Transportation Impact Assessment – Step 4*:* Analysis

135 Lusk Street

Prepared for 2441736 Ontario Inc.
by IBI Group
October 19, 2021

TIA Plan Reports - Certification

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

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

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

CERTIFICATION

1. I have reviewed and have a sound understanding of the objectives, needs and requirements of the City of Ottawa's Official Plan, Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines;

2. I have a sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;

3. I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and

4. I am either a licensed[1] or registered[1] professional in good standing, whose field of expertise [check √ appropriate field(s)] is either transportation engineering □ or transportation planning □.

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

Dated at Ottawa this 19th day of October, 2021.
(City)

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

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Executive Summary

IBI Group (IBI) was retained by 2441736 Ontario Inc. to undertake a Transportation Impact Assessment (TIA) in support of a Site Plan Control application for a proposed hotel development to be located at 135 Lusk Street, Ottawa. The development represents a parcel of land within the 4401 Fallowfield Road Plan of Subdivision.

The site is expected to be fully built out in a single phase and occupied by 2023. The horizon year of the study was therefore taken as 2028, representing 5 years beyond the expected full build-out of the site. The site will be accessed via a single right-in/right-out private approach with a direct connection to Lusk Street. An internal two-way vehicular access, providing a link to the abutting hotel to the east, is proposed at the rear of the property as well. A total of 99 vehicle parking spaces and 8 bicycle parking spaces will be provided near the principal building entrance.

There are seven known developments of significance in the vicinity of the subject site that are either in the development application approval process, are in pre-construction or are in varying stages of construction. For these developments, all unoccupied units are accounted for in the development of background traffic volumes using consistent trip generation assumptions.

Based on the traffic analysis results, the proposed development is expected to generate up to 42 and 53 two-way vehicular trips during the weekday morning and afternoon peak hours, respectively. These traffic volumes represent a marginal increase in traffic volumes with respect to the overall traffic projections expected within the 2028 study horizon year. The mode share targets were based on the South Nepean Traffic Assessment Zone (TAZ) and proportionally adjusted, in accordance with the Conditions of Approval for 4401 Fallowfield Road to yield an 85% auto/15% non-auto mode share split.

The intersection of Fallowfield & O'Keefe/Cobble Hill is presently operating as a two-way stop-controlled intersection. The results of the analysis indicate that, by 2023, traffic signals will be operationally required under background traffic conditions, however signals are not warranted within the timeframe of this study. With traffic signals in place, the intersection would be expected to operate at an acceptable level of service (LOS 'B') beyond the study horizon year. If traffic signals are not implemented by the 2028 study horizon year, the results of the analysis indicate that long delays of at least 6 minutes are expected at the Fallowfield & O'Keefe intersection with or without the inclusion of site-generated traffic. Furthermore, access to nearby transit stops is limited as there are no controlled crossing points along Fallowfield Road between Strandherd Dive and Cedarview Drive. As site-generated traffic will not contribute significantly to any potential traffic operational issues at this intersection, it is recommended that the City continue monitoring this intersection on an annual basis to determine the appropriate timing for the introduction of traffic signals.

The results of the analysis indicate that the intersections of O'Keefe Court & Lusk Street and Fallowfield Road & Forager Street are expected to operate within acceptable standards (LOS 'D' or better) during the weekday morning and afternoon peak hours. Both are T-intersections that are configured with stop control on the minor road and do not warrant auxiliary lanes or future modifications to intersection control within the timeframe of this study.

A multi-modal analysis identifies deficiencies in the existing road network and potential remediation measures have been suggested which the City could consider to meet these prescribed targets. It should be noted that, although these measures would improve for a range of transportation modes, they are not required to safely accommodate the transportation demands of the proposed development.

Roadway modifications (RMA-2019-TPD-041B) were recently implemented to satisfy a conditional requirement for the Subdivision and are now complete. This RMA included a right-in/right-out intersection at Fallowfield & Forager and a multi-use path along the west side of Fallowfield Road between O'Keefe Court to just south of Forager Street. It is understood that the southbound bus stop originally proposed as

part of this RMA has been deferred until traffic signals are implemented at the Fallowfield & O'Keefe/Cobble Hill intersection.

All study area intersections were shown to operate well within the capacity constraints of the adjacent transportation network, with the appropriate modifications in place (i.e. signalization of Fallowfield & O'Keefe/Cobble Hill by 2023). Further, the proposed development will contribute a nominal increase in traffic volume of traffic to the adjacent road network. A post-development Monitoring Plan is, therefore, not a requirement of this study.

Based on the findings of this study, it is the overall opinion of IBI Group that the proposed development will integrate well with and can be safely accommodated by the adjacent transportation network with the recommended actions and modifications in place.

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1 Introduction

IBI Group (IBI) was retained by 2441736 Ontario Inc. to undertake a Transportation Impact Assessment (TIA) in support of a Site Plan Control application for a proposed hotel development to be located at 135 Lusk Street, Ottawa. The development represents a parcel of land in the original 4401 Fallowfield Road Plan of Subdivision.

In accordance with the City of Ottawa's Transportation Impact Assessment Guidelines, published in June 2017, the following report is divided into four major components:

- **Screening** – Prior to the commencement of a TIA, an initial assessment of the proposed development is undertaken to establish the need for a comprehensive review of the site based on three triggers: Trip Generation, Location and Safety.
- **Scoping** – This component of the TIA report describes both the existing and planned conditions in the vicinity of the development and defines study parameters such as the study area, analysis periods and analysis years of the development. It also provides an opportunity to identify any scope exemptions that would eliminate elements of scope described in the TIA Guidelines but not relevant to the development proposal, based on consultation with City staff.
- **Forecasting** – The Forecasting component of the TIA is intended to review both the development-generated travel demand and the background network travel demand. It also provides an opportunity to rationalize this demand to ensure projections are within the capacity constraints of the transportation network.
- **Analysis** – This component documents the results of any analyses undertaken to ensure that the transportation related features of the proposed development are in conformance with prescribed technical standards and that its impacts on the transportation network are both sustainable and effectively managed. It also identifies a development strategy to ensure that what is being proposed is aligned with the City of Ottawa's policies and city-building objectives.

Throughout the development of a TIA report, each of the four study components above are submitted in draft form to the City of Ottawa and undergo a review by a designated Transportation Project Manager. Any comments received are addressed to the satisfaction of the City's Transportation Project Manager before proceeding with subsequent components of the study. All technical comments and responses are included in **Appendix A**.

Roadway modifications proposed as part of RMA-2019-TPD-041B were recently implemented to satisfy a conditional requirement for the Subdivision and are now considered complete. This RMA included a right-in/right-out intersection at Fallowfield Road & Forager Street and a multi-use pathway along the west side of Fallowfield Road. It is understood that the southbound bus stop originally proposed as part of this RMA has been deferred until traffic signals are implemented at the Fallowfield & O'Keefe/Cobble Hill intersection. The need for additional off-site road modifications or a post-development Monitoring Plan to track performance of the planned TIA Strategy will be confirmed through the analysis undertaken in this study.

2 TIA Screening

An initial screening was completed to confirm the need for a Transportation Impact Assessment by reviewing the following three triggers:

- **Trip Generation**: Preliminary trip generation estimates were developed based on the Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Edition). A 1.28 person-trip conversion factor was applied to the base trip generation data to obtain person-trip generation. The 60 person-trip threshold prescribed by the TIA Guidelines is met during the weekday afternoon peak hour, therefore the Trip Generation trigger is satisfied.
- **Location**: The proposed development will not be accessed from a boundary street that is designated as part of the City's Transit Priority, Rapid Transit network or Spine Bicycle Networks, nor is the subject site within a Design Priority Area or Transit-Oriented Development zone. As such, the Location trigger is not satisfied.
- **Safety**: Boundary street conditions were reviewed to determine if there is an elevated potential for safety concerns adjacent the site. Based on this review, there is no elevated potential for safety concerns adjacent to the site, therefore the Safety trigger is not satisfied.

As the proposed development meets the Trip Generation trigger, the need to undertake a Transportation Impact Assessment is confirmed.

A copy of the Screening Form is provided in **Appendix B**.

3 Project Scoping

3.1 Description of Proposed Development

3.1.1 Site Location

The subject property is presently an undeveloped, greenfield site located at 135 Lusk Street and is within the 4401 Fallowfield Road business park. The site occupies approximately 0.6 hectares and is generally bound by Lusk Street to the north, a hotel at 125 Lusk Street to the east, Fallowfield Road to the south and undeveloped lands to the west.

Based on GeoOttawa, the property is zoned IP[2265] H(24) – Business Park Industrial Zone.

The site location and its surrounding context is illustrated in **Exhibit 1**.

IBI

135 Lusk Street
Transportation Impact Assessment

Exhibit 1:
Site Location

PROJECT No. 135639

SCALE: 0m 125m 250m

3.1.2 Land Use Details

Table 1 summarizes the proposed land uses included in this development.

Table 1 - Land Use Statistics

LAND USE	SIZE
Hotel	99 suites

The proposed development is illustrated in **Exhibit 2** below.

The site will be accessed via a single right-in/right-out private approach with a direct connection to Lusk Street. An internal two-way vehicular access, providing a link to the abutting hotel to the east, is proposed at the rear of the property as well.

With regards to parking, a total of 99 vehicle spaces are proposed within the on-site surface parking lot, along with eight bike parking spaces near the principal building entrance. It is expected that a maximum of 15 employees will be on-site at any given time.

3.1.3 Development Phasing & Date of Occupancy

It is anticipated that the proposed development will be constructed and fully occupied in a single phase by 2023.

135 Lusk Street
Transportation Impact Assessment

Exhibit 2: Proposed Development

PROJECT No. 135639

SCALE: 0m 5m 10m

3.2 Existing Conditions

3.2.1 Existing Road Network

3.2.1.1 Roadways

The proposed development is bound by the following street(s):

- **Fallowfield Road** is a two-lane, undivided rural arterial roadway under the jurisdiction of the City of Ottawa with a right-of-way protection of 44.5m. Between Highway 416 and Strandherd Drive, Fallowfield Road has a posted speed of 80km/h, prior to taking a 90-degree turn to the northeast and continuing through to the context area with a reduced speed limit of 60 km/h.
- **Lusk Street** is a two-lane local road under the jurisdiction of the City of Ottawa, extending from O'Keefe Court and terminates in a cul-de-sac approximately 250m to the southwest. Lusk Street has a 20m right-of-way, an unposted speed limit of 50 km/h and provides access to the 4401 Fallowfield Road business park.
- **Forager Street** is a two-lane local road under the jurisdiction of the City of Ottawa, linking Lusk Street to Fallowfield Road and provides access to the 4401 Fallowfield Road business park. Forager Street has a 20m right-of-way and an unposted speed limit of 50 km/h.

Other streets within the vicinity of the proposed development are as follows:

- **Strandherd Drive** is a four-lane divided urban arterial road under the jurisdiction of the City of Ottawa with a posted speed limit of 80 km/h within the vicinity of the subject lands, and a right-of-way protection of 44.5m.
- **O'Keefe Court** is a two-lane local road under the jurisdiction of the City of Ottawa, extending west from Fallowfield Road and terminating in a cul-de-sac approximately 800m west of the Fallowfield & O'Keefe intersection. The roadway has a rural cross-section with a posted speed limit of 50km/h. O'Keefe Court extends along the former Fallowfield Road alignment (prior to its realignment to Strandherd Drive). Its right-of-way (ROW) therefore varies and is generally 30m, however, additional ROW has been taken on a portion of the north side to accommodate a multi-use path.
- **Cedarview Road** is a City of Ottawa roadway under the jurisdiction of the City of Ottawa that extends from Strandherd Drive in the south to Baseline Road in the north. Cedarview Road is a two-lane urban arterial road north of Fallowfield Road, with a 37.5m right-of-way protection. Between Fallowfield Road and Jockvale Road, it is a major collector with a 26m right-of-way. The posted speed limit on Cedarview Road is 60 km/h. South of Strandherd Drive and the VIA Rail corridor, Cedarview Road has been renamed Borrisokane Road and continues south to Barnsdale Road.
- **Foxtail Avenue** is a two-lane local road under the jurisdiction of the City of Ottawa, extending north from O'Keefe Court and provides access for the Orchard Estates residential community. The posted speed limit is 40 km/h.

3.2.1.2 Intersections

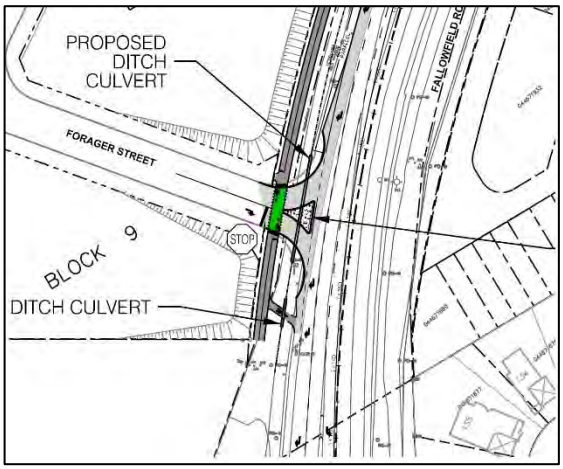
The following existing intersections have been identified as having the greatest potential to be impacted by the proposed development:

Fallowfield Road & O'Keefe Court / Cobble Hill Drive presently exists as a four-legged unsignalized intersection with stop-control on the O'Keefe Court and Cobble Hill Drive approaches. Each leg of the intersection is configured with a single through lane and auxiliary left-turn lane. Auxiliary right-turn lanes are provided along Fallowfield Road, while the side streets are configured with shared through-right lanes. The City of Ottawa is currently monitoring this intersection for implementation of traffic signals, once warranted.

Figure 1 - Fallowfield Road & O'Keefe Court / Cobble Hill Drive intersection

Fallowfield Road & Forager Street is a three- legged intersection which has been recently modified to restrict turning movements to right-in/right-out and incorporate a multi-use pathway (MUP) on the west side of Fallowfield Road between Forager Street and Fallowfield Road. This MUP includes a bi-directional shared cross-ride on the eastbound approach to achieve connectivity across Forager Street. Each leg of the intersection is configured with a single through lane, with an auxiliary right-turn lane on the southbound approach only.

Figure 2 - Fallowfield Road & Forager Street



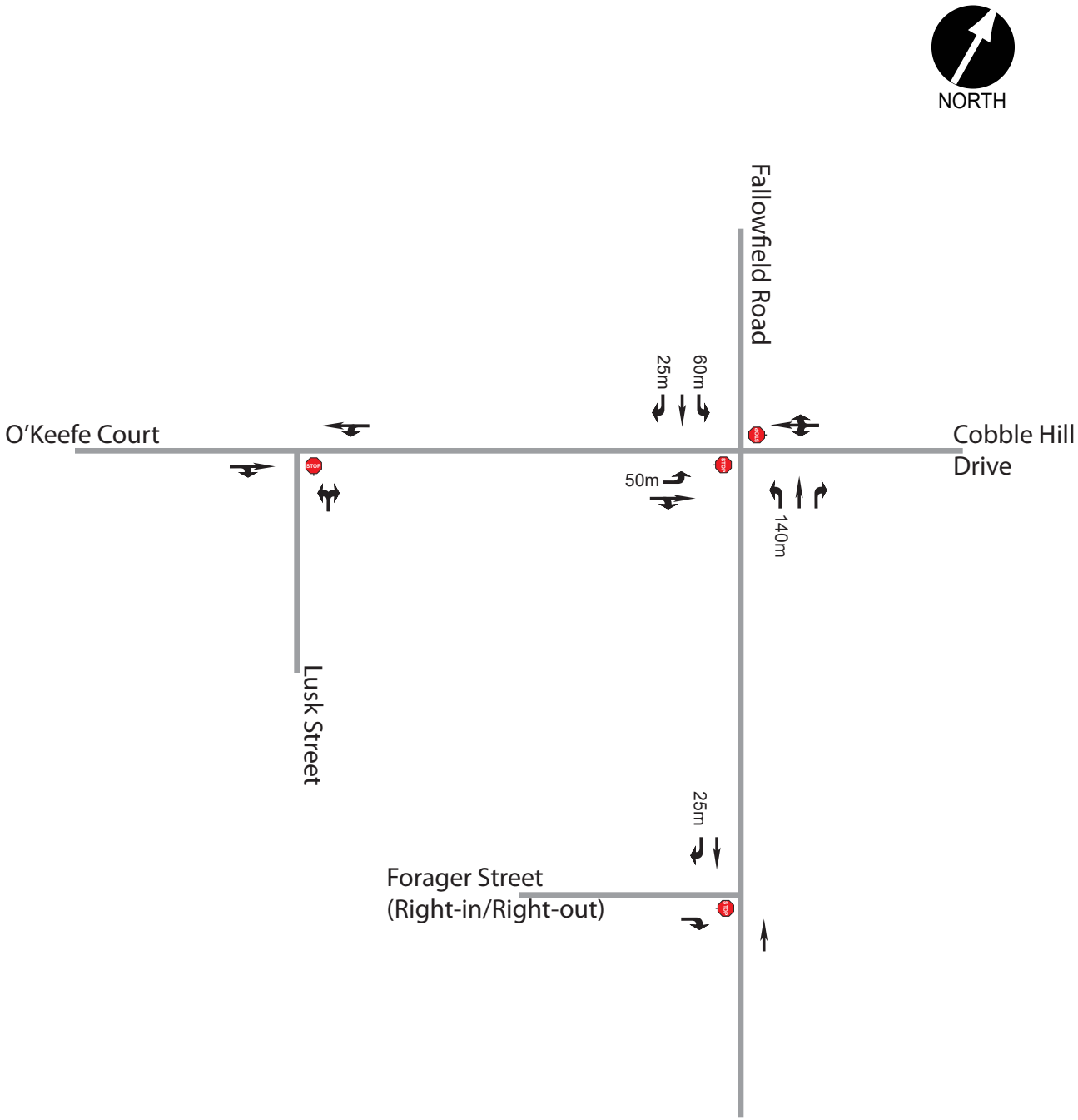
The intersection control and lane configurations for all intersections described previously are shown in **Exhibit 3** below.

3.2.1.3 Traffic Management Measures

There are currently no traffic management or traffic calming measures on the boundary streets within the vicinity of the proposed development.

3.2.1.4 Nearby Driveways

The Hampton Inn and Suites Hotel is located immediately to the east of the subject development and includes two full-movement private approaches on Lusk Street, with the nearest being approximately 7 metres from the abutting property line.



Legend

- Stop Sign
- Lane Configurations
- xxxm Storage Lengths

3.2.1.5 Existing Traffic Volumes

Weekday morning and afternoon peak hour turning movement counts were obtained by IBI staff at the following intersection(s):

- Fallowfield Road and O'Keefe Court/Cobble Hill Drive (IBI Group – January 30, 2018)

A growth rate was applied to the through volumes along Fallowfield Road to approximate existing (2021) traffic volumes. Justification of background traffic volumes is discussed further in the Forecasting section of this report.

In general, the City requires the use of traffic counts conducted within the last 3 years. Due to the ongoing COVID-19 pandemic, however, it is not possible to collect data representative typical conditions at this time. To compensate for this, traffic generation associated with the any developments which were built out/occupied following the collection of this data have been accounted for explicitly in in the Existing (2021) Traffic volumes, including the neighbouring Hampton Inn & Suites Hotel.

Weekday peak hour vehicular, pedestrian and cyclist traffic volumes representative of Existing (2021) conditions are shown in **Exhibit 4** below. Traffic count data is provided in **Appendix C**.

3.2.2 Existing Bicycle and Pedestrian Facilities

The section of Fallowfield Road was recently reconstructed to incorporate a multi-use path on the west side from just south of Forager Street to O'Keefe Court. An east-west multi-use path presently exists along the north side of O'Keefe Court from Lytle Park in the west to Cedarview Road in the east as well.

With respect to dedicated cycling infrastructure within the context area, a bike pocket exists along Fallowfield Road on the southbound approach to the Fallowfield Road & O'Keefe Court/Cobble Hill Drive intersection. Uni-directional cycle tracks are also provided on both sides of Strandherd Drive from Fallowfield Road to Maravista Drive with cross-rides, two-stage left-turn bike boxes and bicycle signals at key signalized intersections.

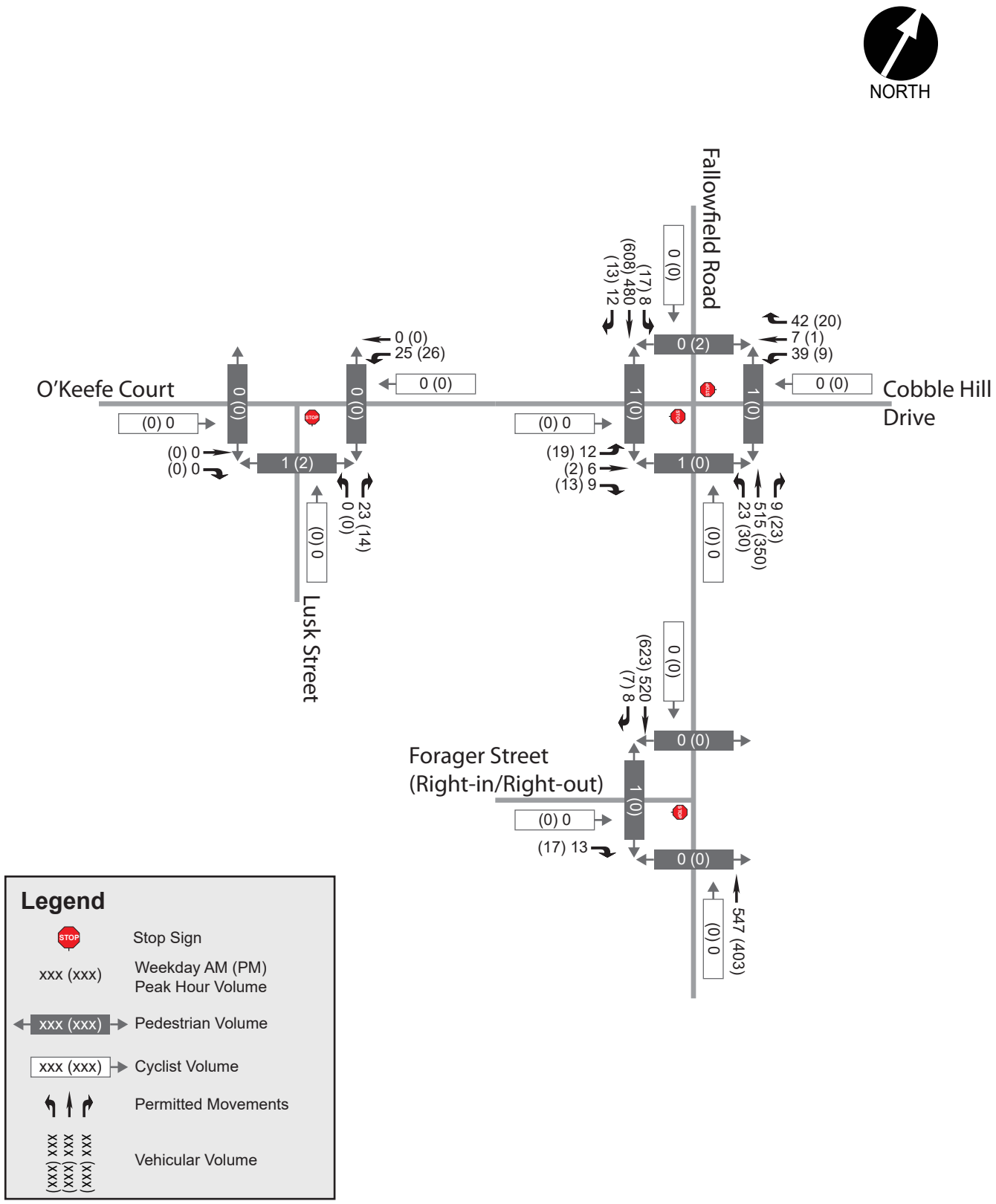
3.2.3 Existing Transit Facilities and Service

OC Transpo operates the following transit route within close proximity to the proposed development:

- **Route #272** provides weekday peak period and peak direction service between the Cobble Hill residential development in Barrhaven South and Tunney's Pasture Station and operates on a 10-minute headway. Service is provided from Barrhaven to downtown in the morning peak period and the reverse in the afternoon.

The nearest bus stops to the proposed development are located on Cobble Hill Drive, just east of Fallowfield Road and represent an approximate 410-metre walking distance from the site. It should be noted as well that there is presently no controlled pedestrian crossing of Fallowfield Road to facilitate access to these transit stops from the proposed development.

A transit service map for the above noted transit route is provided in **Appendix D**.



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135 Lusk Street
Transportation Impact Assessment

Exhibit 4:
Existing (2021)
Traffic

PROJECT No. 135639

SCALE: N.T.S.

3.2.4 Collision History

A review of historical collision data has been conducted for the road network surrounding the proposed development. The TIA Guidelines require a safety review if at least six collisions for any one movement or of a discernible pattern, over a five-year period have occurred. **Table 2** summarizes all reported collisions between January 1, 2014 and December 31, 2019.

Table 2 - Reported Collisions within Vicinity of Proposed Development

LOCATION	# OF REPORTED COLLISIONS
INTERSECTIONS	
Fallowfield Road & Strandherd Drive	42
Fallowfield Road & O'Keefe Court / Cobble Hill Drive	1
SEGMENTS	
Fallowfield Road – Strandherd Drive to O'Keefe Court / Cobber Hill Drive	1
O'Keefe Court – Fallowfield Road to cul-de-sac	4

Based on the collision history summarized above, the Fallowfield Road & Strandherd Drive is the only intersection where the collisions are significant but as it is not within the study area, no further analysis is required.

Detailed collision records are provided in **Appendix E**.

3.3 Planned Conditions

3.3.1 Transportation Network

3.3.1.1 Future Road Network Projects

The 2013 Transportation Master Plan (TMP) outlines future road network modifications in the 2031 'Affordable Network'. The following projects were noted that may have an impact on traffic patterns within the vicinity of the site:

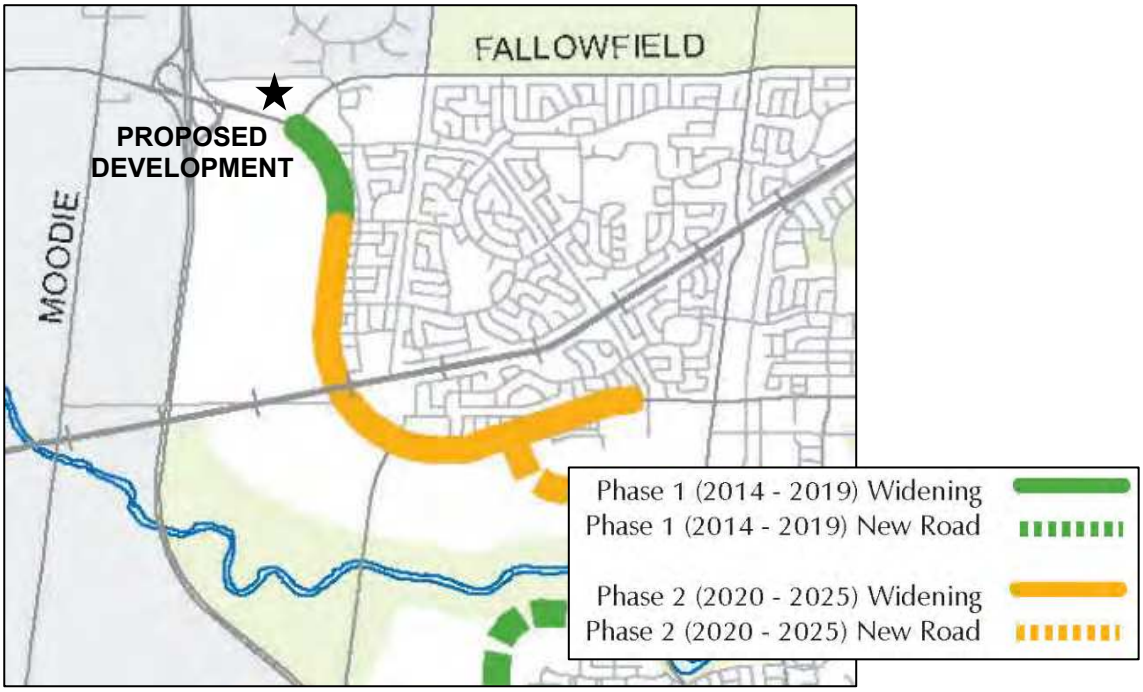
- **Strandherd Drive** – Planned widening of Strandherd Drive from two to four lanes. The first phase included widening between Fallowfield Road and Maravista Drive (Phase 1: 2014-2019) and was completed in 2015. The second phase includes widening between Maravista Drive and Jockvale Road (Phase 2: 2020-2025).

The *2019 City-Wide Development Charges Background Study (March 15, 2019)* identifies the following revisions for the timing of the TMP road network modifications described above:

- **Strandherd Drive Phase 2** – The timing for the second phase of the planned widening has been revised to 2020-2024.

Figure 3 below illustrates the planned changes to the arterial road network projects in the broader area, as per the TMP Affordable Plan.

Figure 3 - Future Road Network Projects



Source: 2013 Transportation Master Plan – Map 11 '2031 Affordable Network'

Although not part of the '2031 Affordable Network', the TMP indicates that Fallowfield Road may be widened between Strandherd Drive and Greenbank Road some time beyond the TMP's 2031 horizon.

3.3.1.2 Future Transit Facilities and Services

The 2013 TMP outlines the future rapid transit and transit priority (RTTP) network. The TMP does not identify any planned RTTP projects within the vicinity of the proposed development as part of the '2031 Affordable Network' or '2031 Network Concept'. The Roadway Modification Application (RMA) completed for the Fallowfield & Forager intersection originally included a new southbound bus stop on Fallowfield Road south of O'Keefe Court, however OC Transpo has deferred the installation of this bus stop until after the intersection becomes signalized.

3.3.1.3 Future Cycling and Pedestrian Facilities

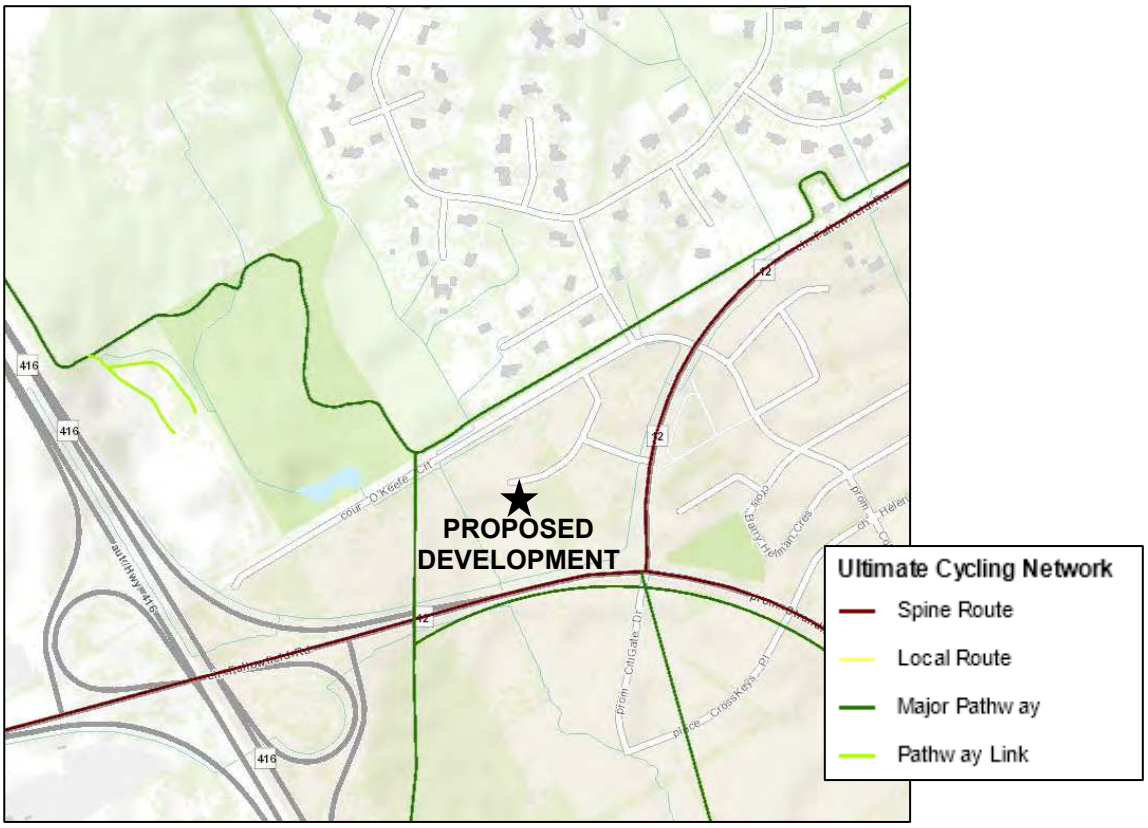
Regarding pedestrian facilities, a 2.0-metre wide concrete sidewalk is planned on the south side of Lusk Street from O'Keefe Court and includes the site's frontage. This sidewalk will connect with a future 3.0-metre wide asphalt pathway proposed along the northern property boundary, providing a direct pedestrian link to the western portion of the 4401 Fallowfield Road Subdivision.

