | | 1417 | | | 1716 | | 1262 | 1413 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 35 | 4 | 0 | 0 | 9 | 102 | 0 | 22 | 0 | 38 | 7 | 61 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 88 | 0 | 0 | 0 | 0 | 0 | 23 | 0 |
| Lane Group Flow (vph) | 35 | 4 | 0 | 0 | 23 | 0 | 0 | 22 | 0 | 38 | 45 | 0 |
| Heavy Vehicles (%) | 22% | 25% | 0% | 0% | 1% | 7% | 2% | 2% | 2% | 3% | 0% | 8% |
| 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) | 6.7 | 6.7 | | | 6.7 | | | 30.4 | | 30.4 | 30.4 | |
| Effective Green, g (s) | 6.7 | 6.7 | | | 6.7 | | | 30.4 | | 30.4 | 30.4 | |
| Actuated g/C Ratio | 0.14 | 0.14 | | | 0.14 | | | 0.62 | | 0.62 | 0.62 | |
| Clearance Time (s) | 6.1 | 6.1 | | | 6.1 | | | 6.1 | | 6.1 | 6.1 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | | | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 133 | 190 | | | 192 | | | 1058 | | 778 | 871 | |
| v/s Ratio Prot | | 0.00 | | | 0.02 | | | 0.01 | | | c0.03 | |
| v/s Ratio Perm | c0.04 | | | | | | | | | 0.03 | | |
| v/c Ratio | 0.26 | 0.02 | | | 0.12 | | | 0.02 | | 0.05 | 0.05 | |
| Uniform Delay, d1 | 19.1 | 18.5 | | | 18.7 | | | 3.7 | | 3.7 | 3.7 | |
| Progression Factor | 1.00 | 1.00 | | | 1.00 | | | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 1.1 | 0.0 | | | 0.3 | | | 0.0 | | 0.1 | 0.1 | |
| Delay (s) | 20.1 | 18.5 | | | 19.0 | | | 3.7 | | 3.9 | 3.9 | |
| Level of Service | C | B | | | B | | | A | | A | A | |
| Approach Delay (s) | | 20.0 | | | 19.0 | | | 3.7 | | | 3.9 | |
| Approach LOS | | B | | | B | | | A | | | A | |

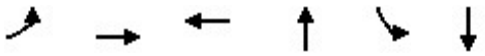
| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 12.1 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.09 | | |
| Actuated Cycle Length (s) | 49.3 | Sum of lost time (s) | 12.2 |
| Intersection Capacity Utilization | 27.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Phase Number | 2 | 4 | 6 | 8 |
|---|---|---|---|---|
| Movement | NBTL | EBTL | SBTL | WBTL |
| Lead/Lag | | | | |
| Lead-Lag Optimize | | | | |
| Recall Mode | Max | None | Max | None |
| Maximum Split (s) | 30 | 30 | 30 | 30 |
| Maximum Split (%) | 50.0% | 50.0% | 50.0% | 50.0% |
| Minimum Split (s) | 24.1 | 24.1 | 24.1 | 24.1 |
| Yellow Time (s) | 4.1 | 4.1 | 4.1 | 4.1 |
| All-Red Time (s) | 2 | 2 | 2 | 2 |
| Minimum Initial (s) | 8 | 8 | 8 | 8 |
| Vehicle Extension (s) | 3 | 3 | 3 | 3 |
| Minimum Gap (s) | 3 | 3 | 3 | 3 |
| Time Before Reduce (s) | 0 | 0 | 0 | 0 |
| Time To Reduce (s) | 0 | 0 | 0 | 0 |
| Walk Time (s) | 7 | 7 | 7 | 7 |
| Flash Dont Walk (s) | 11 | 11 | 11 | 11 |
| Dual Entry | Yes | Yes | Yes | Yes |
| Inhibit Max | Yes | Yes | Yes | Yes |
| Start Time (s) | 0 | 30 | 0 | 30 |
| End Time (s) | 30 | 0 | 30 | 0 |
| Yield/Force Off (s) | 23.9 | 53.9 | 23.9 | 53.9 |
| Yield/Force Off 170(s) | 12.9 | 42.9 | 12.9 | 42.9 |
| Local Start Time (s) | 0 | 30 | 0 | 30 |
| Local Yield (s) | 23.9 | 53.9 | 23.9 | 53.9 |
| Local Yield 170(s) | 12.9 | 42.9 | 12.9 | 42.9 |

| Intersection Summary | |
|---|---|
| Cycle Length | 60 |
| Control Type | Actuated-Uncoordinated |
| Natural Cycle | 50 |

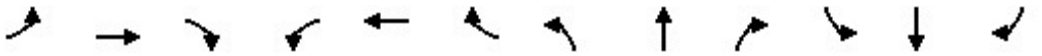
Splits and Phases: 3: Future Development & Dorchester Road & Oldfield Road





| Lane Group | EBL | EBT | WBT | NBT | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 111 | 11 | 77 | 12 | 75 | 110 |
| v/c Ratio | 0.44 | 0.03 | 0.21 | 0.01 | 0.09 | 0.11 |
| Control Delay | 21.8 | 13.9 | 7.0 | 6.4 | 6.8 | 3.0 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 21.8 | 13.9 | 7.0 | 6.4 | 6.8 | 3.0 |
| Queue Length 50th (m) | 8.2 | 0.8 | 0.6 | 0.4 | 2.8 | 0.7 |
| Queue Length 95th (m) | 19.2 | 3.5 | 8.1 | 2.5 | 9.1 | 6.9 |
| Internal Link Dist (m) | | 29.7 | 51.9 | 59.7 | | 61.5 |
| Turn Bay Length (m) | 15.0 | | | | 15.0 | |
| Base Capacity (vph) | 603 | 870 | 764 | 1074 | 821 | 963 |
| 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 | 0.18 | 0.01 | 0.10 | 0.01 | 0.09 | 0.11 |

Intersection Summary



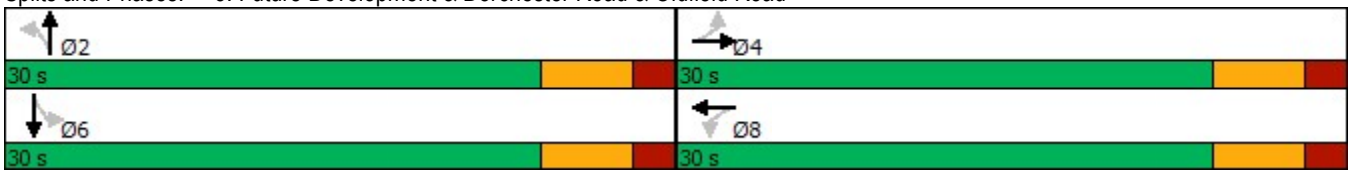
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 102 | 10 | 0 | 0 | 8 | 63 | 0 | 11 | 0 | 69 | 18 | 83 |
| Future Volume (vph) | 102 | 10 | 0 | 0 | 8 | 63 | 0 | 11 | 0 | 69 | 18 | 83 |
| Ideal Flow (vphpl) | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 |
| Total Lost time (s) | 6.1 | 6.1 | | | 6.1 | | | 6.1 | | 6.1 | 6.1 | |
| Lane Util. Factor | 1.00 | 1.00 | | | 1.00 | | | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | | | 0.87 | | | 1.00 | | 1.00 | 0.88 | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1630 | 1750 | | | 1466 | | | 1716 | | 1662 | 1487 | |
| Flt Permitted | 0.71 | 1.00 | | | 1.00 | | | 1.00 | | 0.75 | 1.00 | |
| Satd. Flow (perm) | 1213 | 1750 | | | 1466 | | | 1716 | | 1312 | 1487 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 111 | 11 | 0 | 0 | 9 | 68 | 0 | 12 | 0 | 75 | 20 | 90 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 56 | 0 | 0 | 0 | 0 | 0 | 37 | 0 |
| Lane Group Flow (vph) | 111 | 11 | 0 | 0 | 21 | 0 | 0 | 12 | 0 | 75 | 73 | 0 |
| Heavy Vehicles (%) | 2% | 0% | 0% | 0% | 0% | 4% | 2% | 2% | 2% | 0% | 0% | 4% |
| 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) | 8.4 | 8.4 | | | 8.4 | | | 28.9 | | 28.9 | 28.9 | |
| Effective Green, g (s) | 8.4 | 8.4 | | | 8.4 | | | 28.9 | | 28.9 | 28.9 | |
| Actuated g/C Ratio | 0.17 | 0.17 | | | 0.17 | | | 0.58 | | 0.58 | 0.58 | |
| Clearance Time (s) | 6.1 | 6.1 | | | 6.1 | | | 6.1 | | 6.1 | 6.1 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | | | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 205 | 296 | | | 248 | | | 1001 | | 765 | 868 | |
| v/s Ratio Prot | | 0.01 | | | 0.01 | | | 0.01 | | | 0.05 | |
| v/s Ratio Perm | c0.09 | | | | | | | | | c0.06 | | |
| v/c Ratio | 0.54 | 0.04 | | | 0.08 | | | 0.01 | | 0.10 | 0.08 | |
| Uniform Delay, d1 | 18.8 | 17.2 | | | 17.3 | | | 4.3 | | 4.5 | 4.5 | |
| Progression Factor | 1.00 | 1.00 | | | 1.00 | | | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.9 | 0.1 | | | 0.1 | | | 0.0 | | 0.3 | 0.2 | |
| Delay (s) | 21.7 | 17.2 | | | 17.5 | | | 4.3 | | 4.8 | 4.7 | |
| Level of Service | C | B | | | B | | | A | | A | A | |
| Approach Delay (s) | | 21.3 | | | 17.5 | | | 4.3 | | | 4.7 | |
| Approach LOS | | C | | | B | | | A | | | A | |