Although Fallowfield Road is identified as a 'Spine' cycling route, the Ottawa Cycling Plan (2013) does not describe any planned improvements to bicycle infrastructure along this section of roadway within the study area. The recently constructed multi-use path on the west side of Fallowfield Road provides connectivity from the site to the Fallowfield/O'Keefe Court intersection where a future signalized intersection and bus stops are planned.

A proposed north-south Major Pathway, identified as part of the Ultimate Cycling Network, will connect to the existing multi-use pathway north of O'Keefe Court, continue south through 4401 Fallowfield Road prior to following Highway 416 towards the Jock River.

Figure 4 below shows the future cycling network in the vicinity of the proposed development. The RMA includes a portion of the multi-use pathway on the west side of Fallowfield Road along the 4401 Fallowfield subdivision frontage.

Figure 4 - Ultimate Cycling Network



Source: GeoOttawa

3.3.2 Future Adjacent Developments

The City of Ottawa Transportation Impact Assessment (TIA) Guidelines specify that all significant developments proposed within the surrounding area which are likely to occur within the study's horizon year must be identified and taken into consideration in the development of future background traffic projections.

The subject site forms part of the 4401 Fallowfield Road Plan of Subdivision (previously referred to as the Highway 416 Lands development). It is located in the northwest quadrant of the Fallowfield Road and Strandherd Drive intersection that will eventually consist of two hotels and an office park.

All current development applications within the context area of the proposed development have been summarized below in **Table 3** below.

Table 3 - Future Adjacent Developments

DEVELOPMENT	TIA	LAND USE AND SIZE	TARGETED BUILD-OUT1
100 Lusk Street [3]	Stantec (2020)	• ~1,895 m^2 General Office	2021[1]
115 Lusk Street [3]	IBI Group (2021)	• ~280 m^2 Restaurant • ~560 m^2 Medical Office	2023
Hampton Inn & Suites [3] (125 Lusk Street)	IBI Group (2018)	• 102 Hotel Rooms	2019[2]
Gateway Industrial Centre (4497 O'Keefe Court)	Delcan (2008)	• ~25,981 m^2 General Light Industrial	Unknown
4190, 4200, 4210, 4236 Fallowfield Road and 2740 Cedarview Road	Novatech (2018)	• 194 Residential Units	2023
CitiGate – 416 Employment Lands	Novatech (2012)	• ~32,526.1m^2 Shopping Centre • 200 Hotel Rooms • Gas Station (8 fuel positions) • ~16.6 ha Business Park • 67.65 ha Office Park • ~10.5 ha New Car Sales	2029
CitiGate Hotel (4433 Strandherd Drive) [4]	Novatech (2019)	• 99 Hotel Rooms	2020[1]

Notes:

1. Occupancy assumed to coincide with full build-out of the proposed development in 2023.
2. This development was not built/occupied prior to the collection of turning movement count data at Fallowfield & O'Keefe/Cobble Hill and therefore its traffic impacts are being considered explicitly.
3. Located within the Highway 416 Lands development.
4. Located within the City Gate – 416 Employment Lands development.

The locations of the adjacent developments described above are shown in **Exhibit 5** below.

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135 Lusk Street
Transportation Impact Assessment

Exhibit 5:
Adjacent Developments

PROJECT No. 135639

SCALE: 0m 125m 250m

3.3.3 Network Concept Screenline

Network screenline analysis is not expected to be necessary for this development, as it does not trigger the threshold prescribed in the TIA Guidelines of 200 person-trips or more during the weekday peak hours. Detailed trip generation calculations will be provided in the Forecasting section of the report.

3.4 Study Area

The information presented thus far provides a base level of information for the development's context. Based on preliminary estimates of trip generation completed for the TIA Screening Form, the proposed development is expected to be a low traffic generator with roughly 80 person-trips expected during the critical weekday afternoon peak hour. Travel demand will be subsequently stratified by mode share and further reduced by the variation in travel routes within the broader study area. As such, the proposed development is expected to contribute minimal downstream impacts to intersections at the periphery of the context area, including Cedarview & Fallowfield.

Strandherd Drive from Fallowfield Road to Maravista Drive was also exempt from the study area, as this segment of road was reconstructed in 2015 following the City's Complete Streets design philosophy to accommodate multi-modal travel demands beyond the TMP's ultimate planning horizon of 2031. Consideration was given to the proposed development travel demands as part of the Highway 416 Lands CTS.

With respect to the exemptions discussed above, this TIA will focus on site-specific impacts, integration with its boundary streets, including a functional review of the site access geometry and intersection control, on-site drive aisle requirements to accommodate proposed design vehicles and a review of the site's parking and loading requirements.

A condensed study area is proposed for this TIA, which will consist of the following intersections:

- Fallowfield Road & O'Keefe Court/Cobble Hill Drive
- O'Keefe Court & Lusk Street
- Fallowfield Road & Forager Street

This study area is consistent with the TIA for the adjacent development at Hampton Inn and Suites Hotel at 125 Lusk Street, a development of similar size, land use type and overall traffic impacts on the adjacent road network.

An intersection Multi-Modal Level of Service (MMLOS) analysis is only required for signalized intersections. Based on analysis conducted for previous TIAs within the 4401 Fallowfield Road subdivision, it is expected that the Fallowfield & O'Keefe/Cobble Hill intersection will require signals operationally under Future Background conditions and therefore intersection MMLOS will be limited to this intersection once signalization is required to achieve acceptable operating conditions. Segment-based MMLOS analysis will also be provided on Fallowfield Road between Forager Street and O'Keefe Court.

3.5 Time Periods

Based on a preliminary review of trip generation rates associated with the proposed land uses, the peak weekly traffic generation is expected to occur on Saturdays. For the purposes of comparison, the weekday morning and afternoon peak periods represent 65% and 83% of this peak demand, respectively. It is important to note, however, that the Saturday peak likely does not coincide with the peak hour of adjacent street traffic. As such, consistent with other recently-conducted TIAs within the 4401 Fallowfield Road business park, the weekday morning and afternoon peak hours will constitute the critical analysis periods for this study.

3.6 Study Horizon Year

It is expected that the proposed development will be constructed and fully occupied in a single phase in 2023. The horizon year for this study is therefore 2028.

3.7 Exemptions Review

The TIA Guidelines provide exemption considerations for elements of the Design Review and Network Impact components. **Table 4** summarizes the TIA modules that are not applicable to this study.

Table 4 - Exemptions Review

TIA MODULE	ELEMENT	EXEMPTION CONISDERATIONS	REQUIRED
DESIGN REVIEW COMPONENT			
4.1 Development Design	4.1.2 Circulation and Access	• Only required for site plans	✓
	4.1.3 New Street Networks	• Only required for plans of subdivision	✗
4.2 Parking	4.2.1 Parking Supply	• Only required for site plans	✓
	4.2.2 Spillover Parking	• Only required for site plans where parking supply is 15% below unconstrained demand	✗
NETWORK IMPACT COMPONENT			
4.5 Transportation Demand Management	All Elements	• Not required for site plans expected to have fewer than 60 employees and/or students on location at any given time	✗[1]
4.6 Neighbourhood Traffic Management	4.6.1 Adjacent Neighbourhoods	• Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds	✓
4.8 Network Concept	n/a	• Only required when proposed development generates more than 200 person-trips during the peak hour in excess of the equivalent volume permitted by established zoning	✗

Notes:
[1] *According to the proponent, a maximum of 15 employees are expected to be on-site at any given time.*

4 Forecasting

4.1 Development Generated Traffic

4.1.1 Trip Generation Methodology

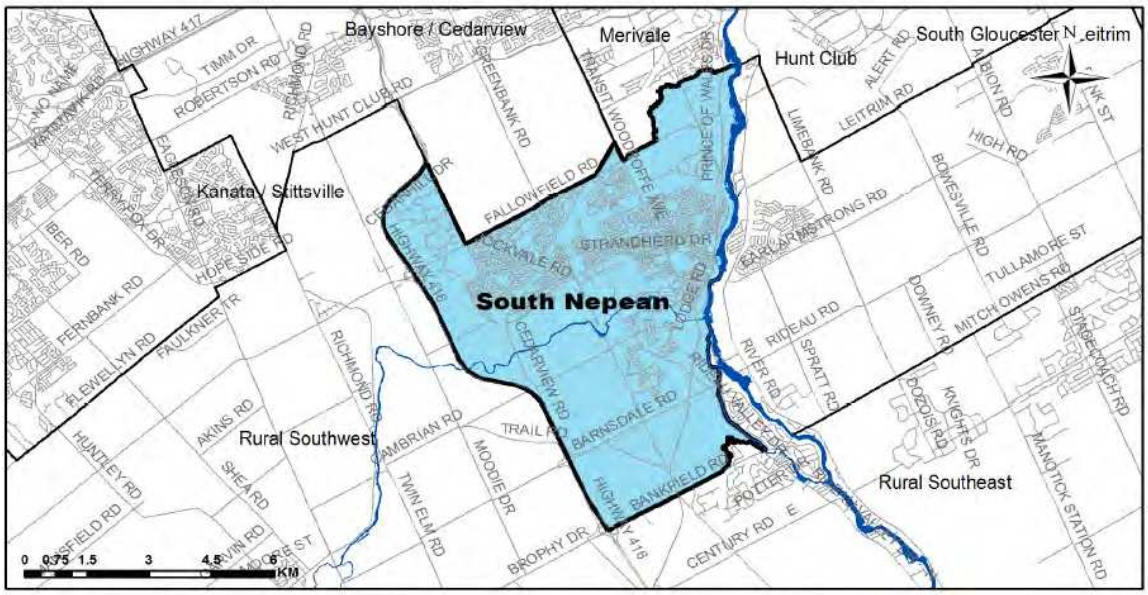
Peak hour site-generated traffic volumes were developed using the Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Edition). The TIA Guidelines indicate that vehicle-trip generation rates from the ITE Trip Generation Manual should be converted to person-trips through the application of a 1.28 vehicle-to-person-trip conversion factor.

Following the application of the vehicle-to-person-trip conversion factor, the person-trips were then subdivided based on representative mode share percentages applicable to the study area to determine the number of auto driver, auto passenger, transit, pedestrian, cycling and 'other' trip types.

Mode share targets were developed based on the local mode share distributions from the South Nepean Traffic Assessment Zone (TAZ) in the 2011 O-D Survey and adjusted to account for Condition 6b of the Conditions of Approval of the Draft Plan of Subdivision of 4401 Fallowfield Road. Condition 6b indicates that all TIAs prepared for Site Plan Applications within the 4401 Fallowfield Road subdivision must assume a maximum non-auto mode share (transit, walking, cycling and 'other') of 15%. Furthermore, Condition 6a indicates that the cumulative vehicle-trip generation of all sites within the 4401 Fallowfield Road subdivision shall not exceed 739 vehicles per hour during the weekday morning and afternoon peak periods.

The extents of the South Nepean TAZ are illustrated in **Figure 5** below.

Figure 5 – South Nepean TAZ



Source: 2011 O-D Survey

4.1.2 Trip Generation Results

4.1.2.1 Base Vehicle Trip Generation

Peak hour vehicular traffic volumes associated with the proposed development were determined using appropriate peak hour trip generation rates from the ITE Trip Generation Manual.

The vehicular trip generation results for the proposed development have been summarized in **Table 5** below.

Table 5 - Base Vehicular Trip Generation Results

LAND USE	SIZE	PERIOD	GENERATED TRIPS (VPH)		
			IN	OUT	TOTAL
310 – Hotel	99 suites	AM	28	19	47
		PM	30	29	49

Notes: vph = vehicles per hour

4.1.2.2 Person Trip Generation

The TIA Guidelines indicate that a 1.28 vehicle-to-person-trip conversion rate should be utilized to convert the base vehicular trip generation results into person trips.

The resulting number of site-generated person-trips is summarized in **Table 6** below.

Table 6 - Person-Trip Generation

LAND USE	PERIOD	PERSON TRIPS (PPH)		
		IN	OUT	TOTAL
Hotel	AM	36	24	60
	PM	39	37	76

Notes: pph = persons per hour

4.1.2.3 Mode Share Proportions

The 2011 TRANS Origin-Destination (O-D) Survey provides approximations of the existing modal share within the South Nepean Traffic Assessment Zone (TAZ). Relevant extracts from the 2011 O-D Survey are provided in **Appendix F**.

Of the available data, a weighted average of the weekday AM 'From', AM 'Within', PM 'To' and PM 'Within' mode share distributions were determined to be the most appropriate to develop a baseline mode share for the proposed development. These distributions were selected to best represent the travel characteristics of hotel guests which typically arrive and check in during the afternoon and check out in the morning. The South Nepean TAZ also includes Barrhaven which provides a wide range of amenities and housing options for hotel prospective hotel employees. As such, the internal (i.e. 'Within District') mode share proportions were also considered in the development of the modal targets for the proposed development.

It is acknowledged, however, that the subject development is located on the periphery of an auto-oriented suburb and therefore, it was determined that the mode share targets specific to this development may deviate from the average mode share experienced in the South Nepean TAZ. The following adjustments were made to the mode share distributions to better represent the travel characteristics of the proposed development:

- 'Cycling' trips were reallocated to 'Auto Driver', as these active transportation trips are unlikely to coincide with the hotel's peak hour trip generation; and
- The vast majority of 'Other' trips were assumed to occur by taxi/rideshare services and therefore in order to quantify their vehicular impacts, these trips were reallocated to 'Auto Driver'.

Given the low probability of site-generated trips occurring by non-auto travel modes (transit, cycling, walking and other) within the horizon year of this study, the mode share targets of all non-auto travel modes were proportionally adjusted to yield a total non-auto mode share of 15% in accordance with the Conditions of Approval for 4401 Fallowfield Road. The difference in mode share was reallocated proportionally to the auto driver and auto passenger modes.

Table 7 below summarizes the 2011 O-D Survey mode shares, as well as the mode share targets.

Table 7 - 2011 O-D Survey Mode Shares and Proposed Mode Share Targets

TRAVEL MODE	2011 O-D SURVEY MODE SHARE				BLENDED MODE SHARE	BLENDED MODE SHARE[1]	MODE SHARE TARGETS
	AM From District	AM Within District	PM To District	PM Within District			
Auto Driver	60%	34%	62%	46%	52%	62%	69%
Auto Passenger	8%	19%	11%	21%	14%	14%	16%
Total Auto Mode Share	**68%**	**53%**	**73%**	**67%**	**66%**	**76%**	**85%**
Transit	27%	4%	24%	4%	16%	16%	10%
Cycling	0%	2%	0%	1%	1%	0%	0%
Walking	0%	17%	0%	20%	8%	8%	5%
Other	4%	24%	2%	9%	9%	0%	0%
Total Non-Auto Mode Share	**31%**	**47%**	**26%**	**34%**	**34%**	**24%**	**15%**

Notes:

[1] Adjustments to reallocate 'Other' mode share to 'Auto Driver'

4.1.2.4 Trip Reduction Factors

Deduction of Existing Development Trips

Not Applicable: The proposed development lands are currently undeveloped, and do not generate any traffic volumes.

Pass-by Traffic

Not Applicable: A pass-by trip is an intermediary stop over en-route to a final destination. Hotel uses do not typically generate pass-by trips. Further, the ITE Trip Generation Handbook (3rd Edition) does not provide survey data for pass-by trips associated with hotel uses. As such, no pass-by reduction factors have been applied to site-generated trips as part of this study.

Synergy/ Internalization

Not Applicable: The proposed development is not expected to generate internal vehicle-trips of any significance between land uses within the 4401 Fallowfield Road subdivision including the Quality Restaurant proposed as part of 115 Lusk Street. Instead, these any trips generated within the subdivision would be expected to occur primarily by active modes due to their close proximity.

4.1.2.5 Trip Generation by Mode

The mode share targets summarized previously in **Table 7** were applied to the number of development-generated person-trips to establish the expected number of trips per travel mode, as shown in **Table 8** below.

Table 8 - Peak Hour Person Trips by Mode

MODE	AM			PM		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Auto Driver	25	17	42	27	26	53
Auto Passenger	6	4	10	6	6	12
Transit	4	2	6	4	4	8
Cycling	0	0	0	0	0	0
Walking	1	1	2	2	2	4
Other	0	0	0	0	0	0
Total	**36**	**24**	**60**	**39**	**37**	**76**

4.1.2.6 Cumulative 4401 Fallowfield Road Trip Generation

Condition 6A of the Conditions of Approval of the Draft Plan of Subdivision of 4401 Fallowfield Road indicates that the total vehicle-trip generation of the subdivision shall not exceed 739 vehicle-trips per hour during the weekday morning and afternoon peak hours. **Table 9** below summarizes the total and cumulative number of vehicle-trips generated during the weekday morning and afternoon peak hours by all sub-developments within 4401 Fallowfield Road subdivision which have been approved or are currently undergoing a Site Plan Control application.

Table 9 - Cumulative 4401 Fallowfield Road Trip Generation

SUB-DEVELOPMENT	TOTAL AM (PM) VEHICLE TRIPS	CUMULATIVE AM (PM) VEHICLE TRIPS
100 Lusk Street	23 (22)	23 (22)
115 Lusk Street	13 (32)	36 (54)
125 Lusk Street	56 (64)	92 (118)
135 Lusk Street	60 (76)	152 (194)
Total from Current Development Applications		**152 (194)**
Total Allowable Vehicle-Trip Generation		**739 (739)**
Percentage of Maximum Trips Permitted		**21% (26%)**

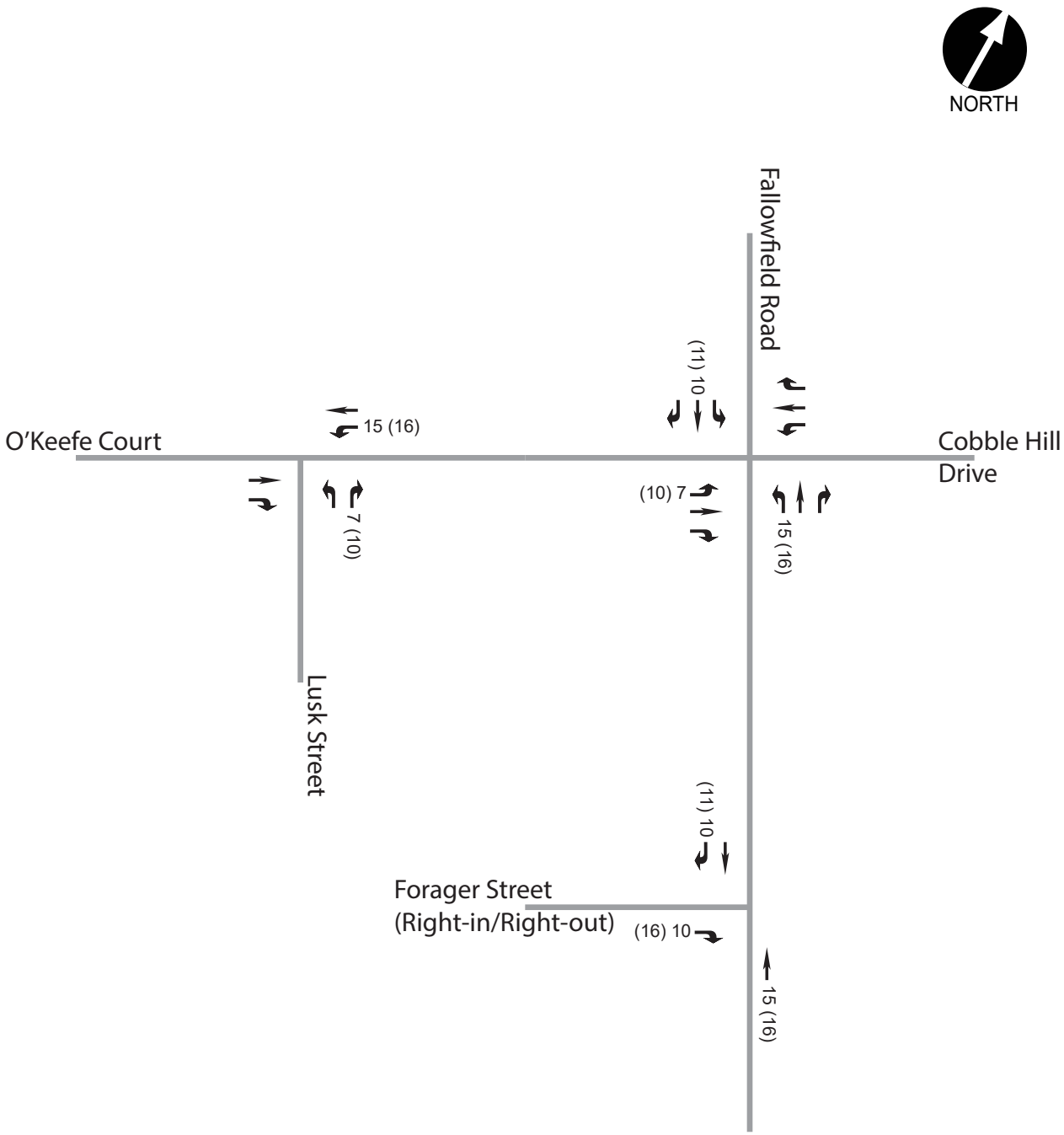
As indicated in **Table 9** above, the proposed development will not exceed the maximum permissible vehicular generation of the 4401 Fallowfield Road subdivision.

4.1.3 Trip Distribution and Assignment

As the proposed development is expected to primarily draw traffic from Highway 416, commercial areas of Barrhaven and the Ottawa International Airport, site-generated traffic has been distributed to the adjacent road network as follows:

- 40% to/from the north via Fallowfield Road
- 60% to/from the south via Fallowfield Road

Utilizing the estimated number of new auto trips and applying the above distribution, future site-generated traffic volumes are illustrated for each of the study area intersections in **Exhibit 6** below.


NORTH
Fallowfield Road
O'Keefe Court
Cobble Hill Drive
Lusk Street
Forager Street
(Right-in/Right-out)
15 (16)
(11) 10
7 (10)
(10) 7
15 (16)
(11) 10
(16) 10
15 (16)
LEGEND
Permitted Movements
Weekday AM (PM) Peak Hour Vehicular Volume

4.2 Background Network Traffic

4.2.1 Changes to the Background Transportation Network

To properly assess future traffic conditions, planned modifications to the transportation network that may impact travel patterns or demand within the study area must be considered. The TIA Scoping reviewed the anticipated changes to the study area transportation network based on the Transportation Master Plan (TMP), the Ottawa Cycling Plan, the Ottawa Pedestrian Plan and the *2019 City-Wide Development Charges Background Study* and determined that there are no major road, pedestrian or cycling network modifications planned within the study area prior to the 2028 study horizon year.

It is worth noting that the intersection of Fallowfield & O'Keefe/Cobble Hill is being monitored by City staff for traffic signal warrants. Also, the intersection of Fallowfield & Forager was recently constructed which allows for an alternative means of accessing the arterial road network with right-in/right-out only movements permitted.

4.2.2 General Background Growth Rates

The background growth rate is intended to represent regional growth from outside the study area that will travel along the adjacent road network. Consistent with the adjacent TIAs conducted for adjacent developments within the 4401 Fallowfield Road subdivision including 115 Lusk Street (IBI, 2021) and the Hampton Inn & Suites TIA (IBI, 2018), a 2% rate of linear growth per annum is proposed within the study area for the calculation of future background traffic.

The background growth rate was only been applied to the through movements on Fallowfield Road as traffic generation relating to all known future adjacent developments has been explicitly accounted for in the analysis.

4.2.3 Other Area Development

All current adjacent development applications within the study area were previously identified in **Table 3** above. All of the developments identified have been accounted for in the future background volume projections. The developments represent specific areas of growth within the study area and are therefore considered in addition to the general background growth rate discussed previously. **Table 10** below summarizes the vehicle trip generation of all current adjacent background development applications.

Table 10 - Adjacent Development Vehicle Trip Generation

DEVELOPMENT	TIA	VEHICLE TRIP GENERATION			
		AM		PM	
		IN	OUT	IN	OUT
100 Lusk Street	Stantec (2020)	20	3	3	19
115 Lusk Street	IBI (2021)	8	5	17	15
Hampton Inn & Suites (125 Lusk Street)	IBI (2018)	33	23	33	31
Gateway Industrial Centre (4497 O'Keefe Court)	Delcan (2008)	20	97	94	46
4190, 4200, 4210, 4236 Fallowfield Road and 2740 Cedarview Road	Novatech (2018)	108	33	131	76
CitiGate – 416 Employment Lands	Novatech (2012)	**Interim (2019)**			
		741	216	664	1,015
		Ultimate (2029)			
		3,494	635	1,128	3,316
CitiGate Hotel (4433 Strandherd Drive)	Novatech (2019)	29	20	27	26

It should be noted that some of the developments shown in **Table 10** above are not expected to be fully built out by the 2028 horizon year of the study or are sub-developments within a larger development. Background development traffic volumes have been adjusted appropriately to account for this.

The CitiGate – 416 Employment Lands is a large multi-phase development which is currently under construction and is expected to be fully built out by 2029. The projected traffic volumes generated by this development at the 2023 and 2028 analysis years were linearly interpolated and considered the development status at the time of the recorded traffic counts utilized in this study.

It was assumed that the Gateway Industrial Centre (4497 O'Keefe Court) development would be fully built out by the 2023 analysis year.

4.3 Demand Rationalization

The purpose of this section is to rationalize future travel demands within the study area to account for potential capacity limitations in the transportation network and its ability to effectively accommodate the additional demand generated by a new development.

4.3.1 Description of Capacity Issues

The recently-completed 115 Lusk Street TIA (IBI, 2021) identified potential capacity issues at the Fallowfield & O'Keefe Court/Cobble Hill intersection (i.e. LOS 'F') by 2023 under Background and Total traffic conditions with its two-way stop-controlled configuration. With traffic signals in place, the intersection capacity would be significantly improved to well within acceptable standards (i.e.

LOS 'D' or better). If traffic signals are not implemented by the 2028 study horizon year, the results of the analysis indicate that long delays of approximately 4 to 5 minutes are expected at the Fallowfield & O'Keefe intersection with or without the inclusion of site-generated traffic.

4.3.2 Adjustment to Development Generated Demands

The proposed development is expected to contribute marginally to demand on the adjacent road network with up to 53 additional two-way vehicle-trips during the critical weekday afternoon peak hour and therefore is unlikely to exacerbate any potential traffic operational issues, particularly because the majority of site-generated traffic is expected to use non-critical movements and therefore not contribute significantly to the overall intersection delay. The impacts on the Fallowfield & O'Keefe intersection will be lessened by the recently-completed Fallowfield & Forager intersection which provides a more direct connection to the arterial road network for right-turning traffic.

4.3.3 Adjustment to Background Network Demands

The Hampton Inn and Suites TIA (IBI, 2018) did not assign any traffic to the Fallowfield & Forager intersection. The development of traffic volumes undertaken for this study assumed a reassignment of site-generated trips in recognition of this recent right-in/right out intersection as a viable alternative for vehicular traffic associated with that hotel.

As prescribed in the TIA Guidelines, the effects of peak-hour spreading have been considered in in future analysis years of this study. It is anticipated that as traffic volumes continue to gradually increase, vehicular trips will have a natural tendency to be more evenly distributed across the peak hour (PHF = 1.0) and eventually increase demands in the shoulders of the peak as well. The impacts of peak hour spreading are accounted for in the Synchro modelling, completed as part of the Analysis component of this study.

4.4 Traffic Volume Summary

4.4.1 Future Background Traffic Volumes

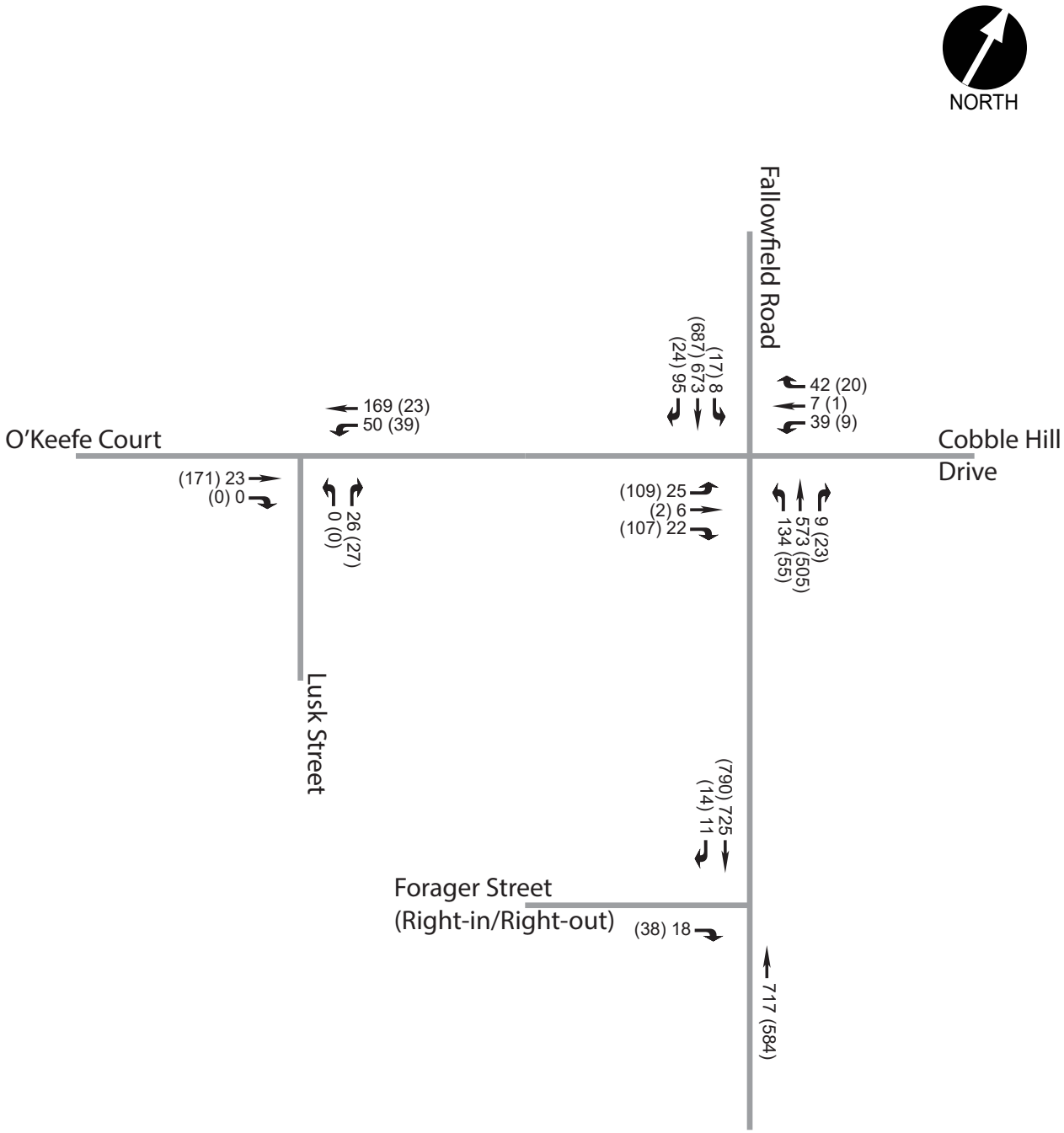
Future background traffic volumes projections have been established by combining the adjacent development traffic and background traffic derived through the application of a growth rate, as discussed previously.

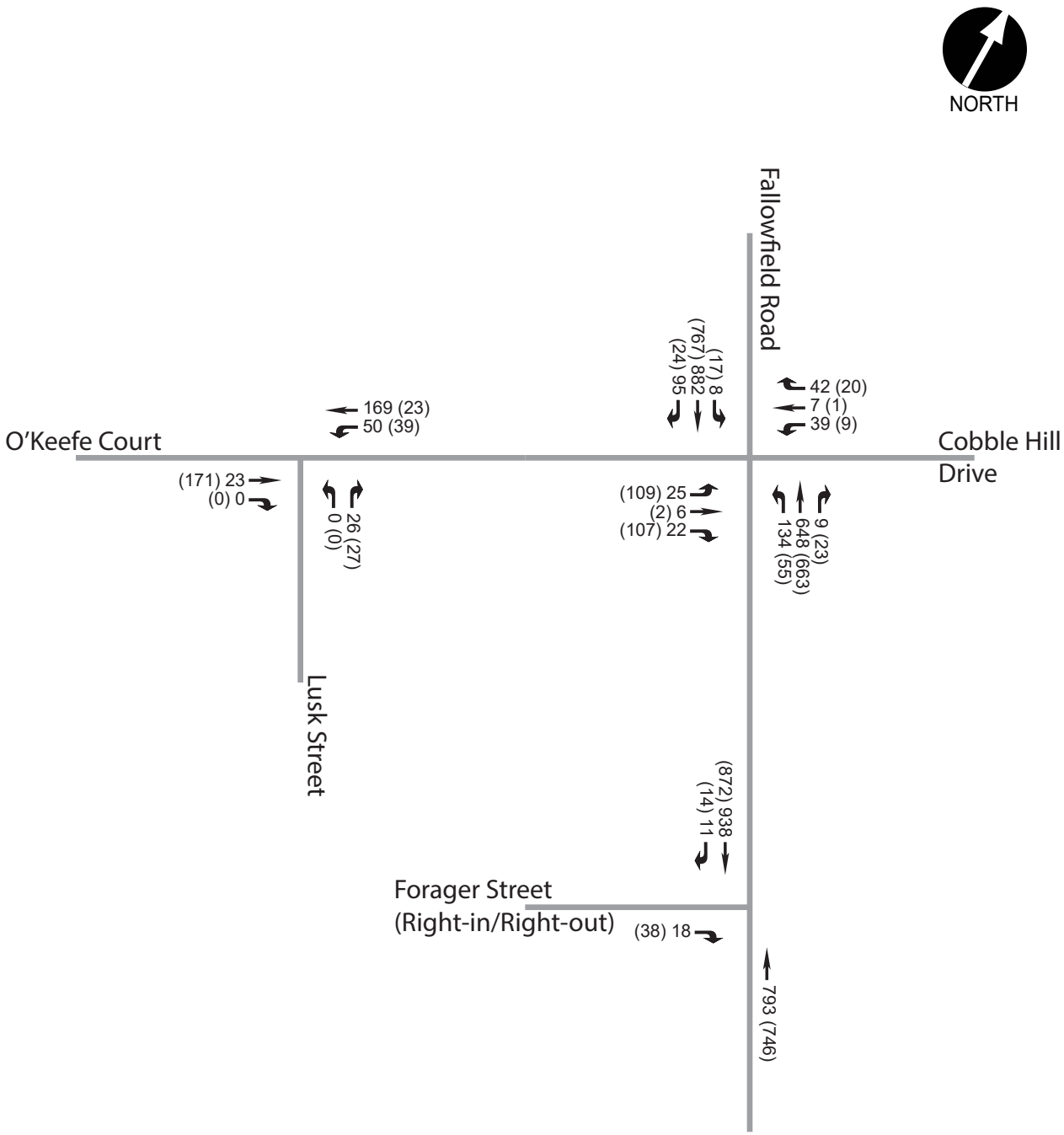
Exhibit 7 and **Exhibit 8** present the future background traffic volumes anticipated for the 2023 build-out year, as well as the 2028 study horizon, respectively.

4.4.2 Future Total Traffic Volumes

Future total volumes have been derived by combining the site-generated traffic from **Exhibit 6** with the future background volumes from **Exhibit 7** and **Exhibit 8**.

Exhibit 9 and **Exhibit 10** present the future total traffic volumes anticipated for 2023 and 2028 analysis years, respectively.


NORTH
Fallowfield Road
O'Keefe Court
Cobble Hill Drive
Lusk Street
Forager Street
(Right-in/Right-out)
169 (23)
50 (39)
(171) 23
(0) 0
26 (27)
0 (0)
(687) 673
(24) 95
(17) 8
42 (20)
7 (1)
39 (9)
(109) 25
(2) 6
(107) 22
9 (23)
573 (505)
134 (55)
(790) 725
(14) 11
(38) 18
717 (584)
LEGEND
Permitted Movements
xxx (xxx)
Weekday AM (PM) Peak Hour Vehicular Volume

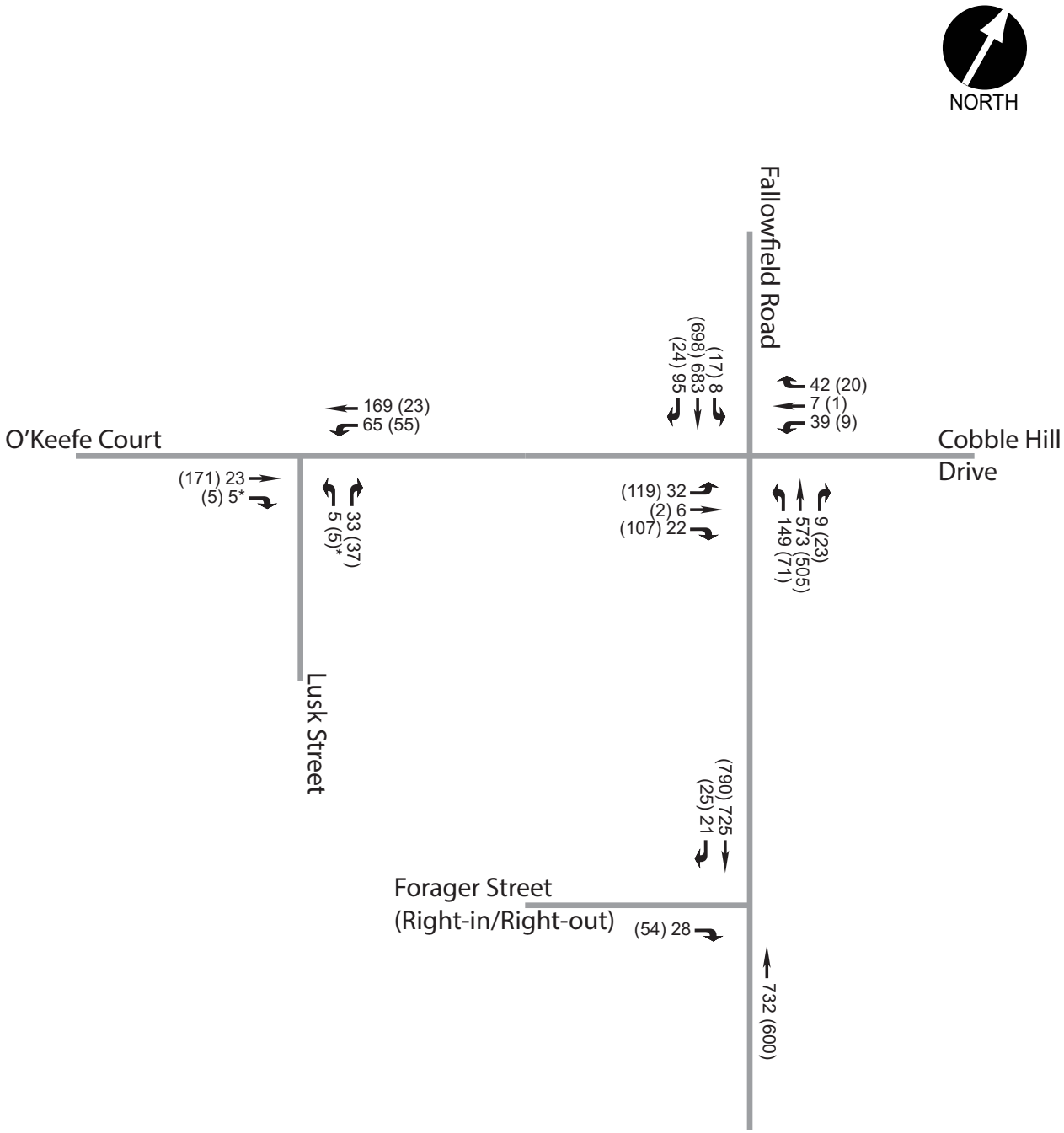


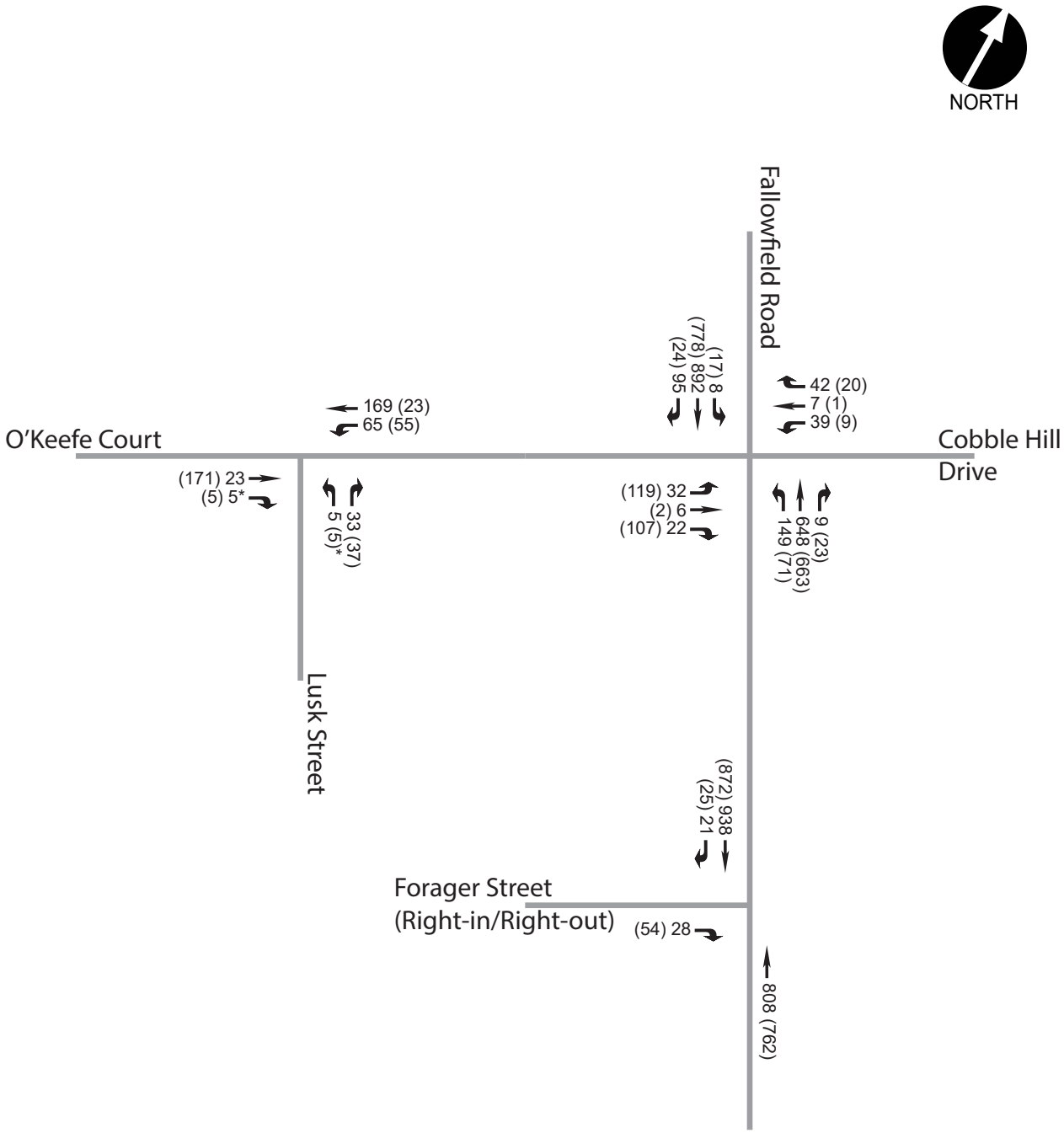
135 Lusk Street
Transportation Impact Assessment

Exhibit 8 - Future (2028) Background Traffic

PROJECT No. 135639

SCALE: N.T.S.


NORTH
Fallowfield Road
O'Keefe Court
Cobble Hill Drive
Lusk Street
Forager Street
(Right-in/Right-out)
169 (23)
65 (55)
(17) 8
(698) 683
(24) 95
42 (20)
7 (1)
39 (9)
(171) 23
(5) 5*
33 (37)
5 (5)*
(119) 32
(2) 6
(107) 22
9 (23)
573 (505)
149 (71)
(790) 725
(25) 21
(54) 28
732 (600)
LEGEND
Permitted Movements
xxx (xxx)
Weekday AM (PM) Peak Hour Vehicular Volume
*Nominal Volumes


NORTH
Fallowfield Road
O'Keefe Court
Cobble Hill Drive
Lusk Street
Forager Street
(Right-in/Right-out)
169 (23)
65 (55)
(17) 8
(778) 892
(24) 95
42 (20)
7 (1)
39 (9)
(171) 23
(5) 5*
33 (37)
5 (5)*
(119) 32
(2) 6
(107) 22
9 (23)
648 (663)
149 (71)
(872) 938
(25) 21
(54) 28
808 (762)
LEGEND
Permitted Movements
xxx (xxx)
Weekday AM (PM) Peak Hour Vehicular Volume
*Nominal Volumes

5 Analysis

5.1 Development Design

5.1.1 Design for Sustainable Modes

The proposed development is located an approximate 800-metre walking distance from existing bus stops on the east side of Fallowfield & O'Keefe Court/Cobble Hill, assuming that transit users cross Fallowfield Road at Strandherd Drive. The RMA for the Fallowfield Road & Forager Street intersection originally included a new southbound bus stop on Fallowfield Road south of O'Keefe Court, which would ultimately reduce the walking distance to transit to approximately 390m, however a bus stop at this location has now been deferred until after the signalization of this intersection.

The TDM-Supportive Development Design and Infrastructure Checklist was completed and is provided in **Appendix G**. This checklist identified includes the following measures which are being considered in association with the proposed development to offset the vehicular impact on the adjacent road network:

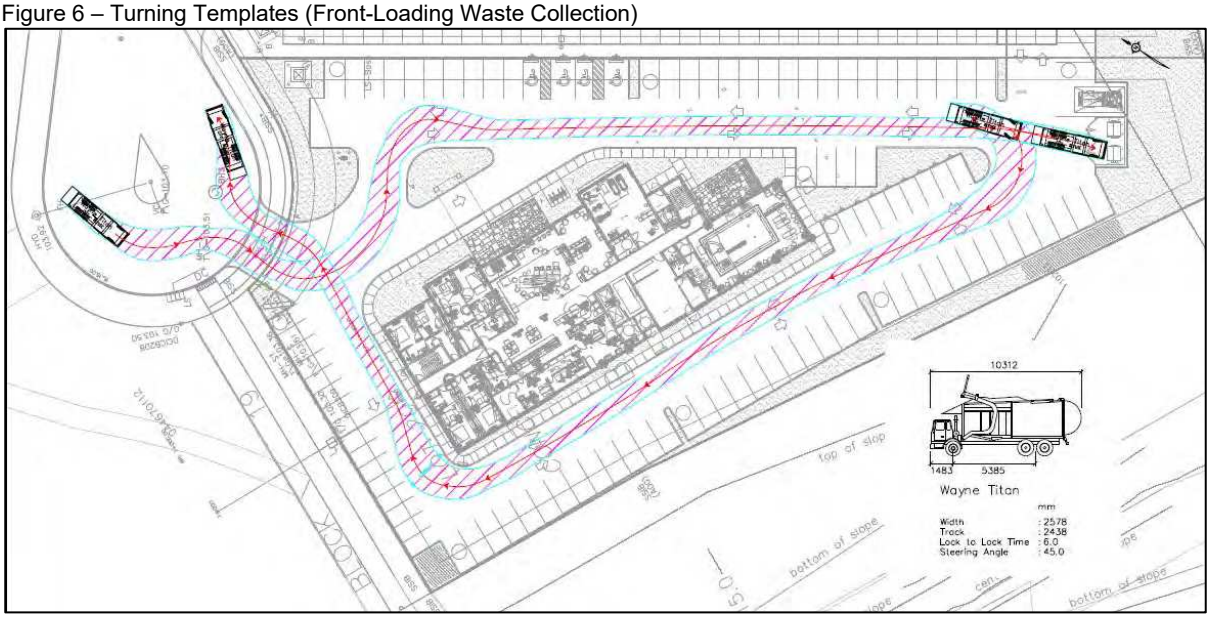
- Bike parking supply exceeding Zoning By-law requirements (discussed further in Section 5.1.2);
- Horizontal bike parking stalls adjacent to the building's primary entrance; and
- Shower facilities for active commuters.

5.1.2 Circulation and Access

The internal drive aisle provides at least 6.7 metres of clear width throughout the site, as indicated on the site plan presented in **Exhibit 2**, and is therefore in compliance with the Zoning By-law.

Vehicle turning templates for the front-loading waste collection design vehicle, which is expected to be the largest vehicle requiring regular access to the site, is presented in **Figure 6** below.

Figure 6 – Turning Templates (Front-Loading Waste Collection)



5.1.3 New Street Networks

Not Applicable: The New Street Networks element is exempt from this TIA, as defined in the study scope. This element is not required for Site Plan Control applications.

5.2 Parking

5.2.1 Parking Supply

Based on the size of the proposed hotel, a minimum of 99 vehicle parking spaces are required to meet the Zoning Bylaw requirements. The site plan indicates that 99 vehicle parking spaces will be provided, therefore the proposed parking supply is within the permissible range.

The Zoning By-law also requires a minimum number of bicycle parking spaces to support the proposed development. A total of eight bicycle parking spaces will be provided, exceeding the six spaces required. As indicated on the site plan, these bike parking stalls will be provided immediately adjacent to the hotel's primary entrance and therefore will provide easy access for hotel patrons or staff.

5.2.2 Spillover Parking

The minimum parking supply requirement specified in the Zoning Bylaw has been met, therefore, no further review of parking is necessary for the purposes of this study.

5.3 Boundary Streets

There are two existing boundary streets adjacent to the proposed development: Lusk Street, Fallowfield Road. As discussed in Section 3.4, segment-based MMLOS analysis will be limited to Fallowfield Road between Forager and O'Keefe/Cobble Hill.

Lusk Street is classified as a local road and was recently constructed in accordance with the latest City road design standards, therefore no Multi-Modal Level of Service (MMLOS) analysis is provided for this road segment. Often, local roads are in essence Complete Streets, as they provide sufficient facilities for active and motorized modes of travel, while typically accommodating low traffic volumes and travel speeds. As discussed previously, concrete sidewalks 2.0 metres in width are proposed along the subject development's frontage which will continue across the site access driveway, therefore the inclusion of a site access driveway on Lusk Street is not anticipated to negatively impact the road.

5.3.1 Mobility

Segment-based Multi-Modal Level of Service (MMLOS) results for Fallowfield Road between Forager Street and O'Keefe Court/Cobble Hill are provided in **Table 11** below.

Details of the MMLOS analysis are provided in **Appendix H**.

Table 11 – Segment-based MMLOS Results

LOCATION	LEVEL OF SERVICE BY MODE			
	PEDESTRIAN (PLOS)	BICYCLE (BLOS)	TRANSIT (TLOS)	TRUCK (TkLOS)
EXISTING & FUTURE CONDITIONS				
Fallowfield – Forager to O'Keefe/Cobble Hill	**D** (Target: C)	A (Target: C)	D (Target: N/A[1])	A (Target: D)

Notes: [1] Not identified as a rapid transit or transit priority corridor in the TMP.

It should be noted that the analysis presented in **Table 11** above considers the recent construction of a multi-use path on the west side of Fallowfield Road which significantly improved the PLOS and BLOS results which were both previously rated as 'F'. In order to meet the PLOS target, however, operating speeds on Fallowfield Road would need to be reduced to 60 km/h or less.

5.3.2 Road Safety

A summary of all reported collisions within the study area over the past 5 years was presented in the Scoping section of this TIA. The City requires a safety review if at least six collisions for any one movement or of a discernible pattern, over a five-year period have occurred. Based on the review of re-occurring events identified in the Scoping section of this report, none of the study area roadway segments or intersections require further analysis.

5.4 Access Intersections

5.4.1 Location and Design of Access

The proposed development will provide a new right-in/right-out access on Lusk Street within the existing cul-de-sac. The new vehicular connection is in conformance with the City of Ottawa Private Approach By-law 2003-447, with particular confirmation of the following items:

- Width: A private approach should have a minimum width of 2.4m and a maximum width of 9.0m.
    - The proposed site access driveway will be 9.0m wide. ✓
- Distance from Intersecting Road: For a commercial development on or within 46m of an arterial or major collector with between 50 and 99 parking spaces, the proposed private approach must be at least 30 metres from the nearest intersecting street line.
    - Not Applicable: The proposed development will provide direct access to Lusk Street, a local street, which does not directly intersect with a major collector or higher-order road.
- Quantity and Spacing of Private Approaches: For sites with frontages between 46 and 150 metres, one (1) two-way and two (2) one-way, or two (2) two-way private approaches are permitted. Any two private approaches must be separated by at least 9.0m and can be reduced to 2.0m in the case of two one-way driveways. On lots that abut more than one roadway, these provisions apply to each frontage separately.
    - The frontage on Lusk Street is approximately 37m and therefore the single proposed two-way private approach is compliant with the by-law. ✓
- Distance from Property Line: Private approaches must be at least 3.0m from the abutting property line, however this requirement can be reduced to 0.3m provided that the access is a safe distance from the access serving the adjacent property, sight lines are adequate and that it does not create a traffic hazard.
    - The proposed site access driveway is located approximately 2m and 24m from the northern and eastern property boundaries, respectively. Given that the site access driveway is located within a cul-de-sac which promotes reduced operating speeds and that there are no existing vehicular access driveways immediately to the north, the position of both site access driveways is deemed to be acceptable. ✓

The Transportation Association of Canada's (TAC) Geometric Design Guide for Canadian Roads (June 2017) does not suggest a minimum clear throat length for a site access driveway proposed on a local road. The clear throat length is provided to ensure that any queues that form due to on-

site circulation blockages do not spillback onto collector or higher-order roads. Given the low traffic volumes typically expected on local roads including Lusk Street, occasional queue spillback is not likely to result in traffic operational issues.

5.4.2 Access Intersection Control

The proposed site access driveway on Lusk Street will be stop-controlled, which is expected to be sufficient, given the low site-generated traffic volumes presented in the Forecasting section of this report.

5.4.3 Intersection Design (MMLOS)

Not Applicable – The proposed site access driveway will be unsignalized, therefore Multi-Modal Level of Service (MMLOS) analysis is not required.

5.5 Transportation Demand Management (TDM) Program

Not Applicable – The provision for Transportation Demand Management (TDM) post-occupancy programming measures is exempt from this TIA, as defined in the study scope. This element is not required for non-residential site plans that are projected to have fewer than 60 employees and/or students on location at any given time. As discussed previously, no more than 15 employees are expected to be on-site.

5.6 Neighbourhood Traffic Management

5.6.1 Adjacent Neighbourhoods

The proposed development relies on the following local roads for access to the arterial road network: O'Keefe Court, Lusk Street and Forager Street. With the development of the 4401 Fallowfield Road Subdivision lands, O'Keefe Court is expected to function as a collector road, while Lusk Street and Forager Street will operate as local roads. To determine if neighbourhood traffic management measures are required, traffic volumes projected in the study horizon year are compared against the appropriate liveability thresholds, as prescribed in the TIA Guidelines.

The livability threshold for a local road is 120 vehicles per hour. Based on Future (2028) Total Traffic volumes, Lusk Street and Forager Street will be required to accommodate up to 95 and 80 weekday peak hour volumes, respectively. As such, both local roads are expected to operate well below the 120 vehicle per hour threshold within the timeframe of this study.

Total traffic volume projections along O'Keefe Court indicate that it may slightly exceed its threshold of 300 vehicles per hour during the weekday afternoon peak hour, with up to 325 vehicles approaching Fallowfield Road. It should be noted, however, that it is not uncommon for a collector road to exceed this threshold within close proximity to an arterial road intersection, and that two-way volumes along the remainder of O'Keefe Court are expected to remain below the 300-vehicle threshold. As such, a neighbourhood traffic management plan will not be required for this TIA.

5.7 Transit

5.7.1 Route Capacity

The estimated future site-generated transit passenger demand was provided in the Forecasting component of this study. The results have been summarized in **Table 12** below.

Table 12 - Development Generated Transit Demand

PERIOD	PEAK PERIOD DEMAND		
	IN	OUT	TOTAL
AM	4	2	6
PM	4	4	8

As indicated in **Table 12** above, the subject development is expected to contribute a negligible increase in transit ridership to the existing transit network, therefore no additional transit capacity will be required to accommodate the proposed development.

5.7.1 Transit Priority Measures

Transit priority measures are not required to support the projected site-generated transit demands which are expected to be nominal.

5.8 Review of Network Concept

Not Applicable – The Network Concept element is exempt from this TIA, as defined in the study scope. This element is not required for proposed developments expected to generate less than 200 person-trips during the weekday morning and afternoon peak hours.

5.9 Intersection Design

The following sections summarize the methodology and results of the multi-modal intersection capacity analysis conducted within the study area.

5.9.1 Intersection Control

5.9.1.1 Traffic Signal Warrants

Traffic signal warrants were completed for the Fallowfield & O'Keefe/Cobble Hill intersection. Based on the results of the analysis, traffic signals are not warranted at this intersection under Future (2028) Total Traffic conditions.

The results of the traffic signal warrant analysis are provided in **Appendix I**.

5.9.1.2 Roundabout Analysis

The feasibility of implementing a roundabout was evaluated at the intersection of Fallowfield & O'Keefe/ Cobble Hill. It was determined that this form of traffic control would not be feasible, given that only one of the suitability factors had been met. Further, the implementation of a roundabout is not consistent with the City's long-term plans for this location which is planned to be upgraded to a signalized intersection once the appropriate warrants are met.

The results of the Roundabout Feasibility Screening Tool are provided in **Appendix I**.

5.9.2 Intersection Analysis Criteria (Automobile)

The following section outlines the City of Ottawa's methodology for determining motor vehicle Level of Service (LOS) at signalized and unsignalized intersections.

5.9.2.1 Signalized Intersections

In qualitative terms, the Level of Service (LOS) defines operational conditions within a traffic stream and their perception by motorists. A LOS definition generally describes these conditions in terms of such factors as delay, speed and travel time, freedom to manoeuvre, traffic interruptions, safety, comfort and convenience. LOS can also be related to the ratio of the volume to capacity (v/c) which is simply the relationship of the traffic volume (either measured or forecast) to the capability of the intersection or road section to accommodate a given traffic volume. This capability varies depending on the factors described above. LOS are given letter designations from 'A' to 'F'. LOS 'A' represents the best operating conditions and LOS 'E' represents the level at which the intersection or an approach to the intersection is carrying the maximum traffic volume that can, practicably, be accommodated. LOS 'F' indicates that the intersection is operating beyond its theoretical capacity.

The City of Ottawa has developed criteria as part of the Transportation Impact Assessment Guidelines, which directly relate the volume to capacity (v/c) ratio of a signalized intersection to a LOS designation. These criteria are as follows:

Table 13 - LOS Criteria for Signalized Intersections

LOS	VOLUME TO CAPACITY RATIO (v/c)
A	0 to 0.60
B	0.61 to 0.70
C	0.71 to 0.80
D	0.81 to 0.90
E	0.91 to 1.00
F	> 1.00

The intersection capacity analysis technique provides an indication of the LOS for each movement at the intersection under consideration and for the intersection as a whole. The overall v/c ratio for an intersection is defined as the sum of equivalent volumes for all critical movements at the intersection divided by the sum of capacities for all critical movements.

The Level of Service calculation is based on locally-specific parameters as described in the TIA Guidelines and incorporates existing signal timing plans obtained from the City of Ottawa. The existing conditions analysis utilized a Peak Hour Factor (PHF) of 0.90, while future conditions consider optimized signal timing plans and use of a Peak Hour Factor (PHF) of 1.0 to recognize peak spreading beyond a 15-minute period in congested conditions.

5.9.2.2 Unsignalized Intersections

The capacity of an unsignalized intersection can also be expressed in terms of the LOS it provides. For an unsignalized intersection, the Level of Service is defined in terms of the average movement delays at the intersection. This is defined as the total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line; this includes the time required for a vehicle to travel from the last-in-queue position to the first-in-queue position. The average delay for any particular minor movement at the un-signalized intersection is a function of the capacity of the approach and the degree of saturation.

The Highway Capacity Manual 2010 (HCM), prepared by the Transportation Research Board, includes the following Levels of Service criteria for un-signalized intersections, related to average movement delays at the intersection, as indicated in **Table 14** below.

Table 14 - LOS Criteria for Unsignalized Intersections

LOS	DELAY (seconds)
A	<10
B	>10 and <15
C	>15 and <25
D	>25 and <35
E	>35 and <50
F	>50

The unsignalized intersection capacity analysis technique included in the HCM and used in the current study provides an indication of the Level of Service for each movement of the intersection under consideration. By this technique, the performance of the unsignalized intersection can be compared under varying traffic scenarios, using the Level of Service concept in a qualitative sense. One unsignalized intersection can be compared with another unsignalized intersection using this concept. Level of Service 'E' represents the capacity of the movement under consideration and generally, in large urban areas, Level of Service 'D' is considered to represent an acceptable operating condition. Level of Service 'E' is considered an acceptable operating condition for planning purposes for intersections located within Ottawa's Urban Core the downtown and its vicinity). Level of Service 'F' indicates that the movement is operating beyond its design capacity.

5.9.3 Intersection Capacity Analysis

Following the established intersection capacity analysis criteria described above, the existing and future conditions are analyzed during the weekday peak hour traffic volumes derived in this study.

The following section presents the results of the intersection capacity analysis. All tables summarize study area intersection LOS results during the weekday morning and afternoon peak hour periods.

The Synchro output files have been provided in **Appendix J**.