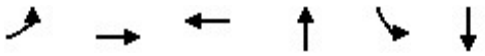
| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 12.3 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.20 | | |
| Actuated Cycle Length (s) | 49.5 | Sum of lost time (s) | 12.2 |
| Intersection Capacity Utilization | 33.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Phase Number | 2 | 4 | 6 | 8 |
|---|---|---|---|---|
| Movement | NBTL | EBTL | SBTL | WBTL |
| Lead/Lag | | | | |
| Lead-Lag Optimize | | | | |
| Recall Mode | Max | None | Max | None |
| Maximum Split (s) | 30 | 30 | 30 | 30 |
| Maximum Split (%) | 50.0% | 50.0% | 50.0% | 50.0% |
| Minimum Split (s) | 24.1 | 24.1 | 24.1 | 24.1 |
| Yellow Time (s) | 4.1 | 4.1 | 4.1 | 4.1 |
| All-Red Time (s) | 2 | 2 | 2 | 2 |
| Minimum Initial (s) | 8 | 8 | 8 | 8 |
| Vehicle Extension (s) | 3 | 3 | 3 | 3 |
| Minimum Gap (s) | 3 | 3 | 3 | 3 |
| Time Before Reduce (s) | 0 | 0 | 0 | 0 |
| Time To Reduce (s) | 0 | 0 | 0 | 0 |
| Walk Time (s) | 7 | 7 | 7 | 7 |
| Flash Dont Walk (s) | 11 | 11 | 11 | 11 |
| Dual Entry | Yes | Yes | Yes | Yes |
| Inhibit Max | Yes | Yes | Yes | Yes |
| Start Time (s) | 0 | 30 | 0 | 30 |
| End Time (s) | 30 | 0 | 30 | 0 |
| Yield/Force Off (s) | 23.9 | 53.9 | 23.9 | 53.9 |
| Yield/Force Off 170(s) | 12.9 | 42.9 | 12.9 | 42.9 |
| Local Start Time (s) | 0 | 30 | 0 | 30 |
| Local Yield (s) | 23.9 | 53.9 | 23.9 | 53.9 |
| Local Yield 170(s) | 12.9 | 42.9 | 12.9 | 42.9 |

| Intersection Summary | |
|---|---|
| Cycle Length | 60 |
| Control Type | Actuated-Uncoordinated |
| Natural Cycle | 50 |

Splits and Phases: 3: Future Development & Dorchester Road & Oldfield Road

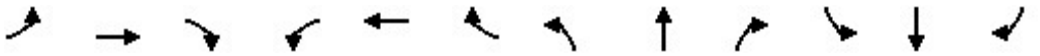




| Lane Group | EBL | EBT | WBT | NBT | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 227 | 91 | 180 | 22 | 40 | 215 |
| v/c Ratio | 0.77 | 0.20 | 0.32 | 0.03 | 0.07 | 0.29 |
| Control Delay | 35.0 | 13.6 | 7.6 | 10.7 | 11.0 | 3.5 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 35.0 | 13.6 | 7.6 | 10.7 | 11.0 | 3.5 |
| Queue Length 50th (m) | 20.2 | 6.5 | 5.3 | 1.2 | 2.2 | 0.4 |
| Queue Length 95th (m) | #44.5 | 14.9 | 16.4 | 5.2 | 8.0 | 11.6 |
| Internal Link Dist (m) | | 29.7 | 51.9 | 59.7 | | 61.5 |
| Turn Bay Length (m) | 15.0 | | | | 15.0 | |
| Base Capacity (vph) | 401 | 608 | 723 | 789 | 580 | 751 |
| 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 | 0.57 | 0.15 | 0.25 | 0.03 | 0.07 | 0.29 |

Intersection Summary

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



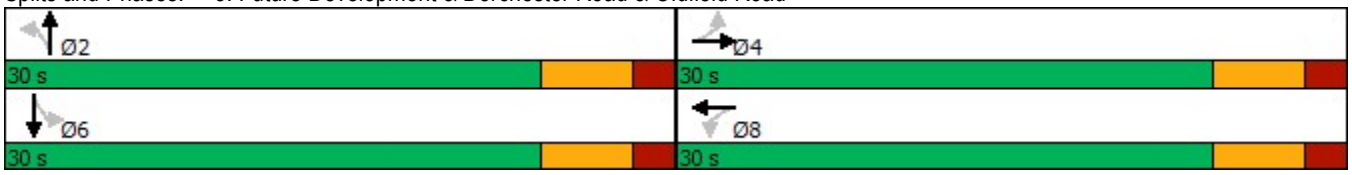
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 209 | 84 | 0 | 0 | 69 | 97 | 0 | 20 | 0 | 37 | 6 | 191 |
| Future Volume (vph) | 209 | 84 | 0 | 0 | 69 | 97 | 0 | 20 | 0 | 37 | 6 | 191 |
| Ideal Flow (vphpl) | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 |
| Total Lost time (s) | 6.1 | 6.1 | | | 6.1 | | | 6.1 | | 6.1 | 6.1 | |
| Lane Util. Factor | 1.00 | 1.00 | | | 1.00 | | | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | | | 0.91 | | | 1.00 | | 1.00 | 0.85 | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1363 | 1400 | | | 1528 | | | 1716 | | 1614 | 1389 | |
| Flt Permitted | 0.64 | 1.00 | | | 1.00 | | | 1.00 | | 0.74 | 1.00 | |
| Satd. Flow (perm) | 923 | 1400 | | | 1528 | | | 1716 | | 1262 | 1389 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 227 | 91 | 0 | 0 | 75 | 105 | 0 | 22 | 0 | 40 | 7 | 208 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 72 | 0 | 0 | 0 | 0 | 0 | 112 | 0 |
| Lane Group Flow (vph) | 227 | 91 | 0 | 0 | 108 | 0 | 0 | 22 | 0 | 40 | 103 | 0 |
| Heavy Vehicles (%) | 22% | 25% | 0% | 0% | 1% | 7% | 2% | 2% | 2% | 3% | 0% | 8% |
| 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) | 17.6 | 17.6 | | | 17.6 | | | 25.4 | | 25.4 | 25.4 | |
| Effective Green, g (s) | 17.6 | 17.6 | | | 17.6 | | | 25.4 | | 25.4 | 25.4 | |
| Actuated g/C Ratio | 0.32 | 0.32 | | | 0.32 | | | 0.46 | | 0.46 | 0.46 | |
| Clearance Time (s) | 6.1 | 6.1 | | | 6.1 | | | 6.1 | | 6.1 | 6.1 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | | | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 294 | 446 | | | 487 | | | 789 | | 580 | 639 | |
| v/s Ratio Prot | | 0.07 | | | 0.07 | | | 0.01 | | | c0.07 | |
| v/s Ratio Perm | c0.25 | | | | | | | | | 0.03 | | |
| v/c Ratio | 0.77 | 0.20 | | | 0.22 | | | 0.03 | | 0.07 | 0.16 | |
| Uniform Delay, d1 | 17.0 | 13.7 | | | 13.8 | | | 8.1 | | 8.3 | 8.7 | |
| Progression Factor | 1.00 | 1.00 | | | 1.00 | | | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 11.9 | 0.2 | | | 0.2 | | | 0.1 | | 0.2 | 0.5 | |
| Delay (s) | 28.8 | 13.9 | | | 14.0 | | | 8.2 | | 8.5 | 9.2 | |
| Level of Service | C | B | | | B | | | A | | A | A | |
| Approach Delay (s) | | 24.6 | | | 14.0 | | | 8.2 | | | 9.1 | |
| Approach LOS | | C | | | B | | | A | | | A | |

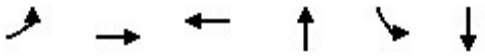
| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 16.6 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.41 | | |
| Actuated Cycle Length (s) | 55.2 | Sum of lost time (s) | 12.2 |
| Intersection Capacity Utilization | 51.4% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Phase Number | 2 | 4 | 6 | 8 |
|---|---|---|---|---|
| Movement | NBTL | EBTL | SBTL | WBTL |
| Lead/Lag | | | | |
| Lead-Lag Optimize | | | | |
| Recall Mode | Max | None | Max | None |
| Maximum Split (s) | 30 | 30 | 30 | 30 |
| Maximum Split (%) | 50.0% | 50.0% | 50.0% | 50.0% |
| Minimum Split (s) | 24.1 | 24.1 | 24.1 | 24.1 |
| Yellow Time (s) | 4.1 | 4.1 | 4.1 | 4.1 |
| All-Red Time (s) | 2 | 2 | 2 | 2 |
| Minimum Initial (s) | 8 | 8 | 8 | 8 |
| Vehicle Extension (s) | 3 | 3 | 3 | 3 |
| Minimum Gap (s) | 3 | 3 | 3 | 3 |
| Time Before Reduce (s) | 0 | 0 | 0 | 0 |
| Time To Reduce (s) | 0 | 0 | 0 | 0 |
| Walk Time (s) | 7 | 7 | 7 | 7 |
| Flash Dont Walk (s) | 11 | 11 | 11 | 11 |
| Dual Entry | Yes | Yes | Yes | Yes |
| Inhibit Max | Yes | Yes | Yes | Yes |
| Start Time (s) | 0 | 30 | 0 | 30 |
| End Time (s) | 30 | 0 | 30 | 0 |
| Yield/Force Off (s) | 23.9 | 53.9 | 23.9 | 53.9 |
| Yield/Force Off 170(s) | 12.9 | 42.9 | 12.9 | 42.9 |
| Local Start Time (s) | 0 | 30 | 0 | 30 |
| Local Yield (s) | 23.9 | 53.9 | 23.9 | 53.9 |
| Local Yield 170(s) | 12.9 | 42.9 | 12.9 | 42.9 |

| Intersection Summary | |
|---|---|
| Cycle Length | 60 |
| Control Type | Actuated-Uncoordinated |
| Natural Cycle | 55 |

Splits and Phases: 3: Future Development & Dorchester Road & Oldfield Road

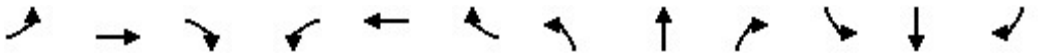




| Lane Group | EBL | EBT | WBT | NBT | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 422 | 151 | 238 | 12 | 78 | 458 |
| v/c Ratio | 0.88 | 0.20 | 0.61 | 0.02 | 0.17 | 0.59 |
| Control Delay | 33.8 | 10.1 | 23.4 | 13.8 | 15.3 | 5.9 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 33.8 | 10.1 | 23.4 | 13.8 | 15.3 | 5.9 |
| Queue Length 50th (m) | 29.2 | 9.2 | 18.9 | 0.8 | 5.6 | 1.4 |
| Queue Length 95th (m) | #69.8 | 18.3 | 37.8 | 4.0 | 15.5 | 21.0 |
| Internal Link Dist (m) | | 29.7 | 51.9 | 59.7 | | 61.5 |
| Turn Bay Length (m) | 15.0 | | | | 15.0 | |
| Base Capacity (vph) | 482 | 922 | 534 | 586 | 448 | 781 |
| 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 | 0.88 | 0.16 | 0.45 | 0.02 | 0.17 | 0.59 |