5.9.3.1 Existing (2021) Traffic

An intersection capacity analysis has been undertaken using the Existing (2021) Traffic volumes presented in **Table 15** below, yielding the following results:

Table 15 - Intersection Capacity Analysis: Existing (2021) Traffic

INTERSECTION	TRAFFIC CONTROL	AM PEAK HOUR		PM PEAK HOUR	
		OVERALL LOS (V/C OR DELAY)	CRITICAL MOVEMENTS (V/C OR DELAY)	OVERALL LOS (V/C OR DELAY)	CRITICAL MOVEMENTS (V/C OR DELAY)
Fallowfield Road & O'Keefe Court / Cobble Hill Drive	Unsignalized	D (33.9s)	EBL (33.9s)	D (32.7s)	EBL (32.7s)
Lusk Street & O'Keefe Court	Unsignalized	A (8.4s)	NBRL (8.4s)	A (8.4s)	NBRL (8.4s)
Fallowfield Road & Forager Street	Unsignalized	B (12.1s)	EBR (12.1s)	B (13.4s)	EBR (13.4s)

Based on the above, the intersection of Fallowfield & O'Keefe/Cobble Hill is operating at an acceptable level of service (LOS 'D' or better) under existing conditions.

5.9.3.2 Future (2023) Background Traffic

An intersection capacity analysis has been undertaken using the Future (2023) Background Traffic volumes presented in **Exhibit 7**, yielding the following results:

Table 16 - Intersection Capacity Analysis: 2023 Background Traffic

INTERSECTION	TRAFFIC CONTROL	AM PEAK HOUR		PM PEAK HOUR	
		OVERALL LOS (V/C OR DELAY)	CRITICAL MOVEMENTS (V/C OR DELAY)	OVERALL LOS (V/C OR DELAY)	CRITICAL MOVEMENTS (V/C OR DELAY)
Fallowfield Road & O'Keefe Court / Cobble Hill Drive	Unsignalized	**F (92.8s)**	**WBTRL (92.8s)**	**F (143.7s)**	**EBL (143.7s)**
	Signalized	A (0.47)	WBTRL (0.56)	B (0.52)	EBL (0.63)
Lusk Street & O'Keefe Court	Unsignalized	A (8.5s)	NBRL (8.5s)	A (9.3s)	NBRL (9.3s)
Fallowfield Road & Forager Street	Unsignalized	B (13.8s)	EBR (13.8s)	B (15.1s)	EBR (15.1s)

By 2023, it is expected that the Fallowfield & O'Keefe/Cobble Hill intersection will operate over its theoretical capacity (i.e. LOS 'F') as a stop-controlled intersection under background traffic conditions. Analysis indicates that signalization of the intersection will be required to achieve an acceptable level of service (LOS 'D' or better) during the weekday morning and afternoon peak hours.

The intersections of Lusk & O'Keefe and Fallowfield & Forager were shown to operate at Level of Service 'B' or better as two-way stop-controlled intersections, which is well within acceptable standards.

5.9.3.3 Future (2028) Background Traffic

An intersection capacity analysis has been undertaken using the Future (2028) Background Traffic volumes presented in **Exhibit 8**, yielding the following results:

Table 17 - Intersection Capacity Analysis: 2028 Background Traffic

INTERSECTION	TRAFFIC CONTROL	AM PEAK HOUR		PM PEAK HOUR	
		OVERALL LOS (V/C OR DELAY)	CRITICAL MOVEMENTS (V/C OR DELAY)	OVERALL LOS (V/C OR DELAY)	CRITICAL MOVEMENTS (V/C OR DELAY)
Fallowfield Road & O'Keefe Court / Cobble Hill Drive	Unsignalized	**F (270.5s)**	**WBTRL (270.5s)**	**F (341.5s)**	**EBL (341.5s)**
	Signalized	A (0.60)	SBT (0.60)	A (0.58)	EBL (0.63)
Lusk Street & O'Keefe Court	Unsignalized	A (8.5s)	NBRL (8.5s)	A (9.3s)	NBRL (9.3s)
Fallowfield Road & Forager Street	Unsignalized	C (16.8s)	EBR (16.8s)	C (16.4s)	EBR (16.4s)

Without signalization, traffic operations are expected to significantly deteriorate at the Fallowfield & O'Keefe/Cobble Hill intersection under Future (2028) Background Traffic conditions, with average delays on some movements of approximately 6 minutes per vehicle. With traffic signals in place, the intersection is expected to operate at an acceptable Level of Service (LOS 'D' or better).

All other study area intersections are shown to operate acceptably (LOS 'D' or better) under Future (2028) Background Traffic conditions.

5.9.3.4 Future (2023) Total Traffic

An intersection capacity analysis has been undertaken using the Future (2023) Total Traffic volumes presented in **Exhibit 9**, yielding the following results:

Table 18 - Intersection Capacity Analysis: 2023 Total Traffic

INTERSECTION	TRAFFIC CONTROL	AM PEAK HOUR		PM PEAK HOUR	
		OVERALL LOS (V/C OR DELAY)	CRITICAL MOVEMENTS (V/C OR DELAY)	OVERALL LOS (V/C OR DELAY)	CRITICAL MOVEMENTS (V/C OR DELAY)
Fallowfield Road & O'Keefe Court / Cobble Hill Drive	Unsignalized	**F (112.5s)**	**WBTRL (112.5s)**	**F (204.9s)**	**EBL (204.9s)**
	Signalized	A (0.48)	WBTRL (0.56)	A (0.54)	EBL (0.65)
Lusk Street & O'Keefe Court	Unsignalized	A (8.5s)	NBRL (8.5s)	A (9.3s)	NBRL (9.3s)
Fallowfield Road & Forager Street	Unsignalized	B (14.0s)	EBR (14.0s)	C (15.6s)	EBR (15.6s)

With the addition of site-generated traffic, the Fallowfield & O'Keefe/Cobble Hill intersection is expected to continue exceeding its theoretical capacity as an unsignalized intersection. With the implementation of traffic signals, however, the intersection as a whole is expected to operate at a Level of Service of 'A' during the weekday morning and afternoon peak hours.

Both the Lusk Street & O'Keefe Court intersection and the Fallowfield Road & Forager Street are expected to operate at an acceptable Level of Service (LOS 'D' or better) under Future (2023) Total Traffic conditions.

5.9.3.5 Future (2028) Total Traffic

An intersection capacity analysis has been undertaken using the Future (2028) Total Traffic volumes presented in **Exhibit 10**, yielding the following results:

Table 19 - Intersection Capacity Analysis: 2028 Total Traffic

INTERSECTION	TRAFFIC CONTROL	AM PEAK HOUR		PM PEAK HOUR	
		OVERALL LOS (V/C OR DELAY)	CRITICAL MOVEMENTS (V/C OR DELAY)	OVERALL LOS (V/C OR DELAY)	CRITICAL MOVEMENTS (V/C OR DELAY)
Fallowfield Road & O'Keefe Court / Cobble Hill Drive	Unsignalized	**F (320.9s)**	**WBTRL (320.9s)**	**F (455.6s)**	**EBL (455.6s)**
	Signalized	B (0.61)	SBT (0.61)	A (0.59)	SBT (0.65)
Lusk Street & O'Keefe Court	Unsignalized	A (8.5s)	NBRL (8.5s)	A (9.3s)	NBRL (9.3s)
Fallowfield Road & Forager Street	Unsignalized	C (17.2s)	EBR (17.2s)	C (17.0s)	EBR (17.0s)

Similar to Future (2028) Background Traffic conditions, some movements at the Fallowfield & O'Keefe/Cobble Hill intersection are expected to continue experiencing long delays, if the intersection remains unsignalized. With traffic signals in place, the overall Level of Service would be expected to improve significantly to LOS 'B' and LOS 'A' and operate well within acceptable standards during the morning and afternoon peak hours, respectively.

All other study area intersections are expected to condition operating at an acceptable Level of Service (LOS 'D' or better) under Future (2028) Total Traffic conditions.

5.9.4 Intersection Design (MMLOS)

Analysis of conditions for each mode has been conducted based on the methodology prescribed in the 2017 Multi-Modal Level of Service Guidelines. The Level of Service for each mode has been calculated for each intersection where signals exist or are anticipated.

The Future (2028) Total Traffic intersection MMLOS results have been summarized in **Table 20** below. Detailed analysis results are provided **Appendix H**.

Table 20 - Intersection MMLOS - Future Conditions

LOCATION	LEVEL OF SERVICE BY MODE			
	PEDESTRIAN (PLOS)	BICYCLE (BLOS)	TRANSIT (TLOS)	TRUCK (TkLOS)
INTERSECTION				
Fallowfield & O'Keefe/ Cobble Hill	**F** (Target: C)	**F** (Target: C)	C (Target: N/A[1])	**F** (Target: D)

Notes: [1] Not identified as a rapid transit or transit priority corridor in the TMP.

5.9.4.1 Summary of Potential Improvements

Based on the MMLOS results outlined in **Table 20** above, the following measures have been identified which could improve conditions for each travel mode:

Pedestrians

The PLOS at intersections is based on several factors including the number of traffic lanes that pedestrians must cross, corner radii, and whether the crossing allows for permissive or protective right or left turns, among others. The City of Ottawa target for PLOS in the General Urban Area is 'C'.

The results of the analysis indicate that the intersection of Fallowfield & O'Keefe/Cobble Hill is expected to operate at PLOS 'F', primarily as a result of the effective number of lanes required to cross (crossing distance/3.5m) in combination with expected pedestrian delays. Providing enhanced pedestrian features such as a median, pedestrian leading interval, zebra stripe high-visibility crosswalk markings on the north and south approaches would reduce the level of pedestrian exposure on those crossings. The above features in combination with a reduced cycle length from the standard length of 120s to 70s and a reduced pedestrian crossing width of no more than 14 metres would achieve a PLOS of 'C'. It should be noted, however, that a reduction in the cycle length may result in negative impacts to the vehicle level of service. Alternatively, a 'protected intersection' design would help achieve the PLOS target.

Cyclists

The BLOS at intersections is dependent on several factors: the number of lanes that the cyclist is required to cross to make a left-turn; the presence of a dedicated right-turn lane on the approach; and the operating speed of each approach. The City target for BLOS is 'C'.

The results of the analysis indicate that cycling facilities at the Fallowfield & O'Keefe/Cobble Hill intersection are not sufficient to achieve the BLOS target. Given the high operating speeds at this location, only the provision of physically separated cycling facilities with two-stage, left-turn bike boxes on all approaches will be sufficient to achieve the BLOS target. Alternatively, a 'protected intersection' design would help achieve attain the BLOS target.

Transit

Intersection TLOS is based on the average signal delay experienced by transit vehicles on each approach. According to the MMLOS Guidelines, there is no target for TLOS on roads that are not designated as either a rapid transit or transit priority corridors in the TMP.

The results of the analysis indicate that the eastbound and westbound approaches are expected to experience average delays between 20 and 45 seconds during the weekday peak hours, however as there are no transit routes that utilize either approach, neither is factored into the TLOS calculation. Both the northbound and southbound approaches do currently serve as transit routes and are expected to experience relatively minor delays of 20s or less upon signalization of

the Fallowfield & O'Keefe/Cobble Hill intersection which results in an overall intersection TLOS of 'C'.

Trucks

The Truck LOS (TkLOS) is based on the right-turn radii, as well as the number of receiving lanes for vehicles making a right-turn from the traffic lane being analyzed. The TkLOS target for Truck Routes in the General Urban Area is 'D'.

Overall, the intersection TkLOS target is not attainable as a result of the tight right-turn radii to/from Cobble Hill Drive. Turning movement count data indicates that trucks infrequently utilize Cobble Hill, which is consistent with its classification as a local road and non-truck route. Given that its primary function is to provide access to adjacent residential subdivisions, the existing right-turn radii is considered acceptable in this context. It should be noted that the right-turn radii to/from O'Keefe Court meets the TkLOS target, which is appropriate given that the Highway 416 Lands development is expected to generate regular truck traffic.

The recommended measures listed above are intended only as suggestions to the City on how the MMLOS within the study area could be improved and do not identify measures to be implemented as a direct consequence of this development. The remediation measures described above would improve mobility and comfort for cyclists but are not required to accommodate the proposed development.

5.10 Geometric Review

The following section provides a review of all geometric requirements for the study area intersections.

5.10.1 Sight Distance and Corner Clearances

The site access driveway is being proposed on a cul-de-sac which would experience reduced operating speeds in comparison with the remainder of the Lusk Street corridor due to its circular configuration which forces vehicles to slow down upon entry. It should be noted as well that the proposed driveway will be restricted to right-in/right movements, thereby further reducing the potential occurrence of traffic operational issues. There are no signalized or stop-controlled intersections within close proximity to the proposed site access driveway. As such, sightline visibility and corner clearance are not expected to be a concern with respect to the proposed access location.

5.10.2 Auxiliary Lane Analyses

Auxiliary turning lane requirements for all study area intersections are described as follows:

5.10.2.1 Auxiliary Left-Turn Lane Requirements (Unsignalized)

The intersection of O'Keefe Court & Lusk Street does not warrant a left-turn lane based on the advancing and opposing volumes projected at this intersection under Future (2028) Total Traffic conditions.

The Fallowfield & Forager intersection is restricted to right-in/right-out movements, therefore it was not necessary to assess left-turn lane requirements at this intersection.

The results of the left-turn lane warrant analysis are provided in **Appendix K**.

5.10.2.2 Auxiliary Left-Turn Lane Requirements (Signalized)

As the intersection of Fallowfield/O'Keefe has been shown to require signalization, a review of auxiliary left-turn lane storage requirements was completed under Future (2028) Total Traffic

conditions, comparing the highest queue lengths on each intersection approach under weekday morning and afternoon peak hours. The review compared the projected 95th percentile queue lengths from Synchro operational results, and the standard queue length calculation based on the following equation:

$$Storage\ Length = \frac{NL}{C} \times 1.5$$

Where:
N = number of vehicles per hour
L = Length occupied by a vehicle in the queue = 7 m
C = number of traffic signal cycles per hour

The results of the auxiliary left-turn lane analysis are summarized below in **Table 21** below.

Table 21 - Auxiliary Left-Turn Storage Analysis at Signalized Intersections

INTERSECTION	APPROACH	95TH %ILE QUEUE LENGTH AM/PM (M)	CALCULATED QUEUE LENGTH AM/PM (M)	EXISTING PARALLEL LENGTH (M)	STORAGE DEFICIENCY (M)
Fallowfield Road & O'Keefe Court / Cobble Hill Drive	NB	20/10	55/25	140	Existing Storage Adequate
	SB	5/5	5/10	60	Existing Storage Adequate
	EB	15/45	15/45	50	Existing Storage Adequate
	WB	25/10[1]	15/5	-	Existing Storage Adequate[2]

Notes: [1] Synchro queues were determined based on existing shared lane configuration
[2] Through volumes are nominal during weekday peak hours (i.e. less than 10 veh/h)

As per the results of the queue length analyses presented **Table 21** above, the existing parallel lanes have sufficient storage to accommodate the projected Future (2028) Total Traffic demand. As such, no modifications to the existing auxiliary lanes are required for signalization of this intersection within the timeframe of this study.

Synchro results indicate that with the existing shared through-left configuration on the westbound approach, queue lengths during the weekday peak hours would be at most 25 metres under Future (2028) Total Traffic conditions. Queue lengths of this magnitude can be considered within an acceptable range for spillback on a through lane given the nominal through volumes of less than 10 vehicles per hour expected on these movements during the weekday peak hours.

5.10.2.3 Auxiliary Right-Turn Lane Requirements (Unsignalized)

The Transportation Association of Canada (TAC) suggests that auxiliary right-turn lanes be considered "when the volume of decelerating or accelerating vehicles compared with through vehicles causes undue hazard." Consideration for auxiliary right-turn lanes is typically given when the right-turning traffic exceeds 10% of the through volume and is at least 60 vehicles per hour.

The Fallowfield & Forager intersection was recently constructed with a southbound parallel lane that includes sufficient deceleration length. No storage is required on this lane.

5.10.2.4 Auxiliary Right-Turn Lane Requirements (Signalized)

Similarly for signalized intersections, Section 9.14 of TAC suggests that auxiliary right-turn lanes shall be considered when more than 10% of vehicles on an approach are turning right and when the peak hour demand exceeds 60 vehicles. The purpose of this guideline is to mitigate operational impacts to through-traffic, particularly on high-speed arterial roadways such as Fallowfield Road, and may not be applicable in all circumstances. The highest of the weekday morning and afternoon peak hour volumes under Future (2028) Total Traffic conditions were considered in this evaluation.

The results of the auxiliary right-turn lane analysis are summarized in **Table 22** below.

Table 22 – Auxiliary Right-Turn Lane Storage Analysis at Signalized Intersections

INTERSECTION	APPROACH	RIGHT TURN VOLUME	APPROACH VEHICLES TURNING RIGHT (%)	95TH %ILE QUEUE LENGTH (M)	EXISTING PARALLEL LENGTH (M)	STORAGE DEFICIENCY (M)
Fallowfield & O'Keefe/Cobble Hill	NB	23	3%	<10	115	Existing Storage Adequate
	SB	95	10%	<10	25	Existing Storage Adequate
	EB	107	47%	15[1]	-	Existing Storage Adequate[2]
	WB	42	48%	25[1]	-	Existing Storage Adequate[2]

Notes: [1] Synchro queues were determined based on existing shared lane configuration
[2] Through volumes are nominal during weekday peak hours (i.e. less than 10 veh/h)

Although the eastbound and westbound approaches technically meet the criteria for a right-turn lane, the through volumes on these approaches were observed to be nominal (i.e. 10 vehicles or less) during the weekday peak hours. Synchro results indicate that with the existing shared through-right configuration on the eastbound and westbound approaches, queue lengths during the weekday peak hours would be at most 15 and 25 metres, respectively, under Future (2028) Total Traffic conditions. Queue lengths of this magnitude can be considered within an acceptable range for spillback on a through lane given the nominal through volumes expected. Further, the right-turn criteria is typically more applicable along high-speed arterial roads and is not considered appropriate in this context.

Based on the traffic volumes projections developed for this TIA, no additional right-turn facilities are expected to be required as a result of projected background or site-generated volumes at the Fallowfield & O'Keefe/Cobble Hill intersection with traffic signals within the timeframe of this study.

5.11 Summary of Improvements Indicated and Modification Options

As per the intersection capacity, Multi-Modal Level of Service and auxiliary lane analyses results presented above, off-site improvements to the adjacent road network have been recommended in order to accommodate the transportation demands of both background and site-generated traffic. The MMLOS results indicate existing deficiencies with respect user comfort and safety that could be considered for implementation by the City but are not required to safely accommodate the proposed development.

5.11.1 Fallowfield Road & O'Keefe Court/Cobble Hill Drive

The intersection of Fallowfield & O'Keefe/Cobble Hill is presently operating as a two-way stop-controlled intersection. The results of the analysis indicate that, by 2023, traffic signals will be operationally required under background traffic conditions, however traffic signals are not warranted within the timeframe of this study. As indicated in **Exhibit 6**, the proposed development is only expected to contribute nominal volumes at this intersection. With traffic signals in place, the intersection would be expected to operate at an acceptable level of service (i.e. LOS 'B') under Future (2028) Total Traffic conditions. If traffic signals are not implemented by the 2028 study horizon year, the results of the analysis indicate that long delays of at least 6 minutes are expected at the Fallowfield & O'Keefe intersection with or without the inclusion of site-generated traffic. It is recommended that the City monitor this intersection on an annual basis to determine the appropriate timing for its signalization.

An analysis of auxiliary lane requirements found available storage at this intersection is sufficient and can accommodate future travel demands within the context of this study.

Based on the MMLOS analysis, in order to meet the Pedestrian Level of Service and Bicycle Level of Service targets, various measures would need to be implemented. To attain the PLOS target, zebra stripe high-visibility crosswalk markings, a pedestrian leading interval and a median on the northbound/southbound approaches are required in conjunction with a reduced cycle length and pedestrian crossing width to no more than four effective lane widths. The implementation of bike lanes or higher-order cycling facilities on all approaches, along with two-stage, left-turn bike boxes are required to meet the BLOS targets. Alternatively, design of the intersection as a 'protected intersection' with fully-integrated pedestrian and cycling facilities will help attain the PLOS and BLOS targets. These features should be considered by the City upon signalization of this intersection but are not required to accommodate the proposed development.

5.11.2 O'Keefe Court & Lusk Street

The O'Keefe & Lusk intersection is expected to operate at a high level of service (i.e. LOS 'A') beyond the 2028 horizon year of this study with stop control on Lusk Street and free-flow on O'Keefe Court.

The auxiliary lane analyses conducted as part of this study indicates that left- or right-turn auxiliary lanes are not required on any of the intersection approaches within the timeframe of this study.

5.11.3 Fallowfield Road & Forager Street

The Fallowfield & Forager intersection was recently constructed with a pork-chop island to restrict turning movements to right-in/right-out. With these restrictions in place, the intersection is expected to operate at LOS 'C' or better within the timeframe of this study.

6 Conclusion

The proposed hotel at 135 Lusk Street is expected to generate up to 42 and 53 two-way vehicular trips during the weekday morning and afternoon peak hours, respectively, and represent a marginal increase in volumes on the adjacent road network. The mode share targets were developed based on the South Nepean Traffic Assessment Zone (TAZ) and proportionally adjusted, in accordance with the Conditions of Approval for 4401 Fallowfield Road, to yield an 85% auto/15% non-auto mode share split.

Fallowfield & O'Keefe/Cobble Hill is presently operating as a two-way stop-controlled intersection. The results of the analysis indicate that, by 2023, traffic signals will be operationally required under background traffic conditions, however signals are not warranted within the timeframe of this study. With traffic signals in place, the intersection would be expected to operate at LOS 'B' beyond the study horizon year. If traffic signals are not implemented by the 2028 study horizon year, the results of the analysis indicate that long delays of at least 6 minutes are expected at the Fallowfield & O'Keefe intersection with or without the inclusion of site-generated traffic. As site-generated traffic will not contribute significantly to any potential traffic operational issues at this intersection, it is recommended that the City continue monitoring this location on an annual basis to determine the appropriate timing for the introduction of traffic signals.

The results of the analysis indicate that the intersections of O'Keefe Court & Lusk Street and Fallowfield Road & Forager Street are expected to operate within acceptable standards (LOS 'D' or better) during the weekday morning and afternoon peak hours. Both are T-intersections that are configured with stop control on the minor road and are not expected to require additional auxiliary lanes or future modifications within the timeframe of this study.

A multi-modal analysis identifies deficiencies in the existing road network and potential remediation measures have been suggested which the City could consider to meet these prescribed targets. It should be noted that, although these measures would improve for a range of transportation modes, they are not required to safely accommodate the transportation demands of the proposed development.

Roadway modifications (RMA-2019-TPD-041B) were recently implemented to satisfy a conditional requirement for the Subdivision and are now complete. This RMA included a right-in/right-out intersection at Fallowfield & Forager and a multi-use path along the west side of Fallowfield Road between O'Keefe Court to just south of Forager Street. It is understood that the southbound bus stop originally proposed as part of this RMA has been deferred until traffic signals are implemented at the Fallowfield & O'Keefe/Cobble Hill intersection.

All study area intersections were shown to operate well within the capacity constraints of the adjacent transportation network, with the appropriate modifications in place (i.e. signalization of Fallowfield & O'Keefe/Cobble Hill by 2023). Further, the proposed development will contribute a nominal increase in traffic volume of traffic to the adjacent road network. A post-development Monitoring Plan is, therefore, not a requirement of this study.

Based on the findings of this study, it is the overall opinion of IBI Group that the proposed development will integrate well with and can be safely accommodated by the adjacent transportation network with the recommended actions and modifications in place.

Appendix A – City Circulation Comments

Step 1 & 2 Submission (Screening & Scoping) – Circulation Comments & Response

Report Submitted: August 23, 2021
Comments Received: September 7, 2021
Transportation Project Manager: Josiane Gervais

Element 2.1.2 - Existing Conditions

- Identify locations of sidewalks within study area. Note that a sidewalk is planned along the south side of Lusk, as per the Subdivision Pavement Markings, Signage and Geometry Plan. This sidewalk should also be shown on the Site Plan for the proposed site.
    - **IBI Response: The locations of the sidewalks within the study area have been added to the site plan, as shown on Exhibit 2 and described in Section 3.3.1.3.**
- 2019 Collision data is available. Please update section to include more current data.
    - **IBI Response: Section 3.2.4 has been updated to include collision data from January 1, 2015 to December 31, 2019.**

Element 2.1.3 - Planned Conditions

- Include the approved 100 Lusk St development.
    - **IBI Response: Section 3.3.2 has been updated to include the 100 Lusk Street development.**

Module 2.3 - Exemptions Review

- Please include the number of anticipated employees, to confirm that Module 4.5 is not required.
    - **IBI Response: The number of employees anticipated for the site has been added to Section 3.1.2 and is not anticipated to exceed 15 persons at any given time, remaining well below the 60-person trip threshold specified in the TIA Guidelines. As such, Element 4.5 - Transportation Demand Management is exempt from this study.**

Step 3 Submission (Forecasting) – Circulation Comments & Response

Report Submitted: September 23, 2021
Comments Received: October 7, 2021
Transportation Project Manager: Josiane Gervais

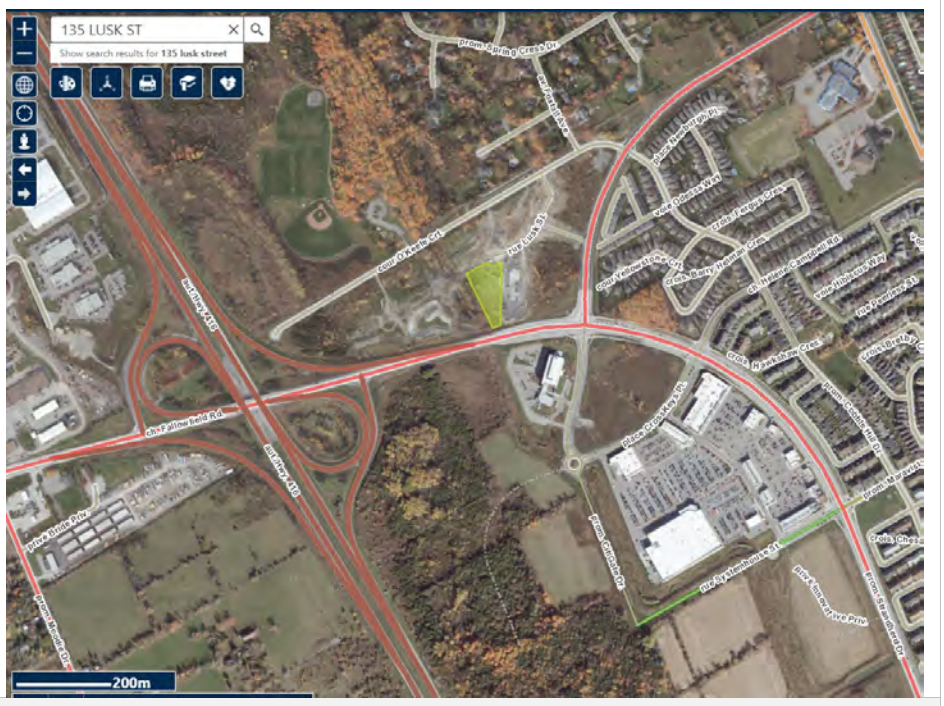
Clarify why Future 2028 Background traffic volumes entering/leaving the subdivision are lower than in 2023. This trend is carried forward in the Total Traffic Volume exhibits as well.

- **IBI Response: An error was identified in the Future Background Traffic volumes and has since been corrected. Future Background and Future Total Traffic volume exhibits have been updated accordingly.**

Appendix B – Screening Form

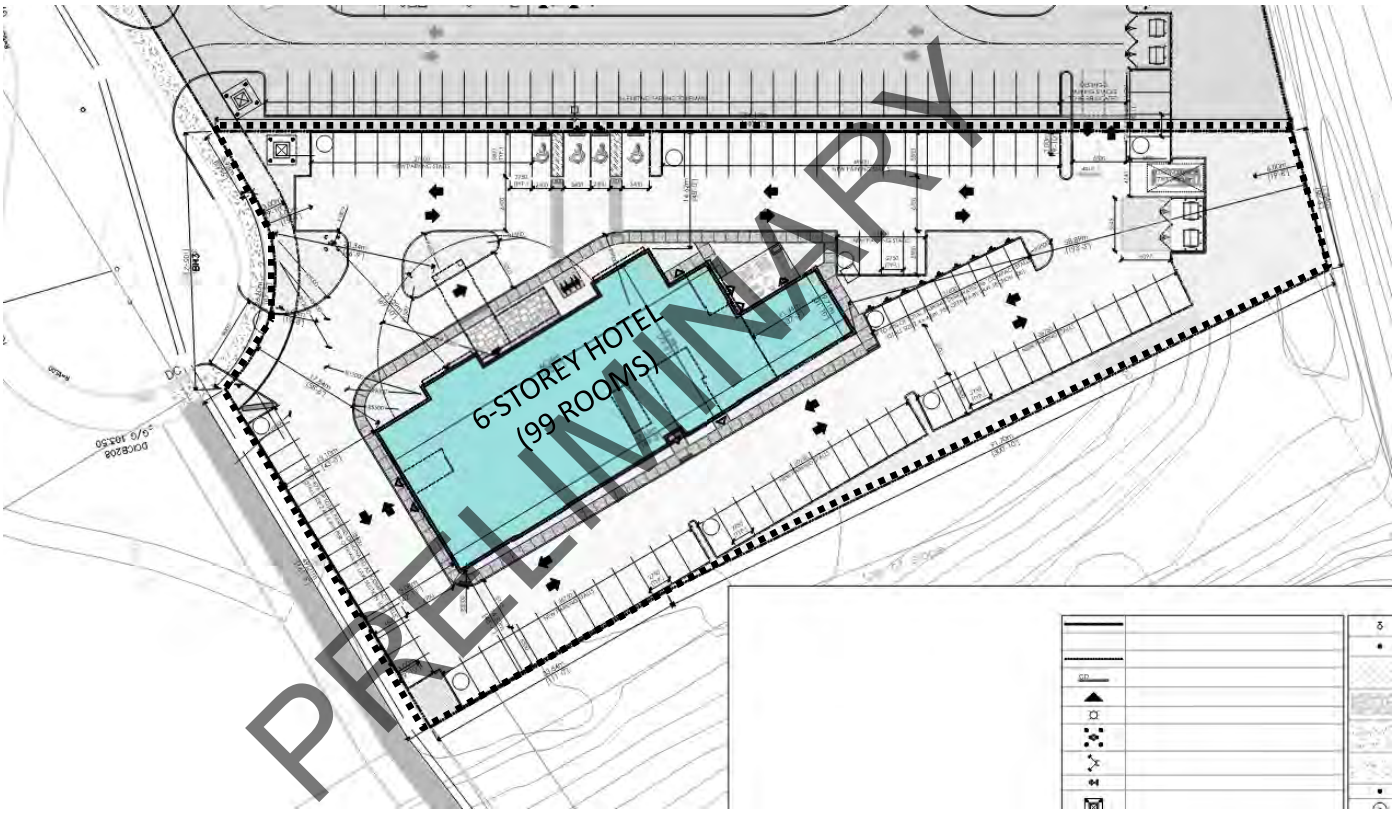
City of Ottawa 2017 TIA Guidelines Screening Form

1. Description of Proposed Development

Municipal Address	135 Lusk Street
Description of Location	South Nepean – North of Strandherd Drive, West of Fallowfield Road and east of Highway 416 
Land Use Classification	Hotel
Development Size (units)	99 suites
Development Size (m^2)	N/A
Number of Accesses and Locations	One (1) proposed right-in/right-out site access driveway on Lusk Street
Phase of Development	Single Phase
Buildout Year	2023

If available, please attach a sketch of the development or site plan to this form.

Proposed Development:



2. Trip Generation Trigger

Considering the Development's Land Use type and Size (as filled out in the previous section), please refer to the Trip Generation Trigger checks below.

Land Use Type	Minimum Development Size
Single-family homes	40 units
Townhomes or apartments	90 units
Office	3,500 m^2
Industrial	5,000 m^2
Fast-food restaurant or coffee shop	100 m^2
Destination retail	1,000 m^2
Gas station or convenience market	75 m^2

** If the development has a land use type other than what is presented in the table above, estimates of person-trip generation may be made based on average trip generation characteristics represented in the current edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual.*

Preliminary trip generation estimates were calculated based on average trip generation characteristics derived for the Hotel land use (310), as indicated in the Institute of Transportation Engineers (ITE) Trip Generation (10th Edition). The 1.28 person-trip conversion factor recommended in the TIA Guidelines was applied to the base trip generation results to obtain the equivalent person-trip generation.

As indicated below, trip generation is expected to exceed the 60 person-trip threshold during the weekday afternoon peak hour, therefore the trip generation trigger is satisfied.

Baseline Vehicle Trips ITE

					AM Peak Hour			PM Peak Hour		
Land Use	Land Use Type	Units/GLA	# of Units		In	Out	Total	In	Out	Total
Hotel	Other	suites	99	Equation:	T=0.47*X			T=0.6*X		
				% Distribution:	59%	41%	100%	51%	49%	100%
				Person Trips:	28	19	47	30	29	59

Person-Trips

	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Conversion Factor:	1.28			1.28		
Person Trips:	36	24	60	39	37	76

- **Based on the results above, the Trip Generation Trigger is satisfied.**

3. Location Triggers

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

**DPA and TOD are identified in the City of Ottawa Official Plan (DPA in Section 2.5.1 and Schedules A and B; TOD in Annex 6). See Chapter 4 for a list of City of Ottawa Planning and Engineering documents that support the completion of TIA).*

➢ **Based on the results above, the Location Trigger is NOT satisfied.**

4. Safety Triggers

	Yes	No
Are posted speed limits on a boundary street are 80 km/hr or greater?		✓
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?		✓
Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions)?		✓
Is the proposed driveway within auxiliary lanes of an intersection?		✓
Does the proposed driveway make use of an existing median break that serves an existing site?		✓
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?		✓
Does the development include a drive-thru facility?		✓

➢ **Based on the results above, the Safety Trigger is NOT satisfied.**

5. Summary

	Yes	No
Does the development satisfy the Trip Generation Trigger?	✓	
Does the development satisfy the Location Trigger?		✓
Does the development satisfy the Safety Trigger?		✓

CONCLUSION: The Trip Generation Trigger is satisfied, therefore a TIA is required.

Appendix C – Traffic Data

Survey Date: Tuesday January 30 2018

Weather: Sunny

NB (South Leg) Street Name: Fallowfield Road

SB (North Leg) Street Name: Fallowfield Road

EB (West Leg) Street Name: O'Keefe Court

WB (East Leg) Street Name: O'Keefe Court

Start Time (AM Peak): 7:00

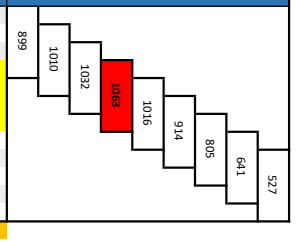
End Time (AM Peak): 10:00

The AM Peak Hour is from 7:45 AM to 8:45 AM

AADT Factor: 1.1

Turning Movement Count - 15 Minute Vehicle Summary Report (AM Peak)

Time Period	Fallowfield Road Northbound					Fallowfield Road Southbound					N/S STREET TOTAL	O'Keefe Court Eastbound					O'Keefe Court Westbound					E/W STREET TOTAL	Grand TOTAL
	LT	ST	RT	U-Turns	NB TOTAL	LT	ST	RT	U-Turns	SB TOTAL		LT	ST	RT	U-Turns	EB TOTAL	LT	ST	RT	U-Turns	WB TOTAL		
7:00 7:15	0	86	1	0	**87**	3	54	1	0	**58**	**145**	0	1	1	0	**2**	7	3	7	0	**17**	**19**	**164**
7:15 7:30	0	135	2	0	**137**	2	70	2	1	**75**	**212**	0	3	4	0	**7**	10	1	15	0	**26**	**33**	**245**
7:30 7:45	2	142	3	0	**147**	0	82	0	0	**82**	**229**	4	1	2	0	**7**	7	0	9	0	**16**	**23**	**252**
7:45 8:00	1	125	6	0	**132**	4	82	0	0	**86**	**218**	0	0	1	0	**1**	9	3	7	0	**19**	**20**	**238**
8:00 8:15	1	127	1	0	**129**	1	111	1	0	**113**	**242**	0	5	3	0	**8**	7	3	15	0	**25**	**33**	**275**
8:15 8:30	2	113	1	0	**116**	0	120	2	0	**122**	**238**	1	1	3	0	**5**	12	0	12	0	**24**	**29**	**267**
8:30 8:45	1	121	1	0	**123**	3	132	2	0	**137**	**260**	1	0	2	0	**3**	11	1	8	0	**20**	**23**	**283**
8:45 9:00	0	76	2	0	**78**	2	88	1	0	**91**	**169**	2	0	5	0	**7**	9	1	5	0	**15**	**22**	**191**
9:00 9:15	1	73	1	0	**75**	4	70	0	0	**74**	**149**	1	0	3	0	**4**	6	1	13	0	**20**	**24**	**173**
9:15 9:30	4	58	3	0	**65**	2	71	2	0	**75**	**140**	1	1	4	0	**6**	4	3	5	0	**12**	**18**	**158**
9:30 9:45	1	32	1	0	**34**	1	70	2	0	**73**	**107**	1	1	3	0	**5**	3	3	1	0	**7**	**12**	**119**
9:45 10:00	1	33	4	0	**38**	0	32	0	0	**32**	**70**	0	1	1	0	**2**	3	1	1	0	**5**	**7**	**77**
Total AM Peak Hr	**5**	**486**	**9**	**0**	**500**	**8**	**445**	**5**	**0**	**458**	**958**	**2**	**6**	**9**	**0**	**17**	**39**	**7**	**42**	**0**	**88**	**105**	**1063**
TOTAL:	14	1121	26	0	**1161**	22	982	13	1	**1018**	**2179**	11	14	32	0	**57**	88	20	98	0	**206**	**263**	**2442**



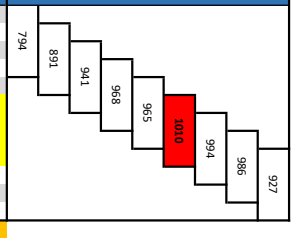
Start Time (PM Peak): 15:00

End Time (PM Peak): 18:00

The PM Peak Hour is from 4:15 PM to 5:15 PM

Turning Movement Count - 15 Minute Vehicle Summary Report (PM Peak)

Time Period	Fallowfield Road Northbound					Fallowfield Road Southbound					N/S STR TOTAL	O'Keefe Court Eastbound					O'Keefe Court Westbound					E/W STR TOTAL	Grand TOTAL
	LT	ST	RT	U-Turns	NB TOTAL	LT	ST	RT	U-Turns	SB TOTAL		LT	ST	RT	U-Turns	EB TOTAL	LT	ST	RT	U-Turns	WB TOTAL		
15:00 15:15	0	28	0	0	**28**	2	82	3	0	**87**	**115**	1	0	1	0	**2**	2	0	5	0	**7**	**9**	**124**
15:15 15:30	3	61	1	0	**65**	2	140	0	0	**142**	**207**	0	1	4	0	**5**	3	0	3	0	**6**	**11**	**218**
15:30 15:45	3	76	1	0	**80**	6	132	3	0	**141**	**221**	1	0	2	0	**3**	6	1	6	0	**13**	**16**	**237**
15:45 16:00	2	76	5	0	**83**	5	107	3	0	**115**	**198**	1	2	2	0	**5**	2	1	9	0	**12**	**17**	**215**
16:00 16:15	3	60	2	0	**65**	4	137	1	0	**142**	**207**	1	1	4	0	**6**	1	1	6	0	**8**	**14**	**221**
16:15 16:30	4	82	5	0	**91**	1	162	2	0	**165**	**256**	3	0	2	0	**5**	3	0	4	0	**7**	**12**	**268**
16:30 16:45	1	85	7	0	**93**	10	144	0	0	**154**	**247**	1	1	4	0	**6**	3	0	8	0	**11**	**17**	**264**
16:45 17:00	0	69	7	0	**76**	1	121	3	0	**125**	**201**	1	0	2	1	**4**	3	1	3	0	**7**	**11**	**212**
17:00 17:15	7	94	4	5	**110**	5	140	0	0	**145**	**255**	0	1	5	0	**6**	0	0	5	0	**5**	**11**	**266**
17:15 17:30	3	87	5	0	**95**	12	131	3	0	**146**	**241**	3	1	2	0	**6**	1	0	4	0	**5**	**11**	**252**
17:30 17:45	2	79	5	0	**86**	7	140	2	0	**149**	**235**	1	0	5	0	**6**	8	0	7	0	**15**	**21**	**256**
17:45 18:00	1	38	2	0	**41**	7	95	1	0	**103**	**144**	2	1	1	0	**4**	1	0	4	0	**5**	**9**	**153**
Total PM Pk Hour	**12**	**330**	**23**	**5**	**370**	**17**	**567**	**5**	**0**	**589**	**959**	**5**	**2**	**13**	**1**	**21**	**9**	**1**	**20**	**0**	**30**	**51**	**1010**
TOTAL:	29	835	44	5	**913**	62	1531	21	0	**1614**	**2527**	15	8	34	1	**58**	33	4	64	0	**101**	**159**	**2686**



Survey Date: Tuesday January 30 2018
Weather: Sunny

NB (South Leg) Street Name: Fallowfield Road
SB (North Leg) Street Name: Fallowfield Road

EB (West Leg) Street Name: O'Keefe Court
WB (East Leg) Street Name: O'Keefe Court

Start Time (AM Peak): 7:00
End Time (AM Peak): 10:00

Turning Movement Count - 15 Minute Pedestrian Volume Report (AM Peak)

Time Period	Fallowfield Road	Fallowfield Road	N/S STREET TOTAL	O'Keefe Court	O'Keefe Court	E/W STREET TOTAL	Grand TOTAL
	NB Approach (East or West Crossing)	SB Approach (East or West Crossing)		EB Approach (North or South Crossing)	WB Approach (North or South Crossing)		
7:00 7:15	0	0	**0**	0	0	**0**	**0**
7:15 7:30	0	0	**0**	0	0	**0**	**0**
7:30 7:45	0	0	**0**	0	1	**1**	**1**
7:45 8:00	0	0	**0**	0	0	**0**	**0**
8:00 8:15	0	0	**0**	0	0	**0**	**0**
8:15 8:30	0	0	**0**	0	0	**0**	**0**
8:30 8:45	0	0	**0**	0	0	**0**	**0**
8:45 9:00	0	0	**0**	0	0	**0**	**0**
9:00 9:15	0	0	**0**	0	0	**0**	**0**
9:15 9:30	1	0	**1**	0	0	**0**	**1**
9:30 9:45	0	0	**0**	1	0	**1**	**1**
9:45 10:00	0	0	**0**	0	0	**0**	**0**
TOTAL:	1	0	**1**	1	1	**2**	**3**

Start Time (PM Peak): 15:00
End Time (PM Peak): 18:00

Turning Movement Count - 15 Minute Pedestrian Volume Report (PM Peak)

Time Period	Fallowfield Road	Fallowfield Road	N/S STREET TOTAL	O'Keefe Court	O'Keefe Court	E/W STREET TOTAL	Grand TOTAL
	NB Approach (East or West Crossing)	SB Approach (East or West Crossing)		EB Approach (North or South Crossing)	WB Approach (North or South Crossing)		
15:00 15:15	0	2	**2**	0	0	**0**	**2**
15:15 15:30	0	0	**0**	0	0	**0**	**0**
15:30 15:45	0	0	**0**	0	0	**0**	**0**
15:45 16:00	0	0	**0**	0	0	**0**	**0**
16:00 16:15	0	0	**0**	0	0	**0**	**0**
16:15 16:30	0	0	**0**	0	0	**0**	**0**
16:30 16:45	0	0	**0**	0	0	**0**	**0**
16:45 17:00	0	0	**0**	0	0	**0**	**0**
17:00 17:15	0	0	**0**	0	0	**0**	**0**
17:15 17:30	0	0	**0**	0	0	**0**	**0**
17:30 17:45	0	0	**0**	0	0	**0**	**0**
17:45 18:00	0	0	**0**	0	0	**0**	**0**
TOTAL:	0	2	**2**	0	0	**0**	**2**

Survey Date: Tuesday January 30 2018

Weather: Sunny

NB (South Leg) Street Name: Fallowfield Road

SB (North Leg) Street Name: Fallowfield Road

O'Keefe Court

O'Keefe Court

Start Time (AM Peak): 7:00

End Time (AM Peak): 10:00

Turning Movement Count - 15 Minute Cyclist Volume Report (AM Peak)

Time Period	Fallowfield Road Northbound	Fallowfield Road Southbound	N/S STREET Total	O'Keefe Court Eastbound	O'Keefe Court Westbound	E/W STREET TOTAL	Grand TOTAL
7:00 7:15	0	0	**0**	0	0	**0**	**0**
7:15 7:30	0	0	**0**	0	0	**0**	**0**
7:30 7:45	0	0	**0**	0	0	**0**	**0**
7:45 8:00	0	0	**0**	0	0	**0**	**0**
8:00 8:15	0	0	**0**	0	0	**0**	**0**
8:15 8:30	0	0	**0**	0	0	**0**	**0**
8:30 8:45	0	0	**0**	0	0	**0**	**0**
8:45 9:00	0	0	**0**	0	0	**0**	**0**
9:00 9:15	0	0	**0**	0	0	**0**	**0**
9:15 9:30	0	0	**0**	0	0	**0**	**0**
9:30 9:45	0	0	**0**	0	0	**0**	**0**
9:45 10:00	0	0	**0**	0	0	**0**	**0**
TOTAL:	0	0	**0**	0	0	**0**	**0**

Start Time (PM Peak): 15:00

End Time (PM Peak): 18:00

Turning Movement Count - 15 Minute Cyclist Volume Report (PM Peak)

Time Period	Fallowfield Road Northbound	Fallowfield Road Southbound	N/S STREET Total	O'Keefe Court Eastbound	O'Keefe Court Westbound	E/W STREET TOTAL	Grand TOTAL
15:00 15:15	0	0	**0**	0	0	**0**	**0**
15:15 15:30	0	0	**0**	0	0	**0**	**0**
15:30 15:45	0	0	**0**	0	0	**0**	**0**
15:45 16:00	0	0	**0**	0	0	**0**	**0**
16:00 16:15	0	0	**0**	0	0	**0**	**0**
16:15 16:30	0	0	**0**	0	0	**0**	**0**
16:30 16:45	0	0	**0**	0	0	**0**	**0**
16:45 17:00	0	0	**0**	0	0	**0**	**0**
17:00 17:15	0	0	**0**	0	0	**0**	**0**
17:15 17:30	0	0	**0**	0	0	**0**	**0**
17:30 17:45	0	0	**0**	0	0	**0**	**0**
17:45 18:00	0	0	**0**	0	0	**0**	**0**
TOTAL:	0	0	**0**	0	0	**0**	**0**

Survey Date: Tuesday January 30 2018
Weather: Sunny

NB (South Leg) Street Name: Fallowfield Road
SB (North Leg) Street Name: Fallowfield Road

EB (West Leg) Street Name: O'Keefe Court
WB (East Leg) Street Name: O'Keefe Court

Start Time (AM Peak): 7:00
End Time (AM Peak): 10:00

Turning Movement Count - 15 Minute Heavy Vehicle Report (AM Peak)

Time Period	Fallowfield Road Northbound					Fallowfield Road Southbound					N/S STREET Total	O'Keefe Court Eastbound					O'Keefe Court Westbound					E/W STREET TOTAL	Grand TOTAL
	LT	ST	RT	U-Turns	NB TOTAL	LT	ST	RT	U-Turns	SB TOTAL		LT	ST	RT	U-Turns	EB TOTAL	LT	ST	RT	U-Turns	WB TOTAL		
7:00 7:15	1	2	0	0	**3**	0	2	0	0	**2**	**5**	0	1	0	0	**1**	0	0	0	0	**0**	**1**	**6**
7:15 7:30	0	2	0	0	**2**	0	4	0	0	**4**	**6**	0	0	0	0	**0**	0	0	1	0	**1**	**1**	**7**
7:30 7:45	0	7	0	0	**7**	0	11	0	0	**11**	**18**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**18**
7:45 8:00	0	7	0	0	**7**	0	3	0	0	**3**	**10**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**10**
8:00 8:15	0	3	2	0	**5**	0	4	0	0	**4**	**9**	0	0	1	0	**1**	0	0	0	0	**0**	**1**	**10**
8:15 8:30	0	11	3	0	**14**	0	7	0	0	**7**	**21**	0	0	0	0	**0**	1	0	0	0	**1**	**1**	**22**
8:30 8:45	0	3	0	0	**3**	1	3	0	0	**4**	**7**	0	0	0	0	**0**	0	1	0	0	**1**	**1**	**8**
8:45 9:00	0	6	0	0	**6**	0	4	0	0	**4**	**10**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**10**
9:00 9:15	0	4	0	0	**4**	0	20	0	0	**20**	**24**	0	0	0	0	**0**	0	0	1	0	**1**	**1**	**25**
9:15 9:30	0	4	1	0	**5**	0	7	0	0	**7**	**12**	0	0	0	0	**0**	0	1	0	0	**1**	**1**	**13**
9:30 9:45	0	3	0	0	**3**	0	8	0	0	**8**	**11**	0	0	1	0	**1**	1	0	0	0	**1**	**2**	**13**
9:45 10:00	0	1	0	0	**1**	0	1	0	0	**1**	**2**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**2**
TOTAL:	1	53	6	0	**60**	1	74	0	0	**75**	**135**	0	1	2	0	**3**	2	2	2	0	**6**	**9**	**144**

Start Time (PM Peak): 15:00
End Time (PM Peak): 18:00

Turning Movement Count - 15 Minute Heavy Vehicle Report (PM Peak)

Time Period	Fallowfield Road Northbound					Fallowfield Road Southbound					N/S STREET TOTAL	O'Keefe Court Eastbound					O'Keefe Court Westbound					E/W STREET TOTAL	Grand TOTAL
	LT	ST	RT	U-Turns	NB TOTAL	LT	ST	RT	U-Turns	SB TOTAL		LT	ST	RT	U-Turns	EB TOTAL	LT	ST	RT	U-Turns	WB TOTAL		
15:00 15:15	0	1	1	0	**2**	0	6	0	0	**6**	**8**	0	0	0	0	**0**	0	0	1	0	**1**	**1**	**9**
15:15 15:30	0	6	0	0	**6**	0	5	0	0	**5**	**11**	0	0	0	0	**0**	0	1	2	0	**3**	**3**	**14**
15:30 15:45	0	10	0	0	**10**	0	5	0	0	**5**	**15**	0	0	0	0	**0**	0	0	1	0	**1**	**1**	**16**
15:45 16:00	0	5	0	0	**5**	0	3	0	0	**3**	**8**	0	0	0	0	**0**	0	0	1	0	**1**	**1**	**9**
16:00 16:15	0	1	1	0	**2**	0	3	0	0	**3**	**5**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**5**
16:15 16:30	0	3	0	0	**3**	0	4	0	0	**4**	**7**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**7**
16:30 16:45	0	3	0	0	**3**	0	9	0	0	**9**	**12**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**12**
16:45 17:00	0	3	0	0	**3**	1	6	0	0	**7**	**10**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**10**
17:00 17:15	0	3	0	0	**3**	0	4	0	0	**4**	**7**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**7**
17:15 17:30	0	1	0	0	**1**	0	3	0	0	**3**	**4**	0	0	0	0	**0**	1	0	1	0	**2**	**2**	**6**
17:30 17:45	0	2	0	0	**2**	0	4	0	0	**4**	**6**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**6**
17:45 18:00	0	0	0	0	**0**	0	2	0	0	**2**	**2**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**2**
TOTAL:	0	38	2	0	**40**	1	54	0	0	**55**	**95**	0	0	0	0	**0**	1	1	6	0	**8**	**8**	**103**

Appendix D – OC Transpo Routes

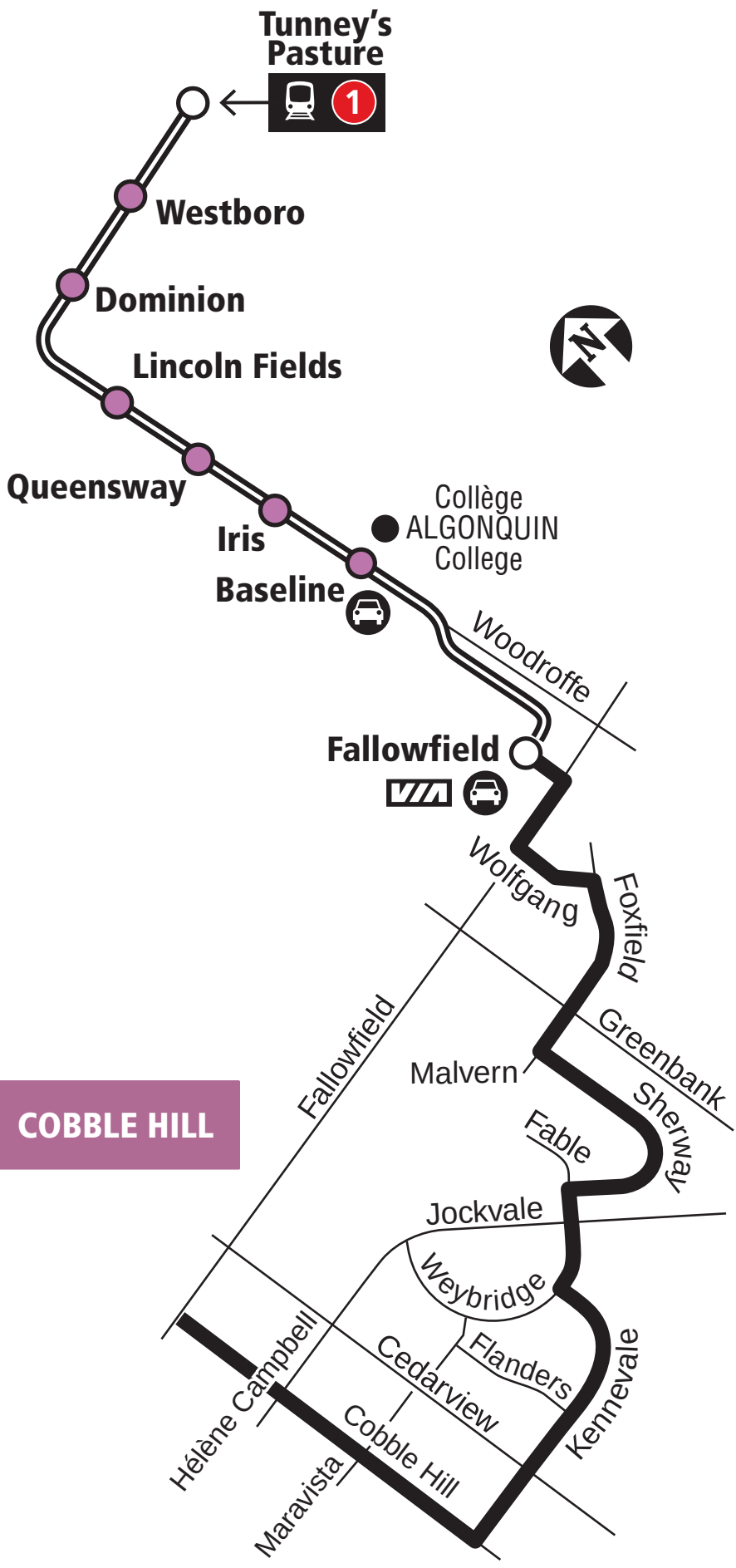
272 Connexion

COBBLE HILL
TUNNEY'S PASTURE

Monday to Friday / Lundi au vendredi

Peak periods only
Périodes de pointe seulement

AM ↑ TUNNEY'S PASTURE



PM ↓ COBBLE HILL

Transitway & Station

Limited stops: Off only in AM / No stop in PM
Arrêts limités : Débarquement en AM seul. / Aucun arrêt en PM

Park & Ride / Parc-o-bus

2020.01

Schedule / Horaire.....613-560-1000
Text / Texto 560560

plus your four digit bus stop number / *plus* votre numéro d'arrêt à quatre chiffres

Customer Service
Service à la clientèle **613-741-4390**

Lost and Found / Objets perdus..... **613-563-4011**

Security / Sécurité **613-741-2478**

Effective January 5, 2020
En vigueur 5 janvier 2020

OC Transpo

INFO 613-741-4390
octranspo.com

Appendix E – Collision Data

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 **To:** December 31, 2019

Location: FALLOWFIELD RD @ O'KEEFE CRT

Traffic Control: Stop sign **Total Collisions:** 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Sep-28, Mon,07:47	Clear	Angle	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					East	Going ahead	Pick-up truck	Other motor vehicle	

Location: FALLOWFIELD RD @ STRANDHERD DR

Traffic Control: Traffic signal **Total Collisions:** 42

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Feb-24, Tue,12:48	Clear	Rear end	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Jul-22, Wed,20:20	Clear	Rear end	P.D. only	Dry	East	Turning left	Pick-up truck	Other motor vehicle	0
					East	Turning left	Automobile, station wagon	Other motor vehicle	
2015-Aug-14, Fri,16:39	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Jan-13, Wed,15:11	Clear	Sideswipe	P.D. only	Wet	West	Changing lanes	Pick-up truck	Other motor vehicle	0
					West	Going ahead	Pick-up truck	Other motor vehicle	
2016-Jan-19, Tue,06:27	Clear	Rear end	P.D. only	Ice	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2016-Feb-20, Sat,03:57	Rain	Rear end	P.D. only	Slush	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2016-Jun-18, Sat,13:50	Clear	Rear end	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Jan-12, Thu,06:25	Rain	Approaching	P.D. only	Wet	West	Unknown	Unknown	Other motor vehicle	0
					East	Going ahead	Pick-up truck	Other motor vehicle	
2017-Feb-26, Sun,14:09	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					West	Changing lanes	Pick-up truck	Other motor vehicle	

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 **To:** December 31, 2019

Location: FALLOWFIELD RD @ STRANDHERD DR

Traffic Control: Traffic signal **Total Collisions:** 42

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2017-Apr-20, Thu,08:40	Clear	Rear end	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	0
					East	Turning left	Pick-up truck	Other motor vehicle	
2017-Jun-05, Mon,14:45	Clear	Rear end	P.D. only	Dry	South	Turning right	Automobile, station wagon	Other motor vehicle	0
					South	Turning right	Automobile, station wagon	Other motor vehicle	
					South	Turning right	Automobile, station wagon	Other motor vehicle	
2017-Jul-14, Fri,18:11	Clear	Rear end	P.D. only	Dry	South	Turning right	Pick-up truck	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
					South	Merging	Automobile, station wagon	Other motor vehicle	
2017-Jul-26, Wed,07:34	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2017-Aug-12, Sat,18:56	Rain	Rear end	Non-fatal injury	Wet	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Aug-15, Tue,14:45	Clear	Angle	Non-fatal injury	Dry	East	Going ahead	Passenger van	Other motor vehicle	0
					North	Turning left	Pick-up truck	Other motor vehicle	
2017-Sep-20, Wed,20:10	Clear	Rear end	P.D. only	Dry	West	Turning right	Automobile, station wagon	Other motor vehicle	0
					West	Turning right	Automobile, station wagon	Other motor vehicle	
2017-Oct-17, Tue,17:28	Clear	Rear end	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Nov-17, Fri,12:02	Clear	Rear end	P.D. only	Dry	West	Going ahead	Pick-up truck	Other motor vehicle	0
					West	Stopped	Passenger van	Other motor vehicle	
2018-Jan-08, Mon,12:55	Snow	Rear end	Non-fatal injury	Slush	East	Slowing or stopping	Pick-up truck	Skidding/sliding	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Feb-08, Thu,15:46	Clear	Angle	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Pick-up truck	Other motor vehicle	

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 **To:** December 31, 2019

Location: FALLOWFIELD RD @ STRANDHERD DR

Traffic Control: Traffic signal **Total Collisions:** 42

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2018-Feb-09, Fri,17:45	Clear	Rear end	Non-fatal injury	Wet	West	Slowing or stopping	Automobile, station wagon	Skidding/sliding	0
					West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
2018-Feb-16, Fri,15:35	Clear	Rear end	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	0
					East	Turning left	Automobile, station wagon	Other motor vehicle	
2018-Mar-09, Fri,10:55	Snow	Angle	Non-fatal injury	Wet	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Turning left	Pick-up truck	Other motor vehicle	
2018-Apr-26, Thu,16:11	Clear	Rear end	P.D. only	Dry	South	Turning right	Automobile, station wagon	Other motor vehicle	0
					South	Turning right	Passenger van	Other motor vehicle	
2018-Jun-19, Tue,21:05	Clear	Angle	Non-fatal injury	Dry	South	Going ahead	Motorcycle	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Jun-24, Sun,14:01	Clear	Rear end	P.D. only	Dry	South	Turning right	Automobile, station wagon	Other motor vehicle	0
					South	Turning right	Automobile, station wagon	Other motor vehicle	
2018-Aug-16, Thu,12:28	Clear	Rear end	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Sep-10, Mon,07:45	Clear	Sideswipe	P.D. only	Dry	West	Unknown	Unknown	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Sep-17, Mon,14:10	Clear	Rear end	P.D. only	Dry	South	Turning right	Pick-up truck	Other motor vehicle	0
					South	Turning right	Automobile, station wagon	Other motor vehicle	
2018-Oct-24, Wed,08:45	Clear	Rear end	Non-fatal injury	Dry	West	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Dec-22, Sat,08:04	Snow	Turning movement	P.D. only	Loose snow	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					East	Turning left	Automobile, station wagon	Other motor vehicle	
2019-Jan-01, Tue,19:29	Clear	Sideswipe	P.D. only	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle	0
					West	Turning left	Municipal transit bus	Other motor vehicle	

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 **To:** December 31, 2019

Location: FALLOWFIELD RD @ STRANDHERD DR

Traffic Control: Traffic signal **Total Collisions:** 42

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2019-Jan-29, Tue,08:35	Clear	Rear end	P.D. only	Loose snow	East	Slowing or stopping	Truck - dump	Other motor vehicle	0
					East	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Jan-31, Thu,16:32	Clear	Rear end	P.D. only	Packed snow	South	Turning right	Automobile, station wagon	Other motor vehicle	0
					South	Turning right	Automobile, station wagon	Other motor vehicle	
2019-Feb-25, Mon,21:05	Clear	Turning movement	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Pick-up truck	Other motor vehicle	
2019-Mar-05, Tue,16:30	Snow	Rear end	P.D. only	Loose snow	South	Turning right	Automobile, station wagon	Other motor vehicle	0
					South	Turning right	Automobile, station wagon	Other motor vehicle	
2019-Apr-24, Wed,18:20	Clear	Rear end	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Stopped	Pick-up truck	Other motor vehicle	
2019-May-04, Sat,10:30	Clear	Rear end	P.D. only	Dry	South	Turning right	Pick-up truck	Other motor vehicle	0
					South	Turning right	Unknown	Other motor vehicle	
2019-Jul-30, Tue,08:03	Clear	Sideswipe	P.D. only	Dry	East	Turning left	Truck and trailer	Other motor vehicle	0
					East	Turning left	Automobile, station wagon	Other motor vehicle	
2019-Sep-14, Sat,15:00	Clear	Rear end	P.D. only	Dry	South	Turning right	Automobile, station wagon	Other motor vehicle	0
					South	Turning right	Automobile, station wagon	Other motor vehicle	
2019-Sep-16, Mon,08:35	Clear	Rear end	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Nov-16, Sat,13:41	Clear	Rear end	P.D. only	Dry	West	Going ahead	Unknown	Other motor vehicle	0
					West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 **To:** December 31, 2019