Intersection Summary

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



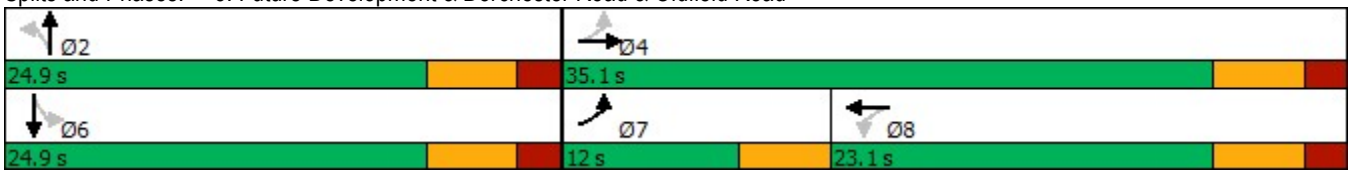
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 388 | 139 | 0 | 0 | 153 | 66 | 0 | 11 | 0 | 72 | 18 | 403 |
| Future Volume (vph) | 388 | 139 | 0 | 0 | 153 | 66 | 0 | 11 | 0 | 72 | 18 | 403 |
| Ideal Flow (vphpl) | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 | 1750 |
| Total Lost time (s) | 4.1 | 6.1 | | | 6.1 | | | 6.1 | | 6.1 | 6.1 | |
| Lane Util. Factor | 1.00 | 1.00 | | | 1.00 | | | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | | | 0.95 | | | 1.00 | | 1.00 | 0.86 | |
| Flt Protected | 0.95 | 1.00 | | | 1.00 | | | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1630 | 1750 | | | 1651 | | | 1716 | | 1662 | 1444 | |
| Flt Permitted | 0.44 | 1.00 | | | 1.00 | | | 1.00 | | 0.75 | 1.00 | |
| Satd. Flow (perm) | 752 | 1750 | | | 1651 | | | 1716 | | 1312 | 1444 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 422 | 151 | 0 | 0 | 166 | 72 | 0 | 12 | 0 | 78 | 20 | 438 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 28 | 0 | 0 | 0 | 0 | 0 | 288 | 0 |
| Lane Group Flow (vph) | 422 | 151 | 0 | 0 | 210 | 0 | 0 | 12 | 0 | 78 | 170 | 0 |
| Heavy Vehicles (%) | 2% | 0% | 0% | 0% | 0% | 4% | 2% | 2% | 2% | 0% | 0% | 4% |
| Turn Type | pm+pt | NA | | Perm | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | 7 | 4 | | | 8 | | | 2 | | | 6 | |
| Permitted Phases | 4 | | | 8 | | | 2 | | | 6 | | |
| Actuated Green, G (s) | 24.1 | 24.1 | | | 12.1 | | | 18.9 | | 18.9 | 18.9 | |
| Effective Green, g (s) | 24.1 | 24.1 | | | 12.1 | | | 18.9 | | 18.9 | 18.9 | |
| Actuated g/C Ratio | 0.44 | 0.44 | | | 0.22 | | | 0.34 | | 0.34 | 0.34 | |
| Clearance Time (s) | 4.1 | 6.1 | | | 6.1 | | | 6.1 | | 6.1 | 6.1 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | | 3.0 | | | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 453 | 764 | | | 361 | | | 587 | | 449 | 494 | |
| v/s Ratio Prot | c0.13 | 0.09 | | | 0.13 | | | 0.01 | | | c0.12 | |
| v/s Ratio Perm | c0.27 | | | | | | | | | 0.06 | | |
| v/c Ratio | 0.93 | 0.20 | | | 0.58 | | | 0.02 | | 0.17 | 0.34 | |
| Uniform Delay, d1 | 13.5 | 9.6 | | | 19.3 | | | 12.0 | | 12.7 | 13.5 | |
| Progression Factor | 1.00 | 1.00 | | | 1.00 | | | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 26.0 | 0.1 | | | 2.4 | | | 0.1 | | 0.8 | 1.9 | |
| Delay (s) | 39.6 | 9.7 | | | 21.7 | | | 12.1 | | 13.5 | 15.4 | |
| Level of Service | D | A | | | C | | | B | | B | B | |
| Approach Delay (s) | | 31.7 | | | 21.7 | | | 12.1 | | | 15.2 | |
| Approach LOS | | C | | | C | | | B | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM 2000 Control Delay | 23.2 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.72 | | |
| Actuated Cycle Length (s) | 55.2 | Sum of lost time (s) | 16.3 |
| Intersection Capacity Utilization | 78.1% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Phase Number | 2 | 4 | 6 | 7 | 8 |
|---|---|---|---|---|---|
| Movement | NBTL | EBTL | SBTL | EBL | WBTL |
| Lead/Lag | | | | Lead | Lag |
| Lead-Lag Optimize | | | | Yes | Yes |
| Recall Mode | Max | None | Max | None | None |
| Maximum Split (s) | 24.9 | 35.1 | 24.9 | 12 | 23.1 |
| Maximum Split (%) | 41.5% | 58.5% | 41.5% | 20.0% | 38.5% |
| Minimum Split (s) | 24.1 | 24.1 | 24.1 | 9.5 | 24.1 |
| Yellow Time (s) | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 |
| All-Red Time (s) | 2 | 2 | 2 | 0 | 2 |
| Minimum Initial (s) | 8 | 8 | 8 | 5 | 8 |
| Vehicle Extension (s) | 3 | 3 | 3 | 3 | 3 |
| Minimum Gap (s) | 3 | 3 | 3 | 3 | 3 |
| Time Before Reduce (s) | 0 | 0 | 0 | 0 | 0 |
| Time To Reduce (s) | 0 | 0 | 0 | 0 | 0 |
| Walk Time (s) | 7 | 7 | 7 | | 7 |
| Flash Dont Walk (s) | 11 | 11 | 11 | | 11 |
| Dual Entry | Yes | Yes | Yes | No | Yes |
| Inhibit Max | Yes | Yes | Yes | Yes | Yes |
| Start Time (s) | 0 | 24.9 | 0 | 24.9 | 36.9 |
| End Time (s) | 24.9 | 0 | 24.9 | 36.9 | 0 |
| Yield/Force Off (s) | 18.8 | 53.9 | 18.8 | 32.8 | 53.9 |
| Yield/Force Off 170(s) | 7.8 | 42.9 | 7.8 | 32.8 | 42.9 |
| Local Start Time (s) | 0 | 24.9 | 0 | 24.9 | 36.9 |
| Local Yield (s) | 18.8 | 53.9 | 18.8 | 32.8 | 53.9 |
| Local Yield 170(s) | 7.8 | 42.9 | 7.8 | 32.8 | 42.9 |

| Intersection Summary | |
|---|---|
| Cycle Length | 60 |
| Control Type | Actuated-Uncoordinated |
| Natural Cycle | 60 |

Splits and Phases: 3: Future Development & Dorchester Road & Oldfield Road



| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 107 | 0 | 10 | 83 | 0 | 6 |
| Future Volume (Veh/h) | 107 | 0 | 10 | 83 | 0 | 6 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 116 | 0 | 11 | 90 | 0 | 7 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | 93 | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | | | 116 | | 228 | 116 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 116 | | 228 | 116 |
| tC, single (s) | | | 4.1 | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 2.2 | | 3.5 | 3.3 |
| p0 queue free % | | | 99 | | 100 | 99 |
| cM capacity (veh/h) | | | 1473 | | 754 | 936 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 |
|---|---|---|---|
| Volume Total | 116 | 101 | 7 |
| Volume Left | 0 | 11 | 0 |
| Volume Right | 0 | 0 | 7 |
| cSH | 1700 | 1473 | 936 |
| Volume to Capacity | 0.07 | 0.01 | 0.01 |
| Queue Length 95th (m) | 0.0 | 0.2 | 0.2 |
| Control Delay (s) | 0.0 | 0.9 | 8.9 |
| Lane LOS | | A | A |
| Approach Delay (s) | 0.0 | 0.9 | 8.9 |
| Approach LOS | | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.7 | | |
| Intersection Capacity Utilization | 22.0% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 285 | 0 | 3 | 258 | 0 | 11 |
| Future Volume (Veh/h) | 285 | 0 | 3 | 258 | 0 | 11 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 310 | 0 | 3 | 280 | 0 | 12 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | 93 | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | | | 310 | | 596 | 310 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 310 | | 596 | 310 |
| tC, single (s) | | | 4.1 | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 2.2 | | 3.5 | 3.3 |
| p0 queue free % | | | 100 | | 100 | 98 |
| cM capacity (veh/h) | | | 1250 | | 465 | 730 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 |
|---|---|---|---|
| Volume Total | 310 | 283 | 12 |
| Volume Left | 0 | 3 | 0 |
| Volume Right | 0 | 0 | 12 |
| cSH | 1700 | 1250 | 730 |
| Volume to Capacity | 0.18 | 0.00 | 0.02 |
| Queue Length 95th (m) | 0.0 | 0.1 | 0.4 |
| Control Delay (s) | 0.0 | 0.1 | 10.0 |
| Lane LOS | | A | B |
| Approach Delay (s) | 0.0 | 0.1 | 10.0 |
| Approach LOS | | | B |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.2 | | |
| Intersection Capacity Utilization | 27.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 522 | 0 | 10 | 548 | 0 | 6 |
| Future Volume (Veh/h) | 522 | 0 | 10 | 548 | 0 | 6 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 567 | 0 | 11 | 596 | 0 | 7 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | 93 | | |
| pX, platoon unblocked | | | | | 0.98 | |
| vC, conflicting volume | | | 567 | | 1185 | 567 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 567 | | 1178 | 567 |
| tC, single (s) | | | 4.1 | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 2.2 | | 3.5 | 3.3 |
| p0 queue free % | | | 99 | | 100 | 99 |
| cM capacity (veh/h) | | | 1005 | | 204 | 523 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 |
|---|---|---|---|
| Volume Total | 567 | 607 | 7 |
| Volume Left | 0 | 11 | 0 |
| Volume Right | 0 | 0 | 7 |
| cSH | 1700 | 1005 | 523 |
| Volume to Capacity | 0.33 | 0.01 | 0.01 |
| Queue Length 95th (m) | 0.0 | 0.3 | 0.3 |
| Control Delay (s) | 0.0 | 0.3 | 12.0 |
| Lane LOS | | A | B |
| Approach Delay (s) | 0.0 | 0.3 | 12.0 |
| Approach LOS | | | B |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.2 | | |
| Intersection Capacity Utilization | 50.0% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

**APPENDIX G**

# JUNCTIONS 10 – FUTURE TOTAL SCENARIOS

# Junctions 10

## ARCADY 10 - Roundabout Module

Version: 10.0.3.1598
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**The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution**

**Filename:** (new file)
**Path:**
**Report generation date:** 2022-11-11 1:39:20 PM

---

**«2026 Future Total, AM**
- **»Junction Network**
- **»Arms**
- **»Traffic Demand**
- **»Origin-Destination Data**
- **»Vehicle Mix**
- **»Results**

### Summary of junction performance

| | AM | | | | |
|---|---|---|---|---|---|
| | Set ID | Queue (PCU) | Delay (s) | RFC | LOS |
| | 2026 Future Total | | | | |
| **Arm 1** | D5 | 0.2 | 5.85 | 0.15 | A |
| **Arm 2** | | 0.2 | 5.61 | 0.14 | A |
| **Arm 3** | | 0.1 | 5.19 | 0.05 | A |
| **Arm 4** | | 0.0 | 5.16 | 0.03 | A |