Location: FALLOWFIELD RD btwn STRANDHERD DR & O'KEEFE CRT

Traffic Control: No control **Total Collisions:** 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2016-Apr-22, Fri,15:13	Rain	Rear end	P.D. only	Wet	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	

Location: O'KEEFE CRT btwn FOXTAIL AVE & END

Traffic Control: No control **Total Collisions:** 3

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Nov-22, Sun,06:07	Clear	SMV other	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Fence/noice barrier	0
2017-Apr-23, Sun,23:26	Clear	SMV other	Non-fatal injury	Dry	West	Going ahead	Automobile, station wagon	Ditch	0
2019-Aug-04, Sun,00:18	Clear	SMV other	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Ran off road	0

Location: O'KEEFE CRT btwn FOXTAIL AVE & FALLOWFIELD RD

Traffic Control: No control **Total Collisions:** 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Aug-26, Wed,16:49	Clear	Rear end	P.D. only	Dry	West	Unknown	Unknown	Other motor vehicle	0
					West	Stopped	Pick-up truck	Other motor vehicle	

Appendix F – Trip Generation Data

South Nepean

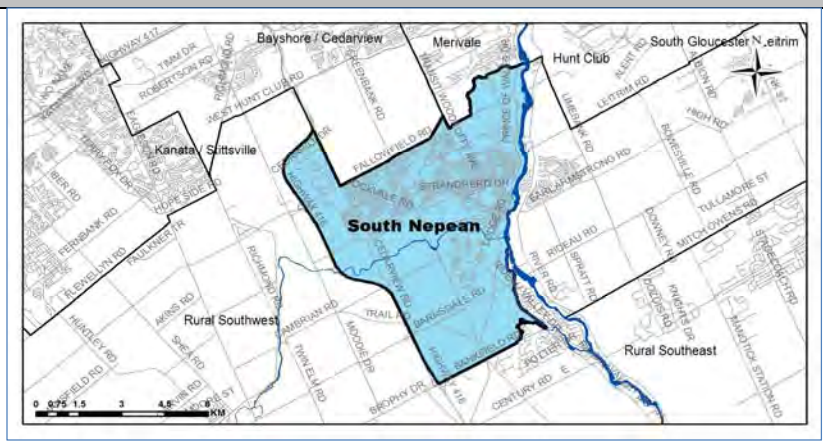
Demographic Characteristics

Population	72,750	Actively Travelled	57,830
Employed Population	35,540	Number of Vehicles	44,130
Households	26,260	Area (km^2)	54.8

Occupation Status (age 5+)	Male	Female	Total
Full Time Employed	17,630	14,730	32,350
Part Time Employed	620	2,570	3,190
Student	9,910	9,420	19,340
Retiree	3,420	4,200	7,620
Unemployed	720	500	1,220
Homemaker	180	2,390	2,570
Other	270	540	810
Total:	32,750	34,350	67,100

Traveller Characteristics	Male	Female	Total
Transit Pass Holders	5,590	6,100	11,700
Licensed Drivers	24,480	25,260	49,740
Telecommuters	60	310	370
Trips made by residents	88,180	97,380	185,550

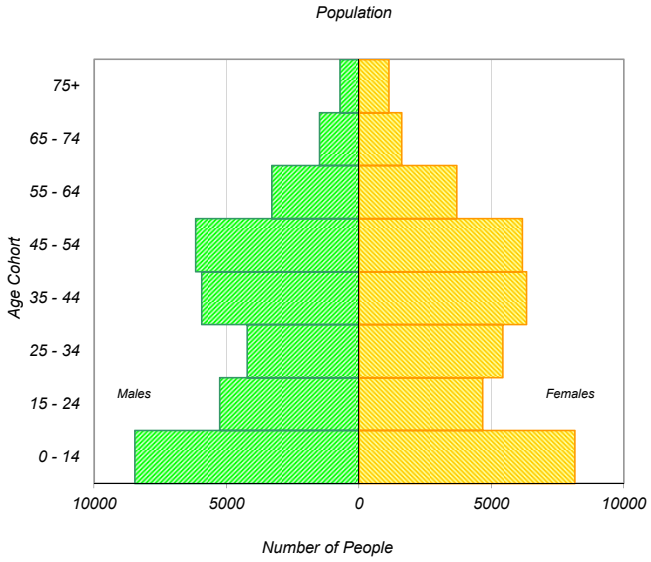
Selected Indicators	
Daily Trips per Person (age 5+)	2.77
Vehicles per Person	0.61
Number of Persons per Household	2.77
Daily Trips per Household	7.07
Vehicles per Household	1.68
Workers per Household	1.35
Population Density (Pop/km2)	1330

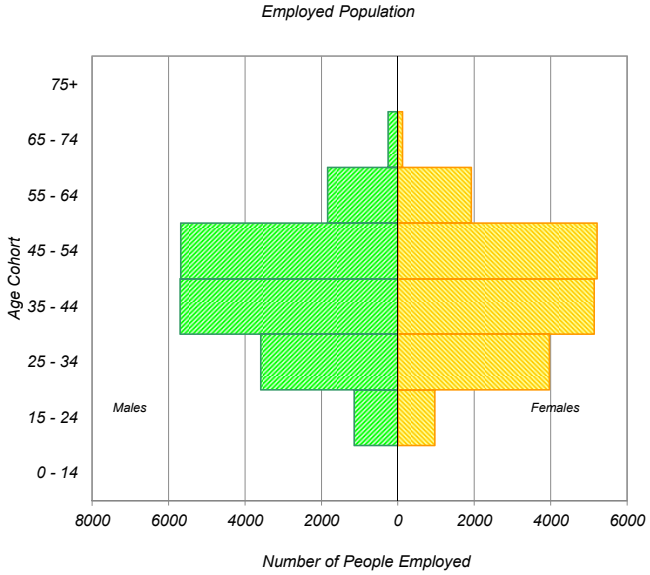


Household Size		
1 person	3,560	14%
2 persons	7,300	28%
3 persons	5,500	21%
4 persons	6,320	24%
5+ persons	3,590	14%
Total:	26,260	100%

Households by Vehicle Availability		
0 vehicles	810	3%
1 vehicle	9,500	36%
2 vehicles	13,800	53%
3 vehicles	1,730	7%
4+ vehicles	410	2%
Total:	26,260	100%

Households by Dwelling Type		
Single-detached	14,530	55%
Semi-detached	3,090	12%
Townhouse	7,770	30%
Apartment/Condo	870	3%
Total:	26,260	100%



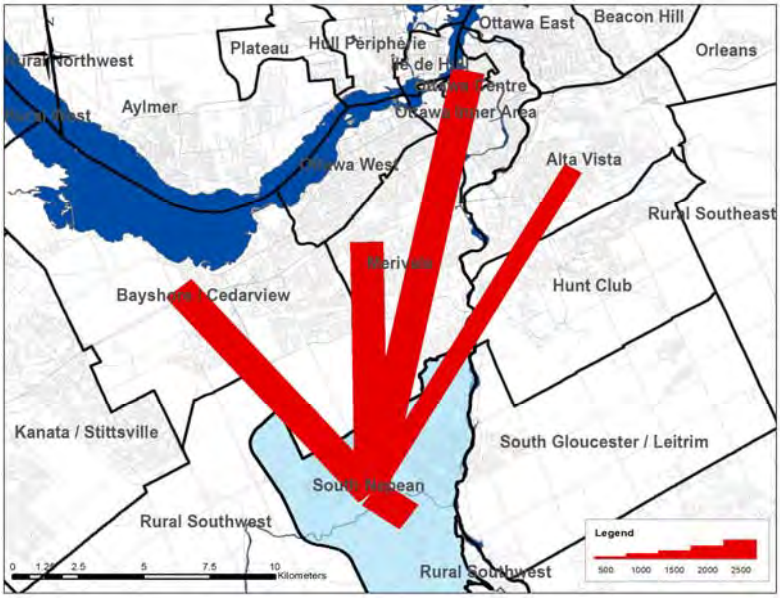


* In 2005 data was only collected for household members aged 11+ therefore these results cannot be compared to the 2011 data.

Travel Patterns

Top Five Destinations of Trips from South Nepean

AM Peak Period



Summary of Trips to and from South Nepean

AM Peak Period (6:30 - 8:59)	Destinations of Trips From		Origins of Trips To	
Districts	District	% Total	District	% Total
Ottawa Centre	3,820	9%	30	0%
Ottawa Inner Area	2,270	5%	340	1%
Ottawa East	630	2%	50	0%
Beacon Hill	370	1%	50	0%
Alta Vista	2,360	6%	460	2%
Hunt Club	920	2%	440	2%
Merivale	4,310	10%	790	3%
Ottawa West	1,830	4%	160	1%
Bayshore / Cedarview	3,230	8%	700	3%
Orléans	330	1%	200	1%
Rural East	20	0%	60	0%
Rural Southeast	250	1%	580	2%
South Gloucester / Leitrim	100	0%	310	1%
South Nepean	17,260	42%	17,260	74%
Rural Southwest	580	1%	970	4%
Kanata / Stittsvile	1,800	4%	690	3%
Rural West	80	0%	30	0%
Île de Hull	840	2%	50	0%
Hull Périphérie	260	1%	40	0%
Plateau	0	0%	40	0%
Aylmer	60	0%	40	0%
Rural Northwest	40	0%	40	0%
Pointe Gatineau	0	0%	0	0%
Gatineau Est	0	0%	20	0%
Rural Northeast	10	0%	20	0%
Buckingham / Masson-Angers	20	0%	0	0%
Ontario Sub-Total:	40,160	97%	23,120	99%
Québec Sub-Total:	1,230	3%	250	1%
Total:	41,390	100%	23,370	100%

Trips by Trip Purpose

24 Hours	From District		To District		Within District	
Work or related	25,640	41%	5,290	8%	4,680	6%
School	5,310	8%	1,430	2%	10,610	13%
Shopping	4,940	8%	4,220	7%	12,840	16%
Leisure	6,960	11%	4,020	6%	5,760	7%
Medical	1,720	3%	900	1%	840	1%
Pick-up / drive passenger	4,040	6%	3,920	6%	7,530	9%
Return Home	11,460	18%	40,960	65%	34,630	43%
Other	2,640	4%	2,090	3%	3,020	4%
Total:	62,710	100%	62,830	100%	79,910	100%

AM Peak (06:30 - 08:59)	From District		To District		Within District	
Work or related	18,160	75%	2,890	47%	2,120	12%
School	3,280	14%	1,170	19%	9,180	53%
Shopping	180	1%	70	1%	720	4%
Leisure	350	1%	230	4%	220	1%
Medical	400	2%	60	1%	100	1%
Pick-up / drive passenger	1,060	4%	770	13%	2,860	17%
Return Home	210	1%	640	10%	1,070	6%
Other	520	2%	290	5%	990	6%
Total:	24,160	100%	6,120	100%	17,260	100%

PM Peak (15:30 - 17:59)	From District		To District		Within District	
Work or related	410	5%	290	1%	410	2%
School	250	3%	0	0%	50	0%
Shopping	900	11%	1,090	5%	2,090	11%
Leisure	1,420	17%	790	3%	1,840	10%
Medical	190	2%	230	1%	90	0%
Pick-up / drive passenger	820	10%	1,700	7%	1,610	9%
Return Home	3,800	47%	18,990	81%	11,810	64%
Other	360	4%	490	2%	540	3%
Total:	8,150	100%	23,580	100%	18,440	100%

Peak Period (%)	Total:	% of 24 Hours	Within District (%)
24 Hours	205,450		39%
AM Peak Period	47,540	23%	36%
PM Peak Period	50,170	24%	37%

Trips by Primary Travel Mode

24 Hours	From District		To District		Within District	
Auto Driver	41,340	66%	41,280	66%	39,110	49%
Auto Passenger	9,400	15%	10,030	16%	15,320	19%
Transit	9,990	16%	9,520	15%	2,260	3%
Bicycle	310	0%	320	1%	960	1%
Walk	80	0%	170	0%	13,060	16%
Other	1,600	3%	1,520	2%	9,210	12%
Total:	62,720	100%	62,840	100%	79,920	100%

AM Peak (06:30 - 08:59)	From District		To District		Within District	
Auto Driver	14,570	60%	4,360	71%	5,800	34%
Auto Passenger	1,930	8%	780	13%	3,210	19%
Transit	6,610	27%	330	5%	730	4%
Bicycle	80	0%	50	1%	320	2%
Walk	20	0%	10	0%	3,000	17%
Other	930	4%	590	10%	4,200	24%
Total:	24,140	100%	6,120	100%	17,260	100%

PM Peak (15:30 - 17:59)	From District		To District		Within District	
Auto Driver	5,840	72%	14,640	62%	8,420	46%
Auto Passenger	1,730	21%	2,680	11%	3,930	21%
Transit	350	4%	5,770	24%	650	4%
Bicycle	80	1%	110	0%	150	1%
Walk	30	0%	0	0%	3,680	20%
Other	100	1%	380	2%	1,590	9%
Total:	8,130	100%	23,580	100%	18,420	100%

Avg Vehicle Occupancy	From District	To District	Within District
24 Hours	1.23	1.24	1.39
AM Peak Period	1.13	1.18	1.55
PM Peak Period	1.30	1.18	1.47

Transit Modal Split	From District	To District	Within District
24 Hours	16%	16%	4%
AM Peak Period	29%	6%	7%
PM Peak Period	4%	25%	5%

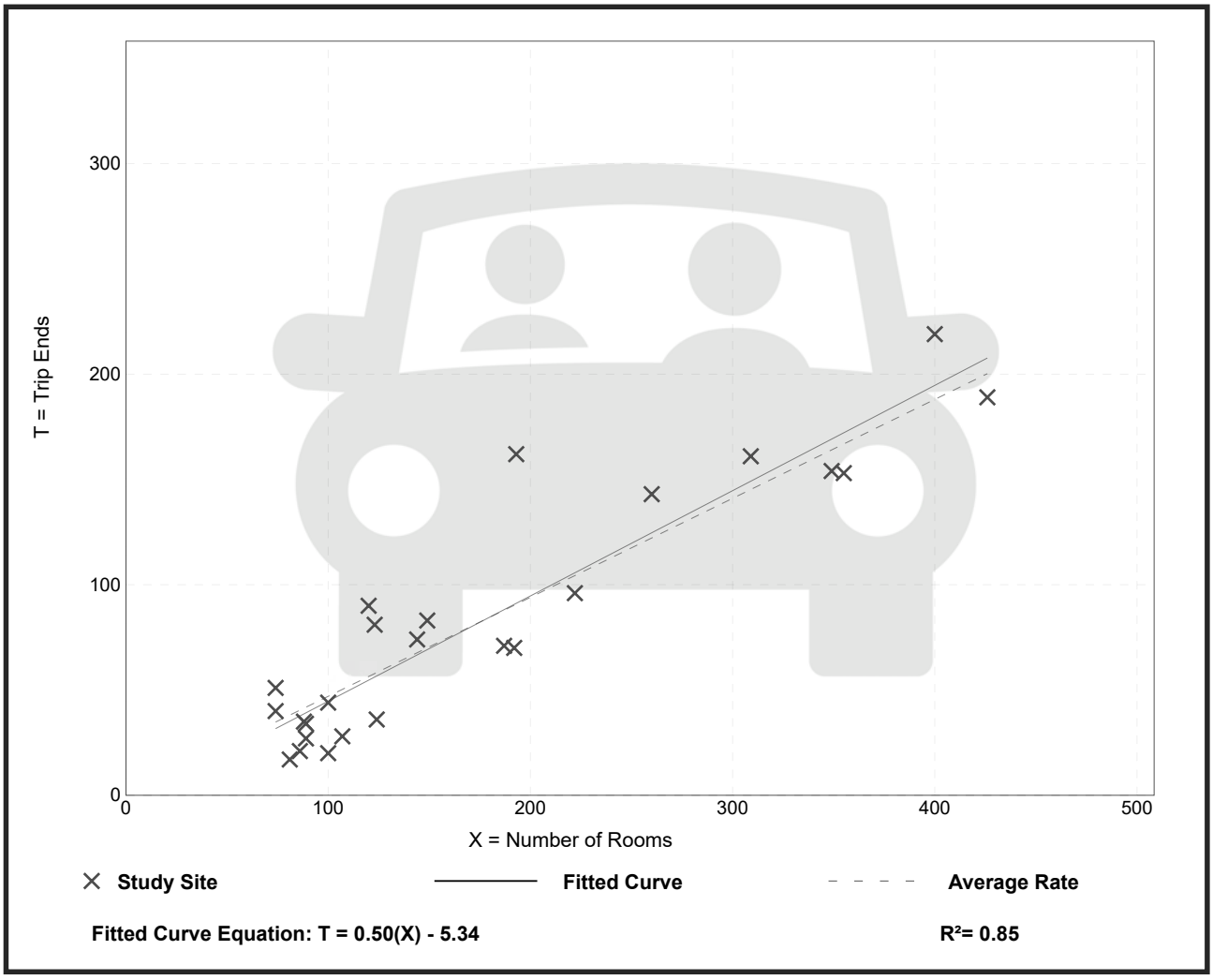
Hotel
(310)

Vehicle Trip Ends vs: **Rooms**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 25
Avg. Num. of Rooms: 178
Directional Distribution: 59% entering, 41% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
0.47	0.20 - 0.84	0.14

Data Plot and Equation



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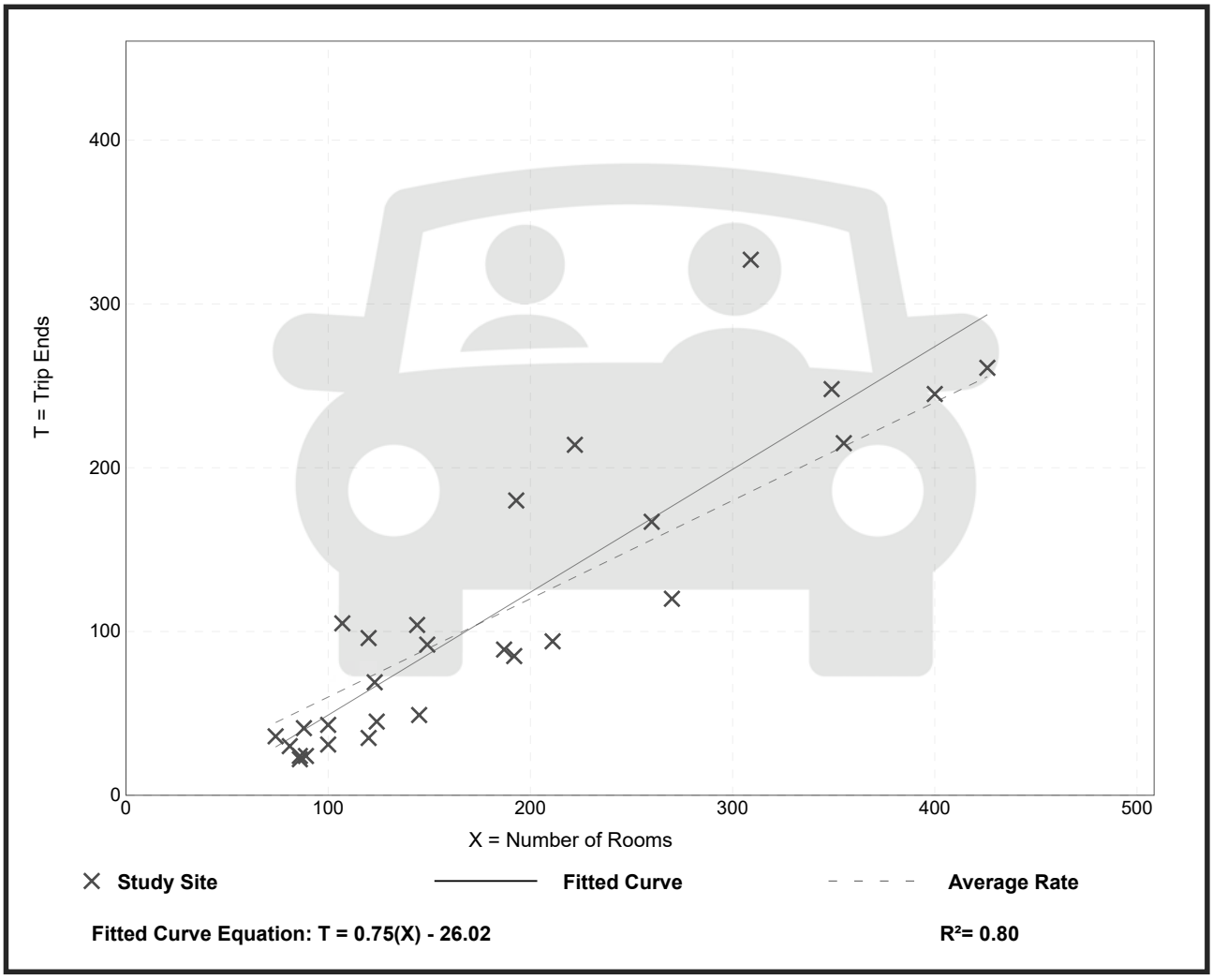
Hotel
(310)

Vehicle Trip Ends vs: **Rooms**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 28
Avg. Num. of Rooms: 183
Directional Distribution: 51% entering, 49% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
0.60	0.26 - 1.06	0.22

Data Plot and Equation



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Appendix G – TDM Measures

TDM-Supportive Development Design and Infrastructure Checklist:
Non-Residential Developments (office, institutional, retail or industrial)

Legend

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

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

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

	TDM-supportive design & infrastructure measures: *Non-residential developments*		Check if completed & add descriptions, explanations or plan/drawing references
	2.	**WALKING & CYCLING: END-OF-TRIP FACILITIES**	
	2.1	**Bicycle parking**	
REQUIRED	2.1.1	Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible *(see Official Plan policy 4.3.6)*	☑ bike racks proposed adjacent to primary entrance
REQUIRED	2.1.2	Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas *(see Zoning By-law Section 111)*	☑ bike parking supply is 8 spaces, exceeding 6 required in Zoning By-law
REQUIRED	2.1.3	Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored *(see Zoning By-law Section 111)*	☑ racks to be secured and anchored
BASIC	2.1.4	Provide bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met), plus the expected peak number of customer/visitor cyclists	☐
BETTER	2.1.5	Provide bicycle parking spaces equivalent to the expected number of commuter and customer/visitor cyclists, plus an additional buffer (e.g. 25 percent extra) to encourage other cyclists and ensure adequate capacity in peak cycling season	☐
	2.2	**Secure bicycle parking**	
REQUIRED	2.2.1	Where more than 50 bicycle parking spaces are provided for a single office building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers *(see Zoning By-law Section 111)*	☐ N/A
BETTER	2.2.2	Provide secure bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met)	☐
	2.3	**Shower & change facilities**	
BASIC	2.3.1	Provide shower and change facilities for the use of active commuters	☑ Hotel use - showers provided
BETTER	2.3.2	In addition to shower and change facilities, provide dedicated lockers, grooming stations, drying racks and laundry facilities for the use of active commuters	☐
	2.4	**Bicycle repair station**	
BETTER	2.4.1	Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	☐

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	3.	**TRANSIT**	
	3.1	**Customer amenities**	
BASIC	3.1.1	Provide shelters, lighting and benches at any on-site transit stops	☐ N/A
BASIC	3.1.2	Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	☐ N/A
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐
	4.	**RIDESHARING**	
	4.1	**Pick-up & drop-off facilities**	
BASIC	4.1.1	Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	☑ Pick-up/drop-off at main entrance
	4.2	**Carpool parking**	
BASIC	4.2.1	Provide signed parking spaces for carpools in a priority location close to a major building entrance, sufficient in number to accommodate the mode share target for carpools	☐
BETTER	4.2.2	At large developments, provide spaces for carpools in a separate, access-controlled parking area to simplify enforcement	☐
	5.	**CARSHARING & BIKESHARING**	
	5.1	**Carshare parking spaces**	
BETTER	5.1.1	Provide carshare parking spaces in permitted non-residential zones, occupying either required or provided parking spaces *(see Zoning By-law Section 94)*	☐
	5.2	**Bikeshare station location**	
BETTER	5.2.1	Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	☐

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	6.	**PARKING**	
	6.1	**Number of parking spaces**	
REQUIRED	6.1.1	Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	☑ Parking meets and does not exceed Zoning By-law requirements
BASIC	6.1.2	Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	☐
BASIC	6.1.3	Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly *(see Zoning By-law Section 104)*	☐ single-use
BETTER	6.1.4	Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking *(see Zoning By-law Section 111)*	☐
	6.2	**Separate long-term & short-term parking areas**	
BETTER	6.2.1	Separate short-term and long-term parking areas using signage or physical barriers, to permit access controls and simplify enforcement (i.e. to discourage employees from parking in visitor spaces, and vice versa)	☐
	7.	**OTHER**	
	7.1	**On-site amenities to minimize off-site trips**	
BETTER	7.1.1	Provide on-site amenities to minimize mid-day or mid-commute errands	☐

Appendix H – MMLOS Analyses

Multi-Modal Level of Service - Segments Form

Consultant	**IBI Group**	**Project**	**135 Lusk Street**
Scenario	**Future Conditions**	**Date**	**August 13, 2021**
Comments			

SEGMENTS		**Street A**	Section 1	Section 2	Section 3	Section 4	Section 5	Section 6	Section 7	Section 8	Section 9
Pedestrian	Sidewalk Width Boulevard Width	**D**	≥ 2 m > 2 m								
	Avg Daily Curb Lane Traffic Volume		> 3000								
	Operating Speed On-Street Parking		> 60 km/h no								
	Exposure to Traffic PLoS		**D**	-	-	-	-	-	-	-	-
	Effective Sidewalk Width		2.0 m								
	Pedestrian Volume		250 ped/hr								
	Crowding PLoS		**B**	-	-	-	-	-	-	-	-
	Level of Service		**D**	-	-	-	-	-	-	-	-
Bicycle	Type of Cycling Facility	**A**	Physically Separated								
	Number of Travel Lanes										
	Operating Speed										
	# of Lanes & Operating Speed LoS		-	-	-	-	-	-	-	-	-
	Bike Lane (+ Parking Lane) Width										
	Bike Lane Width LoS		-	-	-	-	-	-	-	-	-
	Bike Lane Blockages										
	Blockage LoS		-	-	-	-	-	-	-	-	-
	Median Refuge Width (no median = < 1.8 m)										
	No. of Lanes at Unsignalized Crossing										
	Sidestreet Operating Speed										
	Unsignalized Crossing - Lowest LoS		A	-	-	-	-	-	-	-	-
	Level of Service		**A**	-	-	-	-	-	-	-	-
Transit	Facility Type	**D**	Mixed Traffic								
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≥ 0.8								
	Level of Service		**D**	-	-	-	-	-	-	-	-
Truck	Truck Lane Width	**A**	≤ 3.5 m								
	Travel Lanes per Direction		> 1								
	Level of Service		**A**	-	-	-	-	-	-	-	-

Multi-Modal Level of Service - Intersections Form

Consultant	**IBI Group**	**Project**	**135 Lusk Street**
Scenario	**Future Conditions**	**Date**	**October 13, 2021**
Comments			

To add intersections
Select columns LMNO, right-click and *Copy;*
Then select column P, right-click and *Insert Copied Cells*

INTERSECTIONS		**Fallowfield Road & O'Keefe Court / Cobble Hill Drive**				**Intersection B**				**Intersection C**			
	Crossing Side	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	7	6	4	5								
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m								
	Conflicting Left Turns	Permissive	Permissive	Permissive	Permissive								
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control								
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed								
	Ped Signal Leading Interval?	No	No	No	No								
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel								
	Corner Radius	10-15m	10-15m	5-10m	10-15m								
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings								
	PETSI Score	**4**	**20**	**54**	**37**								
	Ped. Exposure to Traffic LoS	**F**	**F**	**D**	**E**	-	-	-	-	-	-	-	-
	Cycle Length	120	120	120	120								
	Effective Walk Time	7	7	66	66								
	Average Pedestrian Delay	**53**	**53**	**12**	**12**								
	Pedestrian Delay LoS	**E**	**E**	**B**	**B**	-	-	-	-	-	-	-	-
	Level of Service	**F**	**F**	**D**	**E**	-	-	-	-	-	-	-	-
		F				**-**				**-**			
	Approach From	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Pocket Bike Lane	Mixed Traffic	Mixed Traffic	Mixed Traffic								
	IF Dedicated Right Turn Lane, THEN Right Turn Configuration, ELSE <blank>	≤ 50 m Introduced right turn lane	> 50 m										
	Dedicated Right Turning Speed	≤ 25 km/h	≤ 25 km/h										
	Cyclist Through Movement	**B**	**F**			-	-	-	-	-	-	-	-
	Separated or Mixed Traffic	**Separated**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	-	-	-	-	-	-	-	-
	Left Turn Approach	1 lane crossed	One lane crossed	No lane crossed	One lane crossed								
	Operating Speed	≥ 60 km/h	≥ 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h								
	Left Turning Cyclist	**E**	**F**	**C**	**E**	-	-	-	-	-	-	-	-
	Level of Service	**E**	**F**	**C**	**E**	-	-	-	-	-	-	-	-
		F				**-**				**-**			
Transit	Average Signal Delay	≤ 20 sec	≤ 10 sec										
	Level of Service	**C**	**B**	**-**	**-**	-	-	-	-	-	-	-	-
		C				**-**				**-**			
Truck	Effective Corner Radius	10 - 15 m	< 10 m	< 10 m	10 - 15 m								
	Number of Receiving Lanes on Departure from Intersection	1	1	1	1								
	Level of Service	**E**	**F**	**F**	**E**	-	-	-	-	-	-	-	-
		F				**-**				**-**			
Auto	Volume to Capacity Ratio	0.61 - 0.70											
	Level of Service	**B**				**-**				**-**			

Appendix I – Intersection Control Warrants

IBI

OTM BOOK 12* - TRAFFIC SIGNAL WARRANT

Project: 135 Lusk Street **Date:** October 13, 2021

Project #: 135639

Location: Fallowfield (Major Roadway) at O'Keefe (Minor Roadway)

Orientation: North/South East/West

Municipality: Ottawa **Scenario:** Future (2023) Total Traffic

Justification 1 - Minimum Vehicle Volume

WARRANT	MINIMUM REQUIREMENT				COMPLIANCE								SECTIONAL PERCENT
	FREE FLOW	RESTR. FLOW	ADJUST. FREE FLOW	ADJUST. RESTR. FLOW	7:00 AM	8:00 AM	9:00 AM	10:00 AM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	
A. Vehicle volumes, all approaches	480	720	480	**720**	1666 100%	833 100%	833 100%	833 100%	1596 100%	798 100%	798 100%	798 100%	100%
B. Vehicle volume along minor roads	120	170	120	**170**	148 87%	74 44%	74 44%	74 44%	258 100%	129 76%	129 76%	129 76%	68%

Justification 2 - Delay to Cross Traffic

WARRANT	MINIMUM REQUIREMENT				COMPLIANCE								SECTIONAL PERCENT
	FREE FLOW	RESTR. FLOW	ADJUST. FREE FLOW	ADJUST. RESTR. FLOW	7:00 AM	8:00 AM	9:00 AM	10:00 AM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	
A. Vehicle volumes, along artery	480	720	480	**720**	1518 100%	759 100%	759 100%	759 100%	1338 100%	669 93%	669 93%	669 93%	97%
B. Combined vehicle and pedestrian volume crossing artery from minor roads	50	70	50	**70**	153 100%	39 56%	39 56%	39 56%	130 100%	65 93%	65 93%	65 93%	81%

Justification 3 - Volume/Delay Combination

JUSTIFICATION	SATISFIED TO 80% OR MORE?	BOTH SATISFIED TO 80% OR MORE?
Justification 1 - Minimum Vehicular Volume	NO	NO
Justification 2 - Delay to Cross Traffic	YES	

Justification 7 - Projected Volumes

WARRANT	DESCRIPTION	MINIMUM REQUIREMENT				COMPLIANCE		ENTIRE %
		FREE FLOW	RESTRICTED FLOW	ADJUSTED FREE FLOW	ADJUSTED RESTRICTED FLOW	SECTIONAL AHV	SECTIONAL %	
1. MINIMUM VEHICULAR VOLUME	A. Vehicle volumes, all approaches (Average Hour)	480	720	576	**864**	816	94%	50%
	B. Vehicle volume along minor roads (Average Hour)	120	170	144	**204**	102	50%	
2. DELAY TO CROSS TRAFFIC	A. Vehicle volumes, along artery (Average Hour)	480	720	576	**864**	714	83%	58%
	B. Combined vehicle and pedestrian volume crossing artery from minor roads (Average Hour)	50	75	60	**90**	52	58%	

Projected Traffic Volumes:

Average Hourly Volume (AHV) Equation: AHV = (amPHV + pmPHV)/4

AM Peak Hour Volumes

			↖	←	42
95	↓	8	↙	←	7
↙	683	↘	↙	←	39
	32	↗	↖	↑	↗
	6	→	149	573	9
	22	↘			

PM Peak Hour Volumes

			↖	←	20
24	↓	17	↙	←	1
↙	698	↘	↙	←	9
	119	↗	↖	↑	↗
	2	→	71	505	23
	107	↘			

Average Hourly Volumes (AHV)

			↖	←	16
30	↓	6	↙	←	2
↙	345	↘	↙	←	12
	38	↗	↖	↑	↗
	2	→	55	270	8
	32	↘			

Eight Hour Traffic Volumes:**

Hour	Major Road						Minor Road						Ped*
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
7:00 AM	149	573	9	8	683	95	32	6	22	39	7	42	0
8:00 AM	75	287	5	4	342	48	16	3	11	20	4	21	0
9:00 AM	75	287	5	4	342	48	16	3	11	20	4	21	0
10:00 AM	75	287	5	4	342	48	16	3	11	20	4	21	0
3:00 PM	71	505	23	17	698	24	119	2	107	9	1	20	0
4:00 PM	36	252	12	9	349	12	60	1	54	5	1	10	0
5:00 PM	36	252	12	9	349	12	60	1	54	5	1	10	0
6:00 PM	36	252	12	9	349	12	60	1	54	5	1	10	0

** Number of pedestrians crossing the major road*
*** These are projected 8-hour traffic volumes.*

Notes:

1. Vehicle volume warrant (1A) and (2A) for intersections of roadways having two or more moving lanes in one direction should be 25% higher than the values given above.

1 Lane per Direction

2. Warrant values for free flow apply when the 85th percentile speed of artery traffic equals or exceeds 70 km/h or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000. Warrant values for restricted flow apply to large urban communities when the 85th percentile speed of artery traffic does not exceed 70 km/h.

Restricted Flow

3. The lowest sectional percentage governs the entire warrant.

4. For "T" intersections the warrant values for the minor road should be increased by 50% (Warrant 1B only).

4-legged Intersection

5. All flow values for Justification 1 and 2 are to be increased by 20% in the case of new intersections, Justification 3 is to only be used for existing intersections and all flow values for Warrant 1 and Warrant 2 of Justification 7 are to be increased by 20% for existing intersections and by 50% in the case of new intersections.

Existing Intersection

6. The crossing volumes are defined as the sum of:
   (a) Left-turns from both minor road approaches.
   (b) The heaviest through volume from the minor road.
   (c) 50% of the heavier left turn movement from major road when both of the following are met:
      (i) the left-turn volume >120 vph
      (ii) the left-turn volume plus the opposing volume >720 vph
   (d) Pedestrians crossing the main road.

CONCLUSION: **The intersection does NOT meet the minimum warrants for traffic control signals.**

* "Ontario Traffic Manual, Book 12 (March 2012)", Ontario Ministry of Transportation.

IBI

OTM BOOK 12* - TRAFFIC SIGNAL WARRANT

Project: 135 Lusk Street **Date:** October 13, 2021

Project #: 135639

Location: Fallowfield (Major Roadway) at O'Keefe (Minor Roadway)

Orientation: North/South East/West

Municipality: Ottawa **Scenario:** Future (2028) Total Traffic

Justification 1 - Minimum Vehicle Volume

WARRANT	MINIMUM REQUIREMENT				COMPLIANCE								SECTIONAL PERCENT
	FREE FLOW	RESTR. FLOW	ADJUST. FREE FLOW	ADJUST. RESTR. FLOW	7:00 AM	8:00 AM	9:00 AM	10:00 AM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	
A. Vehicle volumes, all approaches	480	720	480	**720**	1949 100%	974 100%	974 100%	974 100%	1834 100%	917 100%	917 100%	917 100%	100%
B. Vehicle volume along minor roads	120	170	120	**170**	148 87%	74 44%	74 44%	74 44%	258 100%	129 76%	129 76%	129 76%	68%

Justification 2 - Delay to Cross Traffic

WARRANT	MINIMUM REQUIREMENT				COMPLIANCE								SECTIONAL PERCENT
	FREE FLOW	RESTR. FLOW	ADJUST. FREE FLOW	ADJUST. RESTR. FLOW	7:00 AM	8:00 AM	9:00 AM	10:00 AM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	
A. Vehicle volumes, along artery	480	720	480	**720**	1801 100%	900 100%	900 100%	900 100%	1576 100%	788 100%	788 100%	788 100%	100%
B. Combined vehicle and pedestrian volume crossing artery from minor roads	50	70	50	**70**	153 100%	39 56%	39 56%	39 56%	130 100%	65 93%	65 93%	65 93%	81%

Justification 3 - Volume/Delay Combination

JUSTIFICATION	SATISFIED TO 80% OR MORE?	BOTH SATISFIED TO 80% OR MORE?
Justification 1 - Minimum Vehicular Volume	NO	NO
Justification 2 - Delay to Cross Traffic	YES	

Justification 7 - Projected Volumes

WARRANT	DESCRIPTION	MINIMUM REQUIREMENT				COMPLIANCE		
		FREE FLOW	RESTRICTED FLOW	ADJUSTED FREE FLOW	ADJUSTED RESTRICTED FLOW	SECTIONAL AHV	SECTIONAL %	ENTIRE %
1. MINIMUM VEHICULAR VOLUME	A. Vehicle volumes, all approaches (Average Hour)	480	720	576	**864**	946	100%	50%
	B. Vehicle volume along minor roads (Average Hour)	120	170	144	**204**	102	50%	
2. DELAY TO CROSS TRAFFIC	A. Vehicle volumes, along artery (Average Hour)	480	720	576	**864**	844	98%	58%
	B. Combined vehicle and pedestrian volume crossing artery from minor roads (Average Hour)	50	75	60	**90**	52	58%	

Projected Traffic Volumes:

Average Hourly Volume (AHV) Equation: AHV = (amPHV + pmPHV)/4

AM Peak Hour Volumes

			↖	←	42
95	892	8	↙	←	7
↙	↓	↘	↙	←	39
	32	↗	↖	↑	↗
	6	→	149	648	9
	22	↘			

PM Peak Hour Volumes

			↖	←	20
24	778	17	↙	←	1
↙	↓	↘	↙	←	9
	119	↗	↖	↑	↗
	2	→	71	663	23
	107	↘			

Average Hourly Volumes (AHV)

			↖	←	16
30	417	6	↙	←	2
↙	↓	↘	↙	←	12
	38	↗	↖	↑	↗
	2	→	55	328	8
	32	↘			

Eight Hour Traffic Volumes:

Hour	Major Road						Minor Road						Ped*
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
7:00 AM	149	648	9	8	892	95	32	6	22	39	7	42	0
8:00 AM	75	324	5	4	446	48	16	3	11	20	4	21	0
9:00 AM	75	324	5	4	446	48	16	3	11	20	4	21	0
10:00 AM	75	324	5	4	446	48	16	3	11	20	4	21	0
3:00 PM	71	663	23	17	778	24	119	2	107	9	1	20	0
4:00 PM	36	332	12	9	389	12	60	1	54	5	1	10	0
5:00 PM	36	332	12	9	389	12	60	1	54	5	1	10	0
6:00 PM	36	332	12	9	389	12	60	1	54	5	1	10	0

** Number of pedestrians crossing the major road*

Notes:

1. Vehicle volume warrant (1A) and (2A) for intersections of roadways having two or more moving lanes in one direction should be 25% higher than the values given above.

1 Lane per Direction

2. Warrant values for free flow apply when the 85th percentile speed of artery traffic equals or exceeds 70 km/h or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000. Warrant values for restricted flow apply to large urban communities when the 85th percentile speed of artery traffic does not exceed 70 km/h.

Restricted Flow

3. The lowest sectional percentage governs the entire warrant.

4. For "T" intersections the warrant values for the minor road should be increased by 50% (Warrant 1B only).

4-legged Intersection

5. All flow values for Justification 1 and 2 are to be increased by 20% in the case of new intersections, Justification 3 is to only be used for existing intersections and all flow values for Warrant 1 and Warrant 2 of Justification 7 are to be increased by 20% for existing intersections and by 50% in the case of new intersections.

Existing Intersection

6. The crossing volumes are defined as the sum of:
   - (a) Left-turns from both minor road approaches.
   - (b) The heaviest through volume from the minor road.
   - (c) 50% of the heavier left turn movement from major road when both of the following are met:
     - (i) the left-turn volume >120 vph
     - (ii) the left-turn volume plus the opposing volume >720 vph
   - (d) Pedestrians crossing the main road.

CONCLUSION: **The intersection does NOT meet the minimum warrants for traffic control signals.**

* "Ontario Traffic Manual, Book 12 (March 2012)", Ontario Ministry of Transportation.

City of Ottawa
Roundabout Initial Feasability Screening Tool

The intent of this screening tool is to provide a relatively quick assessment of the feasibility of a roundabout at a particular intersection in comparison to other appropriate forms of traffic control or road modifications including all-way stop control, traffic signals, auxiliary lanes, etc. The intended outcome of this tool is to provide enough information to assist staff in deciding whether or not to proceed with an Intersection Control Study to investigate the feasibility of a roundabout in more detail.

1	Project Name:	115 Lusk Street - Transportation Impact Assessment
2	Intersection:	Fallowfield Road & O'Keefe Court / Cobble Hill Drive
3	Location and Description of Intersection: Lane Configuration, total or approach AADT, distance to nearby intersection(s), etc. Attach or sketch a diagram and include existing and/or horizon-year turning movements. If an existing intersection then indicate type of control	The intersection is currently configured as a two-way stop-controlled intersection with free-flow on Fallowfield Road.
4	What traditional modifications are proposed? All-way stop control, traffic signals, auxiliary lanes, etc. Attach or sketch a diagram if necessary.	Traffic signals.
5	What size of roundabout is being considered? Describe, and attach a Roundabout Traffic Flow Worksheet	Multi-lane roundabout.
6	Why is a roundabout being considered?	As an alternative to traffic signals.

7 Are there contra-indications for a roundabout?

If "Yes" is indicated for one or more of the contra-indications then a roundabout may be problematic at the subject intersection. That is not to say that a

No.	Contra-Indication	Outcome
1	Is there insufficient property at the intersection (i.e. less than 44 metres diameter if considering a single-lane roundabout, and less than 60 metres if considering a two-lane roundabout) or property constraints that would require demolition of adjacent structures?	Yes ☐ No ☒
2	Are there any instances where stopping sight distance (SSD) of a roundabout yield line may not be attainable (i.e. the intersection is on a crest vertical curve)?	Yes ☐ No ☒
3	Is there an existing uncontrolled approach with a grade in excess of 4 percent?	Yes ☐ No ☒
4	Is the intersection located within a coordinated signal system?	Yes ☐ No ☒
5	Is there a closely-spaced traffic signal or railway crossing that could not be controlled with a nearby roundabout?	Yes ☐ No ☒
6	Are significant differences in directional flows or any situations of sudden high demand expected?	Yes ☐ No ☒
7	Are there known visually-impaired pedestrians that cross this intersection?	Yes ☐ No ☒

8 Are there suitability factors for a roundabout?

If "Yes" is indicated for two or more of the suitability factors then a roundabout should be technically feasible at the subject intersection..

No.	Suitability Factor	Outcome
1	Does the intersection currently experience an average collision frequency of more than 1.5 injury crashes per year, or a collision rate in excess of 1 injury crash per 1 million vehicles entering (MVE)?	Yes ☐ No ☒
2	Has there been a fatal crash at the intersection in the last 10 years?	Yes ☐ No ☒
3	Are capacity problems currently being experienced, or expected in the future?	Yes ☒ No ☐
4	Are traffic signals warranted, or expected to be warranted in the future?	Yes ☐ No ☒
5	Does the intersection have more than 4 legs, or unusual geometry?	Yes ☐ No ☒
6	Will Planned modifications to the intersection require that nearby structures be widened (i.e. to accommodate left-turn lanes)?	Yes ☐ No ☒
7	Is the intersection located at a transition between rural and urban environments (i.e. an urban boundary) such that a roundabout could act as a means of speed transition?	Yes ☐ No ☒

9	Conclusions/recommendation whether to proceed with an Intersection Control Study:	The results of the Roundabout Screening Tool indicate that the a roundabout is not feasible or recommended at the intersection of Fallowfield & O'Keefe/ Cobble Hill, given that only one of the suitability factors is met.

Appendix J – Intersection Capacity Analyses

Existing (2021) Traffic

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	6	9	39	7	42	23	515	9	8	480	12
Future Vol, veh/h	12	6	9	39	7	42	23	515	9	8	480	12
Conflicting Peds, #/hr	0	0	1	1	0	0	1	0	1	1	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	500	-	-	-	-	-	1400	-	0	600	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	11	3	14	0	0	5	56	12	4	0
Mvmt Flow	13	7	10	43	8	47	26	572	10	9	533	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1209	1187	535	1192	1190	573	547	0	0	583	0	0
Stage 1	552	552	-	625	625	-	-	-	-	-	-	-
Stage 2	657	635	-	567	565	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.31	7.13	6.64	6.2	4.1	-	-	4.22	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.13	5.64	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.13	5.64	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.399	3.527	4.126	3.3	2.2	-	-	2.308	-	-
Pot Cap-1 Maneuver	161	190	528	163	178	523	1033	-	-	944	-	-
Stage 1	522	518	-	471	459	-	-	-	-	-	-	-
Stage 2	457	476	-	507	489	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	138	183	527	151	171	522	1032	-	-	943	-	-
Mov Cap-2 Maneuver	138	183	-	151	171	-	-	-	-	-	-	-
Stage 1	508	512	-	459	447	-	-	-	-	-	-	-
Stage 2	399	464	-	486	484	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	24.9	31.4	0.4	0.1
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1032	-	-	138	301	232	943	-	-
HCM Lane V/C Ratio	0.025	-	-	0.097	0.055	0.421	0.009	-	-
HCM Control Delay (s)	8.6	-	-	33.9	17.7	31.4	8.9	-	-
HCM Lane LOS	A	-	-	D	C	D	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.2	2	0	-	-

Intersection	
Int Delay, s/veh	7.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	0	0	25	0	0	23
Future Vol, veh/h	0	0	25	0	0	23
Conflicting Peds, #/hr	0	1	1	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	6	0	0	6	0	0
Mvmt Flow	0	0	28	0	0	26

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	2	0	58	2
Stage 1	-	-	-	-	2	-
Stage 2	-	-	-	-	56	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1634	-	954	1088
Stage 1	-	-	-	-	1026	-
Stage 2	-	-	-	-	972	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1632	-	937	1087
Mov Cap-2 Maneuver	-	-	-	-	937	-
Stage 1	-	-	-	-	1025	-
Stage 2	-	-	-	-	955	-

Approach	EB	WB	NB
HCM Control Delay, s	0	7.2	8.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1087	-	-	1632	-
HCM Lane V/C Ratio	0.024	-	-	0.017	-
HCM Control Delay (s)	8.4	-	-	7.2	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	13	0	547	520	8
Future Vol, veh/h	0	13	0	547	520	8
Conflicting Peds, #/hr	0	0	1	0	0	1
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	6	4	0
Mvmt Flow	0	14	0	608	578	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	579	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.2	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	519	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	518	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.1	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	518	-	-
HCM Lane V/C Ratio	-	0.028	-	-
HCM Control Delay (s)	-	12.1	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	2	13	9	1	20	30	350	23	17	608	13
Future Vol, veh/h	19	2	13	9	1	20	30	350	23	17	608	13
Conflicting Peds, #/hr	2	0	0	0	0	2	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	500	-	-	-	-	-	1400	-	0	600	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	0	0	0	4	0	6	4	0
Mvmt Flow	21	2	14	10	1	22	33	389	26	19	676	14

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1196	1195	676	1184	1183	391	690	0	0	415	0	0
Stage 1	714	714	-	455	455	-	-	-	-	-	-	-
Stage 2	482	481	-	729	728	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.16	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.254	-	-
Pot Cap-1 Maneuver	164	188	457	168	191	662	914	-	-	1123	-	-
Stage 1	425	438	-	589	572	-	-	-	-	-	-	-
Stage 2	569	557	-	417	432	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	151	178	457	155	181	661	914	-	-	1123	-	-
Mov Cap-2 Maneuver	151	178	-	155	181	-	-	-	-	-	-	-
Stage 1	410	431	-	568	551	-	-	-	-	-	-	-
Stage 2	528	537	-	395	425	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	24.9	17.6	0.7	0.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	914	-	-	151	378	320	1123	-	-
HCM Lane V/C Ratio	0.036	-	-	0.14	0.044	0.104	0.017	-	-
HCM Control Delay (s)	9.1	-	-	32.7	15	17.6	8.3	-	-
HCM Lane LOS	A	-	-	D	C	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.5	0.1	0.3	0.1	-	-

Intersection	
Int Delay, s/veh	7.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	0	0	26	0	0	14
Future Vol, veh/h	0	0	26	0	0	14
Conflicting Peds, #/hr	0	2	2	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	29	0	0	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	3	0	61	3
Stage 1	-	-	-	-	3	-
Stage 2	-	-	-	-	58	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1632	-	950	1087
Stage 1	-	-	-	-	1025	-
Stage 2	-	-	-	-	970	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1629	-	931	1085
Mov Cap-2 Maneuver	-	-	-	-	931	-
Stage 1	-	-	-	-	1023	-
Stage 2	-	-	-	-	953	-

Approach	EB	WB	NB
HCM Control Delay, s	0	7.3	8.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1085	-	-	1629	-
HCM Lane V/C Ratio	0.014	-	-	0.018	-
HCM Control Delay (s)	8.4	-	-	7.2	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	17	0	403	623	7
Future Vol, veh/h	0	17	0	403	623	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	3	4	0
Mvmt Flow	0	19	0	448	692	8

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	692	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.2	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	447	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	447	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.4	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	447	-	-
HCM Lane V/C Ratio	-	0.042	-	-
HCM Control Delay (s)	-	13.4	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.1	-	-

Future (2023) Background Traffic

Intersection	
Int Delay, s/veh	7.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	6	22	39	7	42	134	573	9	8	673	95
Future Vol, veh/h	25	6	22	39	7	42	134	573	9	8	673	95
Conflicting Peds, #/hr	0	0	1	1	0	0	1	0	1	1	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	500	-	-	-	-	-	1400	-	0	600	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	11	3	14	0	0	5	56	12	4	0
Mvmt Flow	25	6	22	39	7	42	134	573	9	8	673	95

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1560	1541	675	1594	1627	574	769	0	0	583	0	0
Stage 1	690	690	-	842	842	-	-	-	-	-	-	-
Stage 2	870	851	-	752	785	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.31	7.13	6.64	6.2	4.1	-	-	4.22	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.13	5.64	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.13	5.64	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.399	3.527	4.126	3.3	2.2	-	-	2.308	-	-
Pot Cap-1 Maneuver	92	116	439	86	96	522	854	-	-	944	-	-
Stage 1	439	449	-	357	364	-	-	-	-	-	-	-
Stage 2	349	379	-	401	387	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	69	97	438	68	80	521	853	-	-	943	-	-
Mov Cap-2 Maneuver	69	97	-	68	80	-	-	-	-	-	-	-
Stage 1	370	445	-	301	306	-	-	-	-	-	-	-
Stage 2	264	319	-	372	384	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	51	92.8	1.9	0.1
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	853	-	-	69	250	119	943	-	-
HCM Lane V/C Ratio	0.157	-	-	0.362	0.112	0.739	0.008	-	-
HCM Control Delay (s)	10	-	-	84.3	21.2	92.8	8.8	-	-
HCM Lane LOS	B	-	-	F	C	F	A	-	-
HCM 95th %tile Q(veh)	0.6	-	-	1.4	0.4	4.1	0	-	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	23	0	50	169	0	26
Future Vol, veh/h	23	0	50	169	0	26
Conflicting Peds, #/hr	0	1	1	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	6	0	0	6	0	0
Mvmt Flow	23	0	50	169	0	26

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	24	0	293	24
Stage 1	-	-	-	-	24	-
Stage 2	-	-	-	-	269	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1604	-	702	1058
Stage 1	-	-	-	-	1004	-
Stage 2	-	-	-	-	781	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1602	-	677	1057
Mov Cap-2 Maneuver	-	-	-	-	677	-
Stage 1	-	-	-	-	1003	-
Stage 2	-	-	-	-	754	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.7	8.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1057	-	-	1602	-
HCM Lane V/C Ratio	0.025	-	-	0.031	-
HCM Control Delay (s)	8.5	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

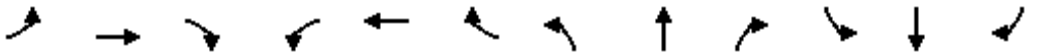
Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	18	0	717	725	11
Future Vol, veh/h	0	18	0	717	725	11
Conflicting Peds, #/hr	0	0	1	0	0	1
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	6	4	0
Mvmt Flow	0	18	0	717	725	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	726	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.2	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	428	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	428	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	428	-	-
HCM Lane V/C Ratio	-	0.042	-	-
HCM Control Delay (s)	-	13.8	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.1	-	-

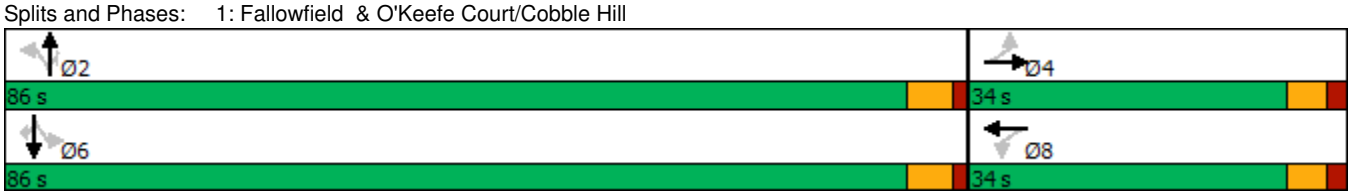


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	6	22	39	7	42	134	573	9	8	673	95
Future Volume (vph)	25	6	22	39	7	42	134	573	9	8	673	95
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	50.0		0.0	0.0		0.0	140.0		0.0	60.0		25.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98			1.00		1.00		0.98	1.00		0.98
Frt		0.882			0.936				0.850			0.850
Flt Protected	0.950				0.978		0.950			0.950		
Satd. Flow (prot)	1729	1452	0	0	1626	0	1729	1733	992	1544	1750	1547
Flt Permitted	0.677				0.844		0.381			0.430		
Satd. Flow (perm)	1232	1452	0	0	1402	0	693	1733	969	698	1750	1512
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			36				23			55
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		201.1			305.1			207.2			300.4	
Travel Time (s)		14.5			22.0			12.4			18.0	
Confl. Peds. (#/hr)			1	1			1		1	1		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	11%	3%	14%	0%	0%	5%	56%	12%	4%	0%
Adj. Flow (vph)	25	6	22	39	7	42	134	573	9	8	673	95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	25	28	0	0	88	0	134	573	9	8	673	95
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	33.5	33.5		33.5	33.5		27.4	27.4	27.4	27.4	27.4	27.4
Total Split (s)	34.0	34.0		34.0	34.0		86.0	86.0	86.0	86.0	86.0	86.0
Total Split (%)	28.3%	28.3%		28.3%	28.3%		71.7%	71.7%	71.7%	71.7%	71.7%	71.7%
Maximum Green (s)	28.5	28.5		28.5	28.5		80.6	80.6	80.6	80.6	80.6	80.6
Yellow Time (s)	3.6	3.6		3.6	3.6		4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	1.9	1.9		1.9	1.9		1.3	1.3	1.3	1.3	1.3	1.3
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5			5.5		5.4	5.4	5.4	5.4	5.4	5.4
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	21.0	21.0		21.0	21.0		15.0	15.0	15.0	15.0	15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	9.4	9.4			9.4		88.4	88.4	88.4	88.4	88.4	88.4
Actuated g/C Ratio	0.09	0.09			0.09		0.84	0.84	0.84	0.84	0.84	0.84
v/c Ratio	0.23	0.19			0.56		0.23	0.39	0.01	0.01	0.46	0.07

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	47.6	22.9			41.6		3.9	3.9	0.4	2.8	4.5	1.4
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.6	22.9			41.6		3.9	3.9	0.4	2.8	4.5	1.4
LOS	D	C			D		A	A	A	A	A	A
Approach Delay		34.5			41.6			3.9			4.1	
Approach LOS		C			D			A			A	
Queue Length 50th (m)	4.8	1.1			10.1		5.0	25.6	0.0	0.3	32.6	1.2
Queue Length 95th (m)	12.6	9.2			24.7		13.0	49.5	0.4	1.4	63.0	5.0
Internal Link Dist (m)		177.1			281.1			183.2			276.4	
Turn Bay Length (m)	50.0						140.0			60.0		25.0
Base Capacity (vph)	333	409			406		581	1454	816	585	1468	1277
Starvation Cap Reductn	0	0			0		0	0	0	0	0	0
Spillback Cap Reductn	0	0			0		0	0	0	0	0	0
Storage Cap Reductn	0	0			0		0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.07			0.22		0.23	0.39	0.01	0.01	0.46	0.07

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 105.3			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.56			
Intersection Signal Delay: 7.0		Intersection LOS: A	
Intersection Capacity Utilization 70.9%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Fallowfield & O'Keefe Court/Cobble Hill



Intersection	
Int Delay, s/veh	12.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	109	2	107	9	1	20	55	505	23	17	687	24
Future Vol, veh/h	109	2	107	9	1	20	55	505	23	17	687	24
Conflicting Peds, #/hr	2	0	0	0	0	2	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	500	-	-	-	-	-	1400	-	0	600	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	4	0	6	4	0
Mvmt Flow	109	2	107	9	1	20	55	505	23	17	687	24

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1360	1359	687	1403	1360	507	711	0	0	528	0	0
Stage 1	721	721	-	615	615	-	-	-	-	-	-	-
Stage 2	639	638	-	788	745	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.16	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.254	-	-
Pot Cap-1 Maneuver	127	150	450	118	150	570	898	-	-	1019	-	-
Stage 1	422	435	-	482	485	-	-	-	-	-	-	-
Stage 2	468	474	-	387	424	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	114	138	450	84	138	569	898	-	-	1019	-	-
Mov Cap-2 Maneuver	114	138	-	84	138	-	-	-	-	-	-	-
Stage 1	396	428	-	453	455	-	-	-	-	-	-	-
Stage 2	422	445	-	289	417	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	79.9	26	0.9	0.2
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	898	-	-	114	432	201	1019	-	-
HCM Lane V/C Ratio	0.061	-	-	0.956	0.252	0.149	0.017	-	-
HCM Control Delay (s)	9.3	-	-	143.7	16.1	26	8.6	-	-
HCM Lane LOS	A	-	-	F	C	D	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	6.1	1	0.5	0.1	-	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	171	0	39	23	0	27
Future Vol, veh/h	171	0	39	23	0	27
Conflicting Peds, #/hr	0	2	2	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	171	0	39	23	0	27

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	173	0	274	173
Stage 1	-	-	-	-	173	-
Stage 2	-	-	-	-	101	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1416	-	720	876
Stage 1	-	-	-	-	862	-
Stage 2	-	-	-	-	928	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1413	-	698	874
Mov Cap-2 Maneuver	-	-	-	-	698	-
Stage 1	-	-	-	-	860	-
Stage 2	-	-	-	-	902	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.8	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	874	-	-	1413	-
HCM Lane V/C Ratio	0.031	-	-	0.028	-
HCM Control Delay (s)	9.3	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	38	0	584	790	14
Future Vol, veh/h	0	38	0	584	790	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	3	4	0
Mvmt Flow	0	38	0	584	790	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	790	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.2	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	393	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	393	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.1	0	0
HCM LOS	C		

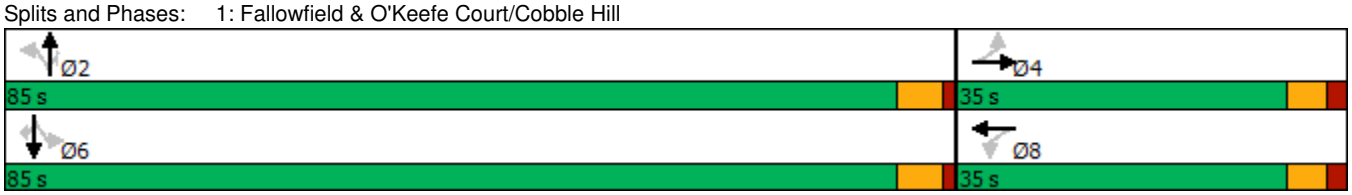
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	393	-	-
HCM Lane V/C Ratio	-	0.097	-	-
HCM Control Delay (s)	-	15.1	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.3	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	109	2	107	9	1	20	55	505	23	17	687	24
Future Volume (vph)	109	2	107	9	1	20	55	505	23	17	687	24
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	50.0		0.0	0.0		0.0	140.0		0.0	60.0		25.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				0.98							
Frt		0.853			0.910				0.850			0.850
Flt Protected	0.950				0.985		0.950			0.950		
Satd. Flow (prot)	1729	1552	0	0	1605	0	1729	1750	1547	1631	1750	1547
Flt Permitted	0.738				0.901		0.355			0.453		
Satd. Flow (perm)	1338	1552	0	0	1468	0	646	1750	1547	778	1750	1547
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		107			20				23			23
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		201.1			305.1			207.2			300.4	
Travel Time (s)		14.5			22.0			12.4			18.0	
Confl. Peds. (#/hr)	2					2						
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	6%	4%	0%
Adj. Flow (vph)	109	2	107	9	1	20	55	505	23	17	687	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	109	109	0	0	30	0	55	505	23	17	687	24
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	33.5	33.5		33.5	33.5		27.4	27.4	27.4	27.4	27.4	27.4
Total Split (s)	35.0	35.0		35.0	35.0		85.0	85.0	85.0	85.0	85.0	85.0
Total Split (%)	29.2%	29.2%		29.2%	29.2%		70.8%	70.8%	70.8%	70.8%	70.8%	70.8%
Maximum Green (s)	29.5	29.5		29.5	29.5		79.6	79.6	79.6	79.6	79.6	79.6
Yellow Time (s)	3.6	3.6		3.6	3.6		4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	1.9	1.9		1.9	1.9		1.3	1.3	1.3	1.3	1.3	1.3
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5			5.5		5.4	5.4	5.4	5.4	5.4	5.4
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	21.0	21.0		21.0	21.0		15.0	15.0	15.0	15.0	15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	14.0	14.0			14.0		82.6	82.6	82.6	82.6	82.6	82.6
Actuated g/C Ratio	0.13	0.13			0.13		0.77	0.77	0.77	0.77	0.77	0.77
v/c Ratio	0.63	0.37			0.14		0.11	0.38	0.02	0.03	0.51	0.02