*There are warnings associated with this model run - see the 'Data Errors and Warnings' tables.*

*Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle.*

### File summary

#### File Description

| | |
|---|---|
| **Title** | |
| **Location** | |
| **Site number** | |
| **Date** | 2022-11-11 |
| **Version** | |
| **Status** | (new file) |
| **Identifier** | |
| **Client** | |
| **Jobnumber** | |
| **Enumerator** | RVAINT\arcady |
| **Description** | |

### Units

| Distance units | Speed units | Traffic units input | Traffic units results | Flow units | Average delay units | Total delay units | Rate of delay units |
|---|---|---|---|---|---|---|---|
| m | kph | PCU | PCU | perHour | s | -Min | perMin |

## Analysis Options

| Calculate Queue Percentiles | Calculate residual capacity | RFC Threshold | Average Delay threshold (s) | Queue threshold (PCU) |
|---|---|---|---|---|
| | | 0.85 | 36.00 | 20.00 |

## Analysis Set Details

| ID | Network flow scaling factor (%) |
|---|---|
| A1 | 100.000 |

## Demand Set Details

| ID | Scenario name | Time Period name | Traffic profile type | Start time (HH:mm) | Finish time (HH:mm) | Time segment length (min) |
|---|---|---|---|---|---|---|
| D5 | 2026 Future Total | AM | ONE HOUR | 08:00 | 09:30 | 15 |

# 2026 Future Total, AM

### Data Errors and Warnings

| Severity | Area | Item | Description |
|---|---|---|---|
| Warning | Vehicle Mix | | HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning. |

## Junction Network

### Junctions

| Junction | Name | Junction type | Use circulating lanes | Arm order | Junction Delay (s) | Junction LOS |
|---|---|---|---|---|---|---|
| 1 | Dorchester Road at Oldfield Road Residential Development | Standard Roundabout | | 1, 2, 3, 4 | 5.61 | A |

### Junction Network

| Driving side | Lighting | Network delay (s) | Network LOS |
|---|---|---|---|
| Right | Normal/unknown | 5.61 | A |

## Arms

### Arms

| Arm | Name | Description | No give-way line |
|---|---|---|---|
| 1 | Oldfield Road | | |
| 2 | Dorchester Road (North) | | |
| 3 | Dorchester Road (West) | | |
| 4 | Site Access | | |

### Roundabout Geometry

| Arm | V - Approach road half-width (m) | E - Entry width (m) | l' - Effective flare length (m) | R - Entry radius (m) | D - Inscribed circle diameter (m) | PHI - Conflict (entry) angle (deg) | Entry only | Exit only |
|---|---|---|---|---|---|---|---|---|
| 1 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |
| 2 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |
| 3 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |
| 4 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |

### Slope / Intercept / Capacity

#### Roundabout Slope and Intercept used in model

| Arm | Final slope | Final intercept (PCU/hr) |
|---|---|---|
| 1 | 0.416 | 752 |
| 2 | 0.416 | 752 |
| 3 | 0.416 | 752 |
| 4 | 0.416 | 752 |

*The slope and intercept shown above include any corrections and adjustments.*

## Traffic Demand

| Vehicle mix source | PCU Factor for a HV (PCU) |
|---|---|
| HV Percentages | 2.00 |

### Demand overview (Traffic)

| Arm | Linked arm | Use O-D data | Average Demand (PCU/hr) | Scaling Factor (%) |
|---|---|---|---|---|
| 1 | | ✓ | 102 | 100.000 |
| 2 | | ✓ | 97 | 100.000 |
| 3 | | ✓ | 36 | 100.000 |
| 4 | | ✓ | 20 | 100.000 |

## Origin-Destination Data

#### Demand (PCU/hr)

| | | To | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| From | 1 | 0 | 94 | 8 | 0 |
| | 2 | 35 | 0 | 56 | 6 |
| | 3 | 4 | 32 | 0 | 0 |
| | 4 | 0 | 20 | 0 | 0 |

## Vehicle Mix

#### Heavy Vehicle Percentages

| | | To | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| From | 1 | 0 | 0 | 0 | 0 |
| | 2 | 0 | 0 | 0 | 0 |
| | 3 | 0 | 0 | 0 | 0 |
| | 4 | 0 | 0 | 0 | 0 |

## Results

### Results Summary for whole modelled period

| Arm | Max RFC | Max Delay (s) | Max Queue (PCU) | Max LOS |
|---|---|---|---|---|
| 1 | 0.15 | 5.85 | 0.2 | A |
| 2 | 0.14 | 5.61 | 0.2 | A |
| 3 | 0.05 | 5.19 | 0.1 | A |
| 4 | 0.03 | 5.16 | 0.0 | A |

### Main Results for each time segment

#### 08:00 - 08:15

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 77 | 39 | 736 | 0.104 | 76 | 0.1 | 5.457 | A |
| 2 | 73 | 6 | 749 | 0.097 | 73 | 0.1 | 5.316 | A |
| 3 | 27 | 31 | 739 | 0.037 | 27 | 0.0 | 5.054 | A |
| 4 | 15 | 53 | 730 | 0.021 | 15 | 0.0 | 5.037 | A |

**08:15 - 08:30**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 92 | 47 | 732 | 0.125 | 92 | 0.1 | 5.618 | A |
| 2 | 87 | 7 | 749 | 0.116 | 87 | 0.1 | 5.441 | A |
| 3 | 32 | 37 | 736 | 0.044 | 32 | 0.0 | 5.112 | A |
| 4 | 18 | 64 | 725 | 0.025 | 18 | 0.0 | 5.089 | A |

**08:30 - 08:45**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 112 | 57 | 728 | 0.154 | 112 | 0.2 | 5.844 | A |
| 2 | 107 | 9 | 748 | 0.143 | 107 | 0.2 | 5.610 | A |
| 3 | 40 | 45 | 733 | 0.054 | 40 | 0.1 | 5.191 | A |
| 4 | 22 | 78 | 719 | 0.031 | 22 | 0.0 | 5.162 | A |

**08:45 - 09:00**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 112 | 57 | 728 | 0.154 | 112 | 0.2 | 5.846 | A |
| 2 | 107 | 9 | 748 | 0.143 | 107 | 0.2 | 5.613 | A |
| 3 | 40 | 45 | 733 | 0.054 | 40 | 0.1 | 5.191 | A |
| 4 | 22 | 78 | 719 | 0.031 | 22 | 0.0 | 5.162 | A |

**09:00 - 09:15**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 92 | 47 | 732 | 0.125 | 92 | 0.1 | 5.621 | A |
| 2 | 87 | 7 | 749 | 0.116 | 87 | 0.1 | 5.443 | A |
| 3 | 32 | 37 | 736 | 0.044 | 32 | 0.0 | 5.113 | A |
| 4 | 18 | 64 | 725 | 0.025 | 18 | 0.0 | 5.090 | A |

**09:15 - 09:30**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 77 | 39 | 735 | 0.104 | 77 | 0.1 | 5.466 | A |
| 2 | 73 | 6 | 749 | 0.097 | 73 | 0.1 | 5.326 | A |
| 3 | 27 | 31 | 739 | 0.037 | 27 | 0.0 | 5.059 | A |
| 4 | 15 | 54 | 730 | 0.021 | 15 | 0.0 | 5.038 | A |

# Junctions 10

## ARCADY 10 - Roundabout Module

Version: 10.0.3.1598
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**The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution**

**Filename:** (new file)
**Path:**
**Report generation date:** 2022-11-11 1:46:32 PM

---

«2026 Future Total , PM
»Junction Network
»Arms
»Traffic Demand
»Origin-Destination Data
»Vehicle Mix
»Results

### Summary of junction performance

| | PM | | | | |
|---|---|---|---|---|---|
| | Set ID | Queue (PCU) | Delay (s) | RFC | LOS |
| | 2026 Future Total | | | | |
| **Arm 1** | D6 | 0.1 | 5.79 | 0.11 | A |
| **Arm 2** | | 0.3 | 6.42 | 0.25 | A |
| **Arm 3** | | 0.2 | 6.11 | 0.17 | A |
| **Arm 4** | | 0.0 | 5.48 | 0.02 | A |

*There are warnings associated with this model run - see the 'Data Errors and Warnings' tables.*

*Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle.*

### File summary

#### File Description

| | |
|---|---|
| **Title** | |
| **Location** | |
| **Site number** | |
| **Date** | 2022-11-11 |
| **Version** | |
| **Status** | (new file) |
| **Identifier** | |
| **Client** | |
| **Jobnumber** | |
| **Enumerator** | RVAINT\arcady |
| **Description** | |

### Units

| Distance units | Speed units | Traffic units input | Traffic units results | Flow units | Average delay units | Total delay units | Rate of delay units |
|---|---|---|---|---|---|---|---|
| m | kph | PCU | PCU | perHour | s | -Min | perMin |

## Analysis Options

| Calculate Queue Percentiles | Calculate residual capacity | RFC Threshold | Average Delay threshold (s) | Queue threshold (PCU) |
|---|---|---|---|---|
| | | 0.85 | 36.00 | 20.00 |

## Analysis Set Details

| ID | Network flow scaling factor (%) |
|---|---|
| A1 | 100.000 |

## Demand Set Details

| ID | Scenario name | Time Period name | Traffic profile type | Start time (HH:mm) | Finish time (HH:mm) | Time segment length (min) |
|---|---|---|---|---|---|---|
| D6 | 2026 Future Total | PM | ONE HOUR | 08:00 | 09:30 | 15 |

# 2026 Future Total , PM

### Data Errors and Warnings

| Severity | Area | Item | Description |
|---|---|---|---|
| Warning | Vehicle Mix | | HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning. |

## Junction Network

### Junctions

| Junction | Name | Junction type | Use circulating lanes | Arm order | Junction Delay (s) | Junction LOS |
|---|---|---|---|---|---|---|
| 1 | Dorchester Road at Oldfield Road Residential Development | Standard Roundabout | | 1, 2, 3, 4 | 6.17 | A |

### Junction Network

| Driving side | Lighting | Network delay (s) | Network LOS |
|---|---|---|---|
| Right | Normal/unknown | 6.17 | A |

## Arms

### Arms

| Arm | Name | Description | No give-way line |
|---|---|---|---|
| 1 | Oldfield Road | | |
| 2 | Dorchester Road (North) | | |
| 3 | Dorchester Road (West) | | |
| 4 | Site Access | | |

### Roundabout Geometry

| Arm | V - Approach road half-width (m) | E - Entry width (m) | l' - Effective flare length (m) | R - Entry radius (m) | D - Inscribed circle diameter (m) | PHI - Conflict (entry) angle (deg) | Entry only | Exit only |
|---|---|---|---|---|---|---|---|---|
| 1 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |
| 2 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |
| 3 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |
| 4 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |

### Slope / Intercept / Capacity

#### Roundabout Slope and Intercept used in model

| Arm | Final slope | Final intercept (PCU/hr) |
|---|---|---|
| 1 | 0.416 | 752 |
| 2 | 0.416 | 752 |
| 3 | 0.416 | 752 |
| 4 | 0.416 | 752 |

*The slope and intercept shown above include any corrections and adjustments.*

## Traffic Demand

| Vehicle mix source | PCU Factor for a HV (PCU) |
|---|---|
| HV Percentages | 2.00 |

### Demand overview (Traffic)

| Arm | Linked arm | Use O-D data | Average Demand (PCU/hr) | Scaling Factor (%) |
|---|---|---|---|---|
| 1 | | ✓ | 71 | 100.000 |
| 2 | | ✓ | 170 | 100.000 |
| 3 | | ✓ | 112 | 100.000 |
| 4 | | ✓ | 11 | 100.000 |

## Origin-Destination Data

#### Demand (PCU/hr)

| | | To | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| From | 1 | 0 | 63 | 8 | 0 |
| | 2 | 69 | 0 | 83 | 18 |
| | 3 | 10 | 102 | 0 | 0 |
| | 4 | 0 | 11 | 0 | 0 |

## Vehicle Mix

#### Heavy Vehicle Percentages

| | | To | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| From | 1 | 0 | 0 | 0 | 0 |
| | 2 | 0 | 0 | 0 | 0 |
| | 3 | 0 | 0 | 0 | 0 |
| | 4 | 0 | 0 | 0 | 0 |

## Results

### Results Summary for whole modelled period

| Arm | Max RFC | Max Delay (s) | Max Queue (PCU) | Max LOS |
|---|---|---|---|---|
| 1 | 0.11 | 5.79 | 0.1 | A |
| 2 | 0.25 | 6.42 | 0.3 | A |
| 3 | 0.17 | 6.11 | 0.2 | A |
| 4 | 0.02 | 5.48 | 0.0 | A |

### Main Results for each time segment

#### 08:00 - 08:15

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 53 | 85 | 717 | 0.075 | 53 | 0.1 | 5.423 | A |
| 2 | 128 | 6 | 749 | 0.171 | 127 | 0.2 | 5.780 | A |
| 3 | 84 | 65 | 725 | 0.116 | 84 | 0.1 | 5.612 | A |
| 4 | 8 | 135 | 695 | 0.012 | 8 | 0.0 | 5.238 | A |

**08:15 - 08:30**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 64 | 101 | 710 | 0.090 | 64 | 0.1 | 5.574 | A |
| 2 | 153 | 7 | 749 | 0.204 | 153 | 0.3 | 6.037 | A |
| 3 | 101 | 78 | 719 | 0.140 | 101 | 0.2 | 5.816 | A |
| 4 | 10 | 163 | 684 | 0.014 | 10 | 0.0 | 5.338 | A |

**08:30 - 08:45**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 78 | 124 | 700 | 0.112 | 78 | 0.1 | 5.787 | A |
| 2 | 187 | 9 | 748 | 0.250 | 187 | 0.3 | 6.412 | A |
| 3 | 123 | 96 | 712 | 0.173 | 123 | 0.2 | 6.112 | A |
| 4 | 12 | 199 | 669 | 0.018 | 12 | 0.0 | 5.479 | A |

**08:45 - 09:00**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 78 | 124 | 700 | 0.112 | 78 | 0.1 | 5.788 | A |
| 2 | 187 | 9 | 748 | 0.250 | 187 | 0.3 | 6.417 | A |
| 3 | 123 | 96 | 712 | 0.173 | 123 | 0.2 | 6.115 | A |
| 4 | 12 | 199 | 669 | 0.018 | 12 | 0.0 | 5.480 | A |

**09:00 - 09:15**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 64 | 102 | 709 | 0.090 | 64 | 0.1 | 5.579 | A |
| 2 | 153 | 7 | 749 | 0.204 | 153 | 0.3 | 6.048 | A |
| 3 | 101 | 78 | 719 | 0.140 | 101 | 0.2 | 5.825 | A |
| 4 | 10 | 163 | 684 | 0.014 | 10 | 0.0 | 5.342 | A |

**09:15 - 09:30**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 53 | 85 | 716 | 0.075 | 54 | 0.1 | 5.431 | A |
| 2 | 128 | 6 | 749 | 0.171 | 128 | 0.2 | 5.800 | A |
| 3 | 84 | 66 | 724 | 0.116 | 84 | 0.1 | 5.627 | A |
| 4 | 8 | 136 | 695 | 0.012 | 8 | 0.0 | 5.241 | A |

# Junctions 10

## ARCADY 10 - Roundabout Module

Version: 10.0.3.1598
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+44 (0)1344 379777 software@trl.co.uk trlsoftware.com

**The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution**

**Filename:** (new file)
**Path:**
**Report generation date:** 2022-11-11 1:56:25 PM

---

**«2031 Future Total, AM**
- **»Junction Network**
- **»Arms**
- **»Traffic Demand**
- **»Origin-Destination Data**
- **»Vehicle Mix**
- **»Results**

### Summary of junction performance

| | AM | | | | |
|---|---|---|---|---|---|
| | Set ID | Queue (PCU) | Delay (s) | RFC | LOS |
| | 2031 Future Total | | | | |
| Arm 1 | D9 | 0.4 | 7.75 | 0.28 | A |
| Arm 2 | | 0.6 | 7.78 | 0.36 | A |
| Arm 3 | | 0.8 | 8.79 | 0.44 | A |
| Arm 4 | | 0.0 | 6.22 | 0.04 | A |

*There are warnings associated with this model run - see the 'Data Errors and Warnings' tables.*

*Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle.*

### File summary

#### File Description

| | |
|---|---|
| **Title** | |
| **Location** | |
| **Site number** | |
| **Date** | 2022-11-11 |
| **Version** | |
| **Status** | (new file) |
| **Identifier** | |
| **Client** | |
| **Jobnumber** | |
| **Enumerator** | RVAINT\arcady |
| **Description** | |

### Units

| Distance units | Speed units | Traffic units input | Traffic units results | Flow units | Average delay units | Total delay units | Rate of delay units |
|---|---|---|---|---|---|---|---|
| m | kph | PCU | PCU | perHour | s | -Min | perMin |

## Analysis Options

| Calculate Queue Percentiles | Calculate residual capacity | RFC Threshold | Average Delay threshold (s) | Queue threshold (PCU) |
|---|---|---|---|---|
| | | 0.85 | 36.00 | 20.00 |

## Analysis Set Details

| ID | Network flow scaling factor (%) |
|---|---|
| A1 | 100.000 |

## Demand Set Details

| ID | Scenario name | Time Period name | Traffic profile type | Start time (HH:mm) | Finish time (HH:mm) | Time segment length (min) |
|---|---|---|---|---|---|---|
| D9 | 2031 Future Total | AM | ONE HOUR | 08:00 | 09:30 | 15 |

# 2031 Future Total, AM

### Data Errors and Warnings

| Severity | Area | Item | Description |
|---|---|---|---|
| Warning | Vehicle Mix | | HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning. |

## Junction Network

### Junctions

| Junction | Name | Junction type | Use circulating lanes | Arm order | Junction Delay (s) | Junction LOS |
|---|---|---|---|---|---|---|
| 1 | Dorchester Road at Oldfield Road Residential Development | Standard Roundabout | | 1, 2, 3, 4 | 8.15 | A |

### Junction Network

| Driving side | Lighting | Network delay (s) | Network LOS |
|---|---|---|---|
| Right | Normal/unknown | 8.15 | A |

## Arms

### Arms

| Arm | Name | Description | No give-way line |
|---|---|---|---|
| 1 | Oldfield Road | | |
| 2 | Dorchester Road (North) | | |
| 3 | Dorchester Road (West) | | |
| 4 | Site Access | | |

### Roundabout Geometry

| Arm | V - Approach road half-width (m) | E - Entry width (m) | l' - Effective flare length (m) | R - Entry radius (m) | D - Inscribed circle diameter (m) | PHI - Conflict (entry) angle (deg) | Entry only | Exit only |
|---|---|---|---|---|---|---|---|---|
| 1 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |
| 2 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |
| 3 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |
| 4 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |

### Slope / Intercept / Capacity

#### Roundabout Slope and Intercept used in model

| Arm | Final slope | Final intercept (PCU/hr) |
|---|---|---|
| 1 | 0.416 | 752 |
| 2 | 0.416 | 752 |
| 3 | 0.416 | 752 |
| 4 | 0.416 | 752 |

*The slope and intercept shown above include any corrections and adjustments.*

## Traffic Demand

| Vehicle mix source | PCU Factor for a HV (PCU) |
|---|---|
| HV Percentages | 2.00 |

### Demand overview (Traffic)

| Arm | Linked arm | Use O-D data | Average Demand (PCU/hr) | Scaling Factor (%) |
|---|---|---|---|---|
| 1 | | ✓ | 166 | 100.000 |
| 2 | | ✓ | 234 | 100.000 |
| 3 | | ✓ | 293 | 100.000 |
| 4 | | ✓ | 20 | 100.000 |

## Origin-Destination Data

#### Demand (PCU/hr)

| | | To | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| From | 1 | 0 | 97 | 69 | 0 |
| | 2 | 37 | 0 | 191 | 6 |
| | 3 | 84 | 209 | 0 | 0 |
| | 4 | 0 | 20 | 0 | 0 |

## Vehicle Mix

#### Heavy Vehicle Percentages

| | | To | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| From | 1 | 0 | 0 | 0 | 0 |
| | 2 | 0 | 0 | 0 | 0 |
| | 3 | 0 | 0 | 0 | 0 |
| | 4 | 0 | 0 | 0 | 0 |

## Results

### Results Summary for whole modelled period

| Arm | Max RFC | Max Delay (s) | Max Queue (PCU) | Max LOS |
|---|---|---|---|---|
| 1 | 0.28 | 7.75 | 0.4 | A |
| 2 | 0.36 | 7.78 | 0.6 | A |
| 3 | 0.44 | 8.79 | 0.8 | A |
| 4 | 0.04 | 6.22 | 0.0 | A |

### Main Results for each time segment

#### 08:00 - 08:15

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 125 | 171 | 681 | 0.184 | 124 | 0.2 | 6.457 | A |
| 2 | 176 | 52 | 730 | 0.241 | 175 | 0.3 | 6.467 | A |
| 3 | 221 | 32 | 738 | 0.299 | 219 | 0.4 | 6.908 | A |
| 4 | 15 | 247 | 649 | 0.023 | 15 | 0.0 | 5.675 | A |

**08:15 - 08:30**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 149 | 205 | 666 | 0.224 | 149 | 0.3 | 6.955 | A |
| 2 | 210 | 62 | 726 | 0.290 | 210 | 0.4 | 6.972 | A |
| 3 | 263 | 39 | 736 | 0.358 | 263 | 0.6 | 7.606 | A |
| 4 | 18 | 296 | 629 | 0.029 | 18 | 0.0 | 5.894 | A |

**08:30 - 08:45**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 183 | 251 | 647 | 0.282 | 182 | 0.4 | 7.736 | A |
| 2 | 258 | 76 | 720 | 0.358 | 257 | 0.5 | 7.761 | A |
| 3 | 323 | 47 | 732 | 0.441 | 322 | 0.8 | 8.752 | A |
| 4 | 22 | 362 | 601 | 0.037 | 22 | 0.0 | 6.215 | A |

**08:45 - 09:00**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 183 | 252 | 647 | 0.283 | 183 | 0.4 | 7.754 | A |
| 2 | 258 | 76 | 720 | 0.358 | 258 | 0.6 | 7.782 | A |
| 3 | 323 | 47 | 732 | 0.441 | 323 | 0.8 | 8.789 | A |
| 4 | 22 | 363 | 601 | 0.037 | 22 | 0.0 | 6.219 | A |

**09:00 - 09:15**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 149 | 207 | 666 | 0.224 | 150 | 0.3 | 6.977 | A |
| 2 | 210 | 62 | 726 | 0.290 | 211 | 0.4 | 7.000 | A |
| 3 | 263 | 39 | 736 | 0.358 | 264 | 0.6 | 7.650 | A |
| 4 | 18 | 298 | 628 | 0.029 | 18 | 0.0 | 5.903 | A |

**09:15 - 09:30**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 125 | 173 | 680 | 0.184 | 125 | 0.2 | 6.494 | A |
| 2 | 176 | 52 | 730 | 0.241 | 177 | 0.3 | 6.506 | A |
| 3 | 221 | 32 | 738 | 0.299 | 221 | 0.4 | 6.970 | A |
| 4 | 15 | 249 | 648 | 0.023 | 15 | 0.0 | 5.687 | A |

# Junctions 10

## ARCADY 10 - Roundabout Module

Version: 10.0.3.1598
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+44 (0)1344 379777 software@trl.co.uk trlsoftware.com

**The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution**

**Filename:** (new file)
**Path:**
**Report generation date:** 2022-11-11 1:58:13 PM

---

**«2031 Future Total, PM**
- **»Junction Network**
- **»Arms**
- **»Traffic Demand**
- **»Origin-Destination Data**
- **»Vehicle Mix**
- **»Results**

### Summary of junction performance

| | PM | | | | |
|---|---|---|---|---|---|
| | Set ID | Queue (PCU) | Delay (s) | RFC | LOS |
| | 2031 Future Total | | | | |
| Arm 1 | D10 | 0.7 | 10.96 | 0.42 | B |
| Arm 2 | | 3.7 | 25.42 | 0.80 | D |
| Arm 3 | | 4.1 | 26.91 | 0.82 | D |
| Arm 4 | | 0.0 | 7.72 | 0.03 | A |

*There are warnings associated with this model run - see the 'Data Errors and Warnings' tables.*

*Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle.*

### File summary

#### File Description

| | |
|---|---|
| **Title** | |
| **Location** | |
| **Site number** | |
| **Date** | 2022-11-11 |
| **Version** | |
| **Status** | (new file) |
| **Identifier** | |
| **Client** | |
| **Jobnumber** | |
| **Enumerator** | RVAINT\arcady |
| **Description** | |

### Units

| Distance units | Speed units | Traffic units input | Traffic units results | Flow units | Average delay units | Total delay units | Rate of delay units |
|---|---|---|---|---|---|---|---|
| m | kph | PCU | PCU | perHour | s | -Min | perMin |

## Analysis Options

| Calculate Queue Percentiles | Calculate residual capacity | RFC Threshold | Average Delay threshold (s) | Queue threshold (PCU) |
|---|---|---|---|---|
| | | 0.85 | 36.00 | 20.00 |

## Analysis Set Details

| ID | Network flow scaling factor (%) |
|---|---|
| A1 | 100.000 |

## Demand Set Details

| ID | Scenario name | Time Period name | Traffic profile type | Start time (HH:mm) | Finish time (HH:mm) | Time segment length (min) |
|---|---|---|---|---|---|---|
| D10 | 2031 Future Total | PM | ONE HOUR | 08:00 | 09:30 | 15 |

# 2031 Future Total, PM

### Data Errors and Warnings

| Severity | Area | Item | Description |
|---|---|---|---|
| Warning | Vehicle Mix | | HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning. |

## Junction Network

### Junctions

| Junction | Name | Junction type | Use circulating lanes | Arm order | Junction Delay (s) | Junction LOS |
|---|---|---|---|---|---|---|
| 1 | Dorchester Road at Oldfield Road Residential Development | Standard Roundabout | | 1, 2, 3, 4 | 23.36 | C |

### Junction Network

| Driving side | Lighting | Network delay (s) | Network LOS |
|---|---|---|---|
| Right | Normal/unknown | 23.36 | C |

## Arms

### Arms

| Arm | Name | Description | No give-way line |
|---|---|---|---|
| 1 | Oldfield Road | | |
| 2 | Dorchester Road (North) | | |
| 3 | Dorchester Road (West) | | |
| 4 | Site Access | | |

### Roundabout Geometry

| Arm | V - Approach road half-width (m) | E - Entry width (m) | I' - Effective flare length (m) | R - Entry radius (m) | D - Inscribed circle diameter (m) | PHI - Conflict (entry) angle (deg) | Entry only | Exit only |
|---|---|---|---|---|---|---|---|---|
| 1 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |
| 2 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |
| 3 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |
| 4 | 3.00 | 3.00 | 0.0 | 3.0 | 13.0 | 0.0 | | |

### Slope / Intercept / Capacity

#### Roundabout Slope and Intercept used in model

| Arm | Final slope | Final intercept (PCU/hr) |
|---|---|---|
| 1 | 0.416 | 752 |
| 2 | 0.416 | 752 |
| 3 | 0.416 | 752 |
| 4 | 0.416 | 752 |

*The slope and intercept shown above include any corrections and adjustments.*

## Traffic Demand

| Vehicle mix source | PCU Factor for a HV (PCU) |
|---|---|
| HV Percentages | 2.00 |

### Demand overview (Traffic)

| Arm | Linked arm | Use O-D data | Average Demand (PCU/hr) | Scaling Factor (%) |
|---|---|---|---|---|
| 1 | | ✓ | 219 | 100.000 |
| 2 | | ✓ | 493 | 100.000 |
| 3 | | ✓ | 527 | 100.000 |
| 4 | | ✓ | 11 | 100.000 |

## Origin-Destination Data

### Demand (PCU/hr)

| | | To | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| From | 1 | 0 | 66 | 153 | 0 |
| | 2 | 72 | 0 | 403 | 18 |
| | 3 | 139 | 388 | 0 | 0 |
| | 4 | 0 | 11 | 0 | 0 |

## Vehicle Mix

### Heavy Vehicle Percentages

| | | To | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| From | 1 | 0 | 0 | 0 | 0 |
| | 2 | 0 | 0 | 0 | 0 |
| | 3 | 0 | 0 | 0 | 0 |
| | 4 | 0 | 0 | 0 | 0 |

## Results

### Results Summary for whole modelled period

| Arm | Max RFC | Max Delay (s) | Max Queue (PCU) | Max LOS |
|---|---|---|---|---|
| 1 | 0.42 | 10.96 | 0.7 | B |
| 2 | 0.80 | 25.42 | 3.7 | D |
| 3 | 0.82 | 26.91 | 4.1 | D |
| 4 | 0.03 | 7.72 | 0.0 | A |

### Main Results for each time segment

#### 08:00 - 08:15

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 165 | 297 | 628 | 0.262 | 163 | 0.4 | 7.721 | A |
| 2 | 371 | 114 | 704 | 0.527 | 367 | 1.1 | 10.538 | B |
| 3 | 397 | 67 | 724 | 0.548 | 392 | 1.2 | 10.702 | B |
| 4 | 8 | 446 | 567 | 0.015 | 8 | 0.0 | 6.447 | A |

**08:15 - 08:30**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 197 | 357 | 604 | 0.326 | 196 | 0.5 | 8.831 | A |
| 2 | 443 | 137 | 695 | 0.638 | 441 | 1.7 | 14.034 | B |
| 3 | 474 | 80 | 718 | 0.660 | 471 | 1.9 | 14.395 | B |
| 4 | 10 | 535 | 529 | 0.019 | 10 | 0.0 | 6.930 | A |

**08:30 - 08:45**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 241 | 433 | 572 | 0.422 | 240 | 0.7 | 10.828 | B |
| 2 | 543 | 168 | 682 | 0.796 | 536 | 3.5 | 23.490 | C |
| 3 | 580 | 98 | 711 | 0.816 | 572 | 3.9 | 24.525 | C |
| 4 | 12 | 650 | 481 | 0.025 | 12 | 0.0 | 7.668 | A |

**08:45 - 09:00**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 241 | 439 | 569 | 0.423 | 241 | 0.7 | 10.958 | B |
| 2 | 543 | 168 | 682 | 0.796 | 542 | 3.7 | 25.417 | D |
| 3 | 580 | 99 | 711 | 0.817 | 579 | 4.1 | 26.911 | D |
| 4 | 12 | 658 | 478 | 0.025 | 12 | 0.0 | 7.724 | A |

**09:00 - 09:15**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 197 | 365 | 600 | 0.328 | 198 | 0.5 | 8.970 | A |
| 2 | 443 | 138 | 694 | 0.638 | 451 | 1.8 | 15.175 | C |
| 3 | 474 | 82 | 718 | 0.660 | 482 | 2.0 | 15.794 | C |
| 4 | 10 | 548 | 524 | 0.019 | 10 | 0.0 | 7.001 | A |

**09:15 - 09:30**

| Arm | Total Demand (PCU/hr) | Circulating flow (PCU/hr) | Capacity (PCU/hr) | RFC | Throughput (PCU/hr) | End queue (PCU) | Delay (s) | Unsignalised level of service |
|---|---|---|---|---|---|---|---|---|
| 1 | 165 | 303 | 626 | 0.263 | 165 | 0.4 | 7.825 | A |
| 2 | 371 | 116 | 704 | 0.527 | 374 | 1.1 | 11.006 | B |
| 3 | 397 | 68 | 723 | 0.548 | 400 | 1.2 | 11.236 | B |
| 4 | 8 | 455 | 563 | 0.015 | 8 | 0.0 | 6.493 | A |