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	59.4	11.8			22.5		4.5	5.5	1.7	4.0	6.9	1.7
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.4	11.8			22.5		4.5	5.5	1.7	4.0	6.9	1.7
LOS	E	B			C		A	A	A	A	A	A
Approach Delay		35.6			22.5			5.2			6.7	
Approach LOS		D			C			A			A	
Queue Length 50th (m)	21.2	0.4			1.8		2.4	27.9	0.0	0.7	44.5	0.1
Queue Length 95th (m)	38.5	14.9			9.8		7.3	53.8	2.1	2.8	85.4	2.2
Internal Link Dist (m)		177.1			281.1			183.2			276.4	
Turn Bay Length (m)	50.0						140.0			60.0		25.0
Base Capacity (vph)	367	504			417		496	1345	1194	598	1345	1194
Starvation Cap Reductn	0	0			0		0	0	0	0	0	0
Spillback Cap Reductn	0	0			0		0	0	0	0	0	0
Storage Cap Reductn	0	0			0		0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.22			0.07		0.11	0.38	0.02	0.03	0.51	0.02

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 107.5			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.63			
Intersection Signal Delay: 10.5		Intersection LOS: B	
Intersection Capacity Utilization 69.0%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Fallowfield & O'Keefe Court/Cobble Hill



Future (2028) Background Traffic

Intersection	
Int Delay, s/veh	16.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	6	22	39	7	42	134	648	9	8	882	95
Future Vol, veh/h	25	6	22	39	7	42	134	648	9	8	882	95
Conflicting Peds, #/hr	0	0	1	1	0	0	1	0	1	1	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	500	-	-	-	-	-	1400	-	0	600	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	11	3	14	0	0	5	56	12	4	0
Mvmt Flow	25	6	22	39	7	42	134	648	9	8	882	95

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1844	1825	884	1878	1911	649	978	0	0	658	0	0
Stage 1	899	899	-	917	917	-	-	-	-	-	-	-
Stage 2	945	926	-	961	994	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.31	7.13	6.64	6.2	4.1	-	-	4.22	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.13	5.64	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.13	5.64	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.399	3.527	4.126	3.3	2.2	-	-	2.308	-	-
Pot Cap-1 Maneuver	58	78	332	54	63	473	714	-	-	884	-	-
Stage 1	336	360	-	325	335	-	-	-	-	-	-	-
Stage 2	317	350	-	307	308	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	40	63	331	40	51	473	713	-	-	883	-	-
Mov Cap-2 Maneuver	40	63	-	40	51	-	-	-	-	-	-	-
Stage 1	272	356	-	264	272	-	-	-	-	-	-	-
Stage 2	229	284	-	279	305	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	105.7	270.5	1.9	0.1
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	713	-	-	40	173	73	883	-	-
HCM Lane V/C Ratio	0.188	-	-	0.625	0.162	1.205	0.009	-	-
HCM Control Delay (s)	11.2	-	-	190.7	29.8	270.5	9.1	-	-
HCM Lane LOS	B	-	-	F	D	F	A	-	-
HCM 95th %tile Q(veh)	0.7	-	-	2.3	0.6	6.8	0	-	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	23	0	50	169	0	26
Future Vol, veh/h	23	0	50	169	0	26
Conflicting Peds, #/hr	0	1	1	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	6	0	0	6	0	0
Mvmt Flow	23	0	50	169	0	26

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	24	0	293	24
Stage 1	-	-	-	-	24	-
Stage 2	-	-	-	-	269	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1604	-	702	1058
Stage 1	-	-	-	-	1004	-
Stage 2	-	-	-	-	781	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1602	-	677	1057
Mov Cap-2 Maneuver	-	-	-	-	677	-
Stage 1	-	-	-	-	1003	-
Stage 2	-	-	-	-	754	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.7	8.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1057	-	-	1602	-
HCM Lane V/C Ratio	0.025	-	-	0.031	-
HCM Control Delay (s)	8.5	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

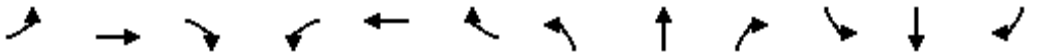
Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	18	0	793	938	11
Future Vol, veh/h	0	18	0	793	938	11
Conflicting Peds, #/hr	0	0	1	0	0	1
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	6	4	0
Mvmt Flow	0	18	0	793	938	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	939	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.2	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	323	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	323	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.8	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	323	-	-
HCM Lane V/C Ratio	-	0.056	-	-
HCM Control Delay (s)	-	16.8	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

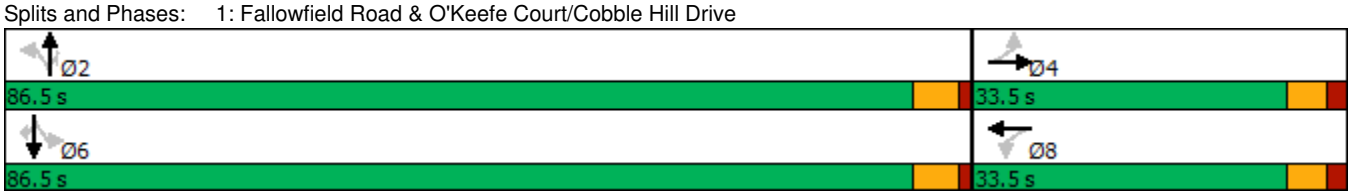


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	6	22	39	7	42	134	648	9	8	882	95
Future Volume (vph)	25	6	22	39	7	42	134	648	9	8	882	95
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	50.0		0.0	0.0		0.0	140.0		0.0	60.0		25.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98			1.00				0.98	1.00		0.98
Frt		0.882			0.936				0.850			0.850
Flt Protected	0.950				0.978		0.950			0.950		
Satd. Flow (prot)	1729	1452	0	0	1626	0	1729	1733	992	1544	1750	1547
Flt Permitted	0.675				0.844		0.286			0.393		
Satd. Flow (perm)	1228	1452	0	0	1402	0	521	1733	969	638	1750	1512
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			36				23			43
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		201.1			305.1			207.2			300.4	
Travel Time (s)		14.5			22.0			12.4			18.0	
Confl. Peds. (#/hr)			1	1			1		1	1		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	11%	3%	14%	0%	0%	5%	56%	12%	4%	0%
Adj. Flow (vph)	25	6	22	39	7	42	134	648	9	8	882	95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	25	28	0	0	88	0	134	648	9	8	882	95
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	33.5	33.5		33.5	33.5		27.4	27.4	27.4	27.4	27.4	27.4
Total Split (s)	33.5	33.5		33.5	33.5		86.5	86.5	86.5	86.5	86.5	86.5
Total Split (%)	27.9%	27.9%		27.9%	27.9%		72.1%	72.1%	72.1%	72.1%	72.1%	72.1%
Maximum Green (s)	28.0	28.0		28.0	28.0		81.1	81.1	81.1	81.1	81.1	81.1
Yellow Time (s)	3.6	3.6		3.6	3.6		4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	1.9	1.9		1.9	1.9		1.3	1.3	1.3	1.3	1.3	1.3
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5			5.5		5.4	5.4	5.4	5.4	5.4	5.4
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	21.0	21.0		21.0	21.0		15.0	15.0	15.0	15.0	15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	9.5	9.5			9.5		88.8	88.8	88.8	88.8	88.8	88.8
Actuated g/C Ratio	0.09	0.09			0.09		0.84	0.84	0.84	0.84	0.84	0.84
v/c Ratio	0.23	0.19			0.56		0.31	0.45	0.01	0.01	0.60	0.07

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	47.9	23.0			41.8		5.2	4.4	0.4	2.8	6.3	1.7
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.9	23.0			41.8		5.2	4.4	0.4	2.8	6.3	1.7
LOS	D	C			D		A	A	A	A	A	A
Approach Delay		34.7			41.8			4.5			5.8	
Approach LOS		C			D			A			A	
Queue Length 50th (m)	4.8	1.1			10.2		5.4	31.0	0.0	0.3	53.0	1.6
Queue Length 95th (m)	12.7	9.2			24.9		15.4	60.1	0.5	1.4	105.6	5.5
Internal Link Dist (m)		177.1			281.1			183.2			276.4	
Turn Bay Length (m)	50.0						140.0			60.0		25.0
Base Capacity (vph)	325	400			397		437	1455	817	535	1469	1276
Starvation Cap Reductn	0	0			0		0	0	0	0	0	0
Spillback Cap Reductn	0	0			0		0	0	0	0	0	0
Storage Cap Reductn	0	0			0		0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.07			0.22		0.31	0.45	0.01	0.01	0.60	0.07

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 105.8			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.60			
Intersection Signal Delay: 7.7		Intersection LOS: A	
Intersection Capacity Utilization 82.5%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 1: Fallowfield Road & O'Keefe Court/Cobble Hill Drive



Intersection	
Int Delay, s/veh	22.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	109	2	107	9	1	20	55	663	23	17	767	24
Future Vol, veh/h	109	2	107	9	1	20	55	663	23	17	767	24
Conflicting Peds, #/hr	2	0	0	0	0	2	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	500	-	-	-	-	-	1400	-	0	600	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	4	0	6	4	0
Mvmt Flow	109	2	107	9	1	20	55	663	23	17	767	24

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1598	1597	767	1641	1598	665	791	0	0	686	0	0
Stage 1	801	801	-	773	773	-	-	-	-	-	-	-
Stage 2	797	796	-	868	825	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.16	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.254	-	-
Pot Cap-1 Maneuver	~ 87	108	405	81	107	464	838	-	-	889	-	-
Stage 1	381	400	-	395	412	-	-	-	-	-	-	-
Stage 2	383	402	-	350	390	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 77	99	405	55	98	463	838	-	-	889	-	-
Mov Cap-2 Maneuver	~ 77	99	-	55	98	-	-	-	-	-	-	-
Stage 1	356	392	-	369	385	-	-	-	-	-	-	-
Stage 2	341	375	-	251	383	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	179.8	38.2	0.7	0.2
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	838	-	-	77	383	138	889	-	-
HCM Lane V/C Ratio	0.066	-	-	1.416	0.285	0.217	0.019	-	-
HCM Control Delay (s)	9.6	-	-	$ 341.5	18.1	38.2	9.1	-	-
HCM Lane LOS	A	-	-	F	C	E	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	8.7	1.2	0.8	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	2.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	171	0	39	23	0	27
Future Vol, veh/h	171	0	39	23	0	27
Conflicting Peds, #/hr	0	2	2	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	171	0	39	23	0	27

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	173	0	274	173
Stage 1	-	-	-	-	173	-
Stage 2	-	-	-	-	101	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1416	-	720	876
Stage 1	-	-	-	-	862	-
Stage 2	-	-	-	-	928	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1413	-	698	874
Mov Cap-2 Maneuver	-	-	-	-	698	-
Stage 1	-	-	-	-	860	-
Stage 2	-	-	-	-	902	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.8	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	874	-	-	1413	-
HCM Lane V/C Ratio	0.031	-	-	0.028	-
HCM Control Delay (s)	9.3	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	38	0	746	872	14
Future Vol, veh/h	0	38	0	746	872	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	3	4	0
Mvmt Flow	0	38	0	746	872	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	872	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.2	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	353	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	353	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.4	0	0
HCM LOS	C		

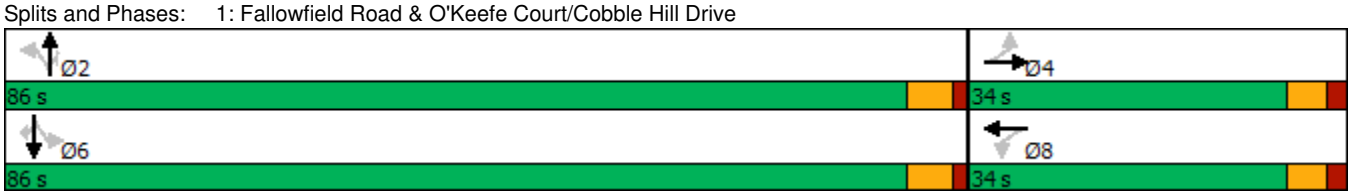
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	353	-	-
HCM Lane V/C Ratio	-	0.108	-	-
HCM Control Delay (s)	-	16.4	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.4	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	109	2	107	9	1	20	55	663	23	17	767	24
Future Volume (vph)	109	2	107	9	1	20	55	663	23	17	767	24
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	50.0		0.0	0.0		0.0	140.0		0.0	60.0		25.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				0.98							
Frt		0.853			0.910				0.850			0.850
Flt Protected	0.950				0.985		0.950			0.950		
Satd. Flow (prot)	1729	1552	0	0	1605	0	1729	1750	1547	1631	1750	1547
Flt Permitted	0.738				0.901		0.316			0.368		
Satd. Flow (perm)	1338	1552	0	0	1468	0	575	1750	1547	632	1750	1547
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		107			20				23			23
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		201.1			305.1			207.2			300.4	
Travel Time (s)		14.5			22.0			12.4			18.0	
Confl. Peds. (#/hr)	2					2						
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	6%	4%	0%
Adj. Flow (vph)	109	2	107	9	1	20	55	663	23	17	767	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	109	109	0	0	30	0	55	663	23	17	767	24
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	33.5	33.5		33.5	33.5		27.4	27.4	27.4	27.4	27.4	27.4
Total Split (s)	34.0	34.0		34.0	34.0		86.0	86.0	86.0	86.0	86.0	86.0
Total Split (%)	28.3%	28.3%		28.3%	28.3%		71.7%	71.7%	71.7%	71.7%	71.7%	71.7%
Maximum Green (s)	28.5	28.5		28.5	28.5		80.6	80.6	80.6	80.6	80.6	80.6
Yellow Time (s)	3.6	3.6		3.6	3.6		4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	1.9	1.9		1.9	1.9		1.3	1.3	1.3	1.3	1.3	1.3
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5			5.5		5.4	5.4	5.4	5.4	5.4	5.4
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	21.0	21.0		21.0	21.0		15.0	15.0	15.0	15.0	15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	14.1	14.1			14.1		83.6	83.6	83.6	83.6	83.6	83.6
Actuated g/C Ratio	0.13	0.13			0.13		0.77	0.77	0.77	0.77	0.77	0.77
v/c Ratio	0.63	0.37			0.14		0.12	0.49	0.02	0.03	0.57	0.02

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	60.1	11.9			22.8		4.7	6.7	1.7	4.1	7.8	1.7
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.1	11.9			22.8		4.7	6.7	1.7	4.1	7.8	1.7
LOS	E	B			C		A	A	A	A	A	A
Approach Delay		36.0			22.8			6.4			7.5	
Approach LOS		D			C			A			A	
Queue Length 50th (m)	21.4	0.4			1.8		2.4	42.2	0.0	0.7	54.0	0.1
Queue Length 95th (m)	38.8	14.8			9.9		7.4	80.6	2.1	2.9	103.8	2.2
Internal Link Dist (m)		177.1			281.1			183.2			276.4	
Turn Bay Length (m)	50.0						140.0			60.0		25.0
Base Capacity (vph)	351	486			400		442	1347	1196	486	1347	1196
Starvation Cap Reductn	0	0			0		0	0	0	0	0	0
Spillback Cap Reductn	0	0			0		0	0	0	0	0	0
Storage Cap Reductn	0	0			0		0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.22			0.07		0.12	0.49	0.02	0.03	0.57	0.02

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 108.6			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.63			
Intersection Signal Delay: 10.7		Intersection LOS: B	
Intersection Capacity Utilization 70.4%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Fallowfield Road & O'Keefe Court/Cobble Hill Drive



Future (2023) Total Traffic

Intersection	
Int Delay, s/veh	9.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	32	6	22	39	7	42	149	573	9	8	683	95
Future Vol, veh/h	32	6	22	39	7	42	149	573	9	8	683	95
Conflicting Peds, #/hr	0	0	1	1	0	0	1	0	1	1	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	500	-	-	-	-	-	1400	-	0	600	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	11	3	14	0	0	5	56	12	4	0
Mvmt Flow	32	6	22	39	7	42	149	573	9	8	683	95

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1600	1581	685	1634	1667	574	779	0	0	583	0	0
Stage 1	700	700	-	872	872	-	-	-	-	-	-	-
Stage 2	900	881	-	762	795	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.31	7.13	6.64	6.2	4.1	-	-	4.22	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.13	5.64	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.13	5.64	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.399	3.527	4.126	3.3	2.2	-	-	2.308	-	-
Pot Cap-1 Maneuver	86	110	433	80	90	522	847	-	-	944	-	-
Stage 1	433	444	-	344	352	-	-	-	-	-	-	-
Stage 2	336	367	-	396	383	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	63	90	432	62	73	521	846	-	-	943	-	-
Mov Cap-2 Maneuver	63	90	-	62	73	-	-	-	-	-	-	-
Stage 1	356	440	-	283	290	-	-	-	-	-	-	-
Stage 2	248	302	-	367	380	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	69.2	112.5	2.1	0.1
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	846	-	-	63	238	109	943	-	-
HCM Lane V/C Ratio	0.176	-	-	0.508	0.118	0.807	0.008	-	-
HCM Control Delay (s)	10.2	-	-	110.5	22.1	112.5	8.8	-	-
HCM Lane LOS	B	-	-	F	C	F	A	-	-
HCM 95th %tile Q(veh)	0.6	-	-	2	0.4	4.6	0	-	-

Intersection	
Int Delay, s/veh	2.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	23	0	65	169	0	33
Future Vol, veh/h	23	0	65	169	0	33
Conflicting Peds, #/hr	0	1	1	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	6	0	0	6	0	0
Mvmt Flow	23	0	65	169	0	33

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	24	0	323	24
Stage 1	-	-	-	-	24	-
Stage 2	-	-	-	-	299	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1604	-	675	1058
Stage 1	-	-	-	-	1004	-
Stage 2	-	-	-	-	757	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1602	-	644	1057
Mov Cap-2 Maneuver	-	-	-	-	644	-
Stage 1	-	-	-	-	1003	-
Stage 2	-	-	-	-	723	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2	8.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1057	-	-	1602	-
HCM Lane V/C Ratio	0.031	-	-	0.041	-
HCM Control Delay (s)	8.5	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	28	0	732	725	21
Future Vol, veh/h	0	28	0	732	725	21
Conflicting Peds, #/hr	0	0	1	0	0	1
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	6	4	0
Mvmt Flow	0	28	0	732	725	21

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	726	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.2	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	428	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	428	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14	0	0
HCM LOS	B		

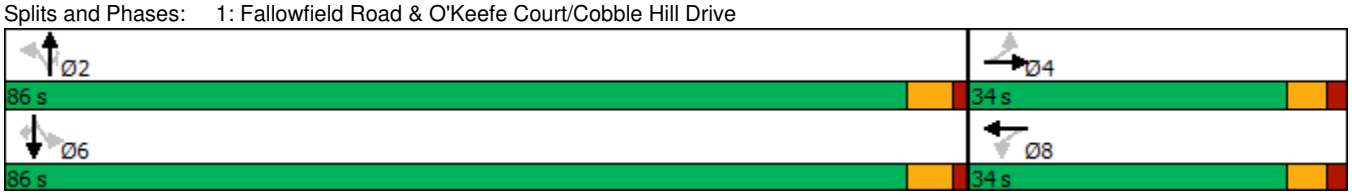
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	428	-	-
HCM Lane V/C Ratio	-	0.065	-	-
HCM Control Delay (s)	-	14	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	6	22	39	7	42	149	573	9	8	683	95
Future Volume (vph)	32	6	22	39	7	42	149	573	9	8	683	95
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	50.0		0.0	0.0		0.0	140.0		0.0	60.0		25.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98			1.00		1.00		0.98	1.00		0.98
Frt		0.882			0.936				0.850			0.850
Flt Protected	0.950				0.978		0.950			0.950		
Satd. Flow (prot)	1729	1452	0	0	1626	0	1729	1733	992	1544	1750	1547
Flt Permitted	0.679				0.844		0.376			0.430		
Satd. Flow (perm)	1236	1452	0	0	1402	0	684	1733	969	698	1750	1512
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			36				23			55
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		201.1			305.1			207.2			300.4	
Travel Time (s)		14.5			22.0			12.4			18.0	
Confl. Peds. (#/hr)			1	1			1		1	1		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	11%	3%	14%	0%	0%	5%	56%	12%	4%	0%
Adj. Flow (vph)	32	6	22	39	7	42	149	573	9	8	683	95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	28	0	0	88	0	149	573	9	8	683	95
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	33.5	33.5		33.5	33.5		27.4	27.4	27.4	27.4	27.4	27.4
Total Split (s)	34.0	34.0		34.0	34.0		86.0	86.0	86.0	86.0	86.0	86.0
Total Split (%)	28.3%	28.3%		28.3%	28.3%		71.7%	71.7%	71.7%	71.7%	71.7%	71.7%
Maximum Green (s)	28.5	28.5		28.5	28.5		80.6	80.6	80.6	80.6	80.6	80.6
Yellow Time (s)	3.6	3.6		3.6	3.6		4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	1.9	1.9		1.9	1.9		1.3	1.3	1.3	1.3	1.3	1.3
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5			5.5		5.4	5.4	5.4	5.4	5.4	5.4
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	21.0	21.0		21.0	21.0		15.0	15.0	15.0	15.0	15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	9.4	9.4			9.4		87.9	87.9	87.9	87.9	87.9	87.9
Actuated g/C Ratio	0.09	0.09			0.09		0.84	0.84	0.84	0.84	0.84	0.84
v/c Ratio	0.29	0.19			0.56		0.26	0.39	0.01	0.01	0.47	0.07

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	49.8	22.9			41.5		4.1	4.0	0.4	2.8	4.6	1.4
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.8	22.9			41.5		4.1	4.0	0.4	2.8	4.6	1.4
LOS	D	C			D		A	A	A	A	A	A
Approach Delay		37.2			41.5			3.9			4.2	
Approach LOS		D			D			A			A	
Queue Length 50th (m)	6.1	1.1			10.0		5.7	25.3	0.0	0.3	33.3	1.2
Queue Length 95th (m)	14.8	9.2			24.7		14.7	49.5	0.4	1.4	64.7	5.0
Internal Link Dist (m)		177.1			281.1			183.2			276.4	
Turn Bay Length (m)	50.0						140.0			60.0		25.0
Base Capacity (vph)	336	411			407		573	1453	816	585	1467	1277
Starvation Cap Reductn	0	0			0		0	0	0	0	0	0
Spillback Cap Reductn	0	0			0		0	0	0	0	0	0
Storage Cap Reductn	0	0			0		0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.07			0.22		0.26	0.39	0.01	0.01	0.47	0.07

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 104.8			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.56			
Intersection Signal Delay: 7.2		Intersection LOS: A	
Intersection Capacity Utilization 72.3%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Fallowfield Road & O'Keefe Court/Cobble Hill Drive



Intersection	
Int Delay, s/veh	17.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	119	2	107	9	1	20	71	505	23	17	698	24
Future Vol, veh/h	119	2	107	9	1	20	71	505	23	17	698	24
Conflicting Peds, #/hr	2	0	0	0	0	2	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	500	-	-	-	-	-	1400	-	0	600	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	4	0	6	4	0
Mvmt Flow	119	2	107	9	1	20	71	505	23	17	698	24

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1403	1402	698	1446	1403	507	722	0	0	528	0	0
Stage 1	732	732	-	647	647	-	-	-	-	-	-	-
Stage 2	671	670	-	799	756	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.16	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.254	-	-
Pot Cap-1 Maneuver	~ 118	141	444	111	141	570	889	-	-	1019	-	-
Stage 1	416	430	-	463	470	-	-	-	-	-	-	-
Stage 2	449	459	-	382	419	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 105	127	444	77	127	569	889	-	-	1019	-	-
Mov Cap-2 Maneuver	~ 105	127	-	77	127	-	-	-	-	-	-	-
Stage 1	383	423	-	426	432	-	-	-	-	-	-	-
Stage 2	397	422	-	284	412	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	114.8	27.8	1.1	0.2
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	889	-	-	105	425	188	1019	-	-
HCM Lane V/C Ratio	0.08	-	-	1.133	0.256	0.16	0.017	-	-
HCM Control Delay (s)	9.4	-	-	204.9	16.4	27.8	8.6	-	-
HCM Lane LOS	A	-	-	F	C	D	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	7.6	1	0.6	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	2.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	171	0	55	23	0	37
Future Vol, veh/h	171	0	55	23	0	37
Conflicting Peds, #/hr	0	2	2	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	171	0	55	23	0	37

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	173	0	306	173
Stage 1	-	-	-	-	173	-
Stage 2	-	-	-	-	133	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1416	-	690	876
Stage 1	-	-	-	-	862	-
Stage 2	-	-	-	-	898	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1413	-	662	874
Mov Cap-2 Maneuver	-	-	-	-	662	-
Stage 1	-	-	-	-	860	-
Stage 2	-	-	-	-	863	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.4	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	874	-	-	1413	-
HCM Lane V/C Ratio	0.042	-	-	0.039	-
HCM Control Delay (s)	9.3	-	-	7.7	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

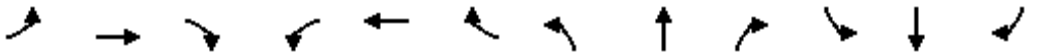
Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	54	0	600	790	25
Future Vol, veh/h	0	54	0	600	790	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	3	4	0
Mvmt Flow	0	54	0	600	790	25

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	790	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.2	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	393	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	393	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.6	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	393	-	-
HCM Lane V/C Ratio	-	0.137	-	-
HCM Control Delay (s)	-	15.6	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.5	-	-

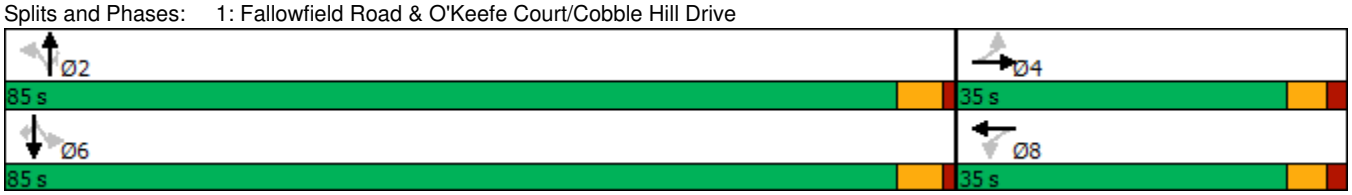


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	119	2	107	9	1	20	71	505	23	17	698	24
Future Volume (vph)	119	2	107	9	1	20	71	505	23	17	698	24
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	50.0		0.0	0.0		0.0	140.0		0.0	60.0		25.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				0.98							
Frt		0.853			0.910				0.850			0.850
Flt Protected	0.950				0.985		0.950			0.950		
Satd. Flow (prot)	1729	1552	0	0	1605	0	1729	1750	1547	1631	1750	1547
Flt Permitted	0.738				0.904		0.347			0.451		
Satd. Flow (perm)	1338	1552	0	0	1473	0	632	1750	1547	774	1750	1547
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		107			20				23			23
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		201.1			305.1			207.2			300.4	
Travel Time (s)		14.5			22.0			12.4			18.0	
Confl. Peds. (#/hr)	2					2						
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	6%	4%	0%
Adj. Flow (vph)	119	2	107	9	1	20	71	505	23	17	698	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	119	109	0	0	30	0	71	505	23	17	698	24
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	33.5	33.5		33.5	33.5		27.4	27.4	27.4	27.4	27.4	27.4
Total Split (s)	35.0	35.0		35.0	35.0		85.0	85.0	85.0	85.0	85.0	85.0
Total Split (%)	29.2%	29.2%		29.2%	29.2%		70.8%	70.8%	70.8%	70.8%	70.8%	70.8%
Maximum Green (s)	29.5	29.5		29.5	29.5		79.6	79.6	79.6	79.6	79.6	79.6
Yellow Time (s)	3.6	3.6		3.6	3.6		4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	1.9	1.9		1.9	1.9		1.3	1.3	1.3	1.3	1.3	1.3
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5			5.5		5.4	5.4	5.4	5.4	5.4	5.4
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	21.0	21.0		21.0	21.0		15.0	15.0	15.0	15.0	15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	14.8	14.8			14.8		82.6	82.6	82.6	82.6	82.6	82.6
Actuated g/C Ratio	0.14	0.14			0.14		0.76	0.76	0.76	0.76	0.76	0.76
v/c Ratio	0.65	0.36			0.14		0.15	0.38	0.02	0.03	0.52	0.02

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	60.0	11.3			22.1		5.1	5.8	1.8	4.3	7.4	1.8
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.0	11.3			22.1		5.1	5.8	1.8	4.3	7.4	1.8
LOS	E	B			C		A	A	A	A	A	A
Approach Delay		36.8			22.1			5.6			7.2	
Approach LOS		D			C			A			A	
Queue Length 50th (m)	23.3	0.4			1.8		3.3	29.2	0.0	0.7	47.7	0.1
Queue Length 95th (m)	41.7	14.7			9.8		9.6	56.6	2.2	3.0	92.1	2.3
Internal Link Dist (m)		177.1			281.1			183.2			276.4	
Turn Bay Length (m)	50.0						140.0			60.0		25.0
Base Capacity (vph)	364	500			416		481	1333	1184	590	1333	1184
Starvation Cap Reductn	0	0			0		0	0	0	0	0	0
Spillback Cap Reductn	0	0			0		0	0	0	0	0	0
Storage Cap Reductn	0	0			0		0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.22			0.07		0.15	0.38	0.02	0.03	0.52	0.02

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 108.3			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 11.1		Intersection LOS: B	
Intersection Capacity Utilization 70.2%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Fallowfield Road & O'Keefe Court/Cobble Hill Drive



Future (2028) Total Traffic

Intersection	
Int Delay, s/veh	20.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	32	6	22	39	7	42	149	648	9	8	892	95
Future Vol, veh/h	32	6	22	39	7	42	149	648	9	8	892	95
Conflicting Peds, #/hr	0	0	1	1	0	0	1	0	1	1	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	500	-	-	-	-	-	1400	-	0	600	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	11	3	14	0	0	5	56	12	4	0
Mvmt Flow	32	6	22	39	7	42	149	648	9	8	892	95

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1884	1865	894	1918	1951	649	988	0	0	658	0	0
Stage 1	909	909	-	947	947	-	-	-	-	-	-	-
Stage 2	975	956	-	971	1004	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.31	7.13	6.64	6.2	4.1	-	-	4.22	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.13	5.64	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.13	5.64	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.399	3.527	4.126	3.3	2.2	-	-	2.308	-	-
Pot Cap-1 Maneuver	55	74	327	51	60	473	708	-	-	884	-	-
Stage 1	332	357	-	312	324	-	-	-	-	-	-	-
Stage 2	305	339	-	303	305	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	37	58	326	~ 36	47	473	707	-	-	883	-	-
Mov Cap-2 Maneuver	37	58	-	~ 36	47	-	-	-	-	-	-	-
Stage 1	262	353	-	246	255	-	-	-	-	-	-	-
Stage 2	213	267	-	275	302	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	158	$ 320.9	2.1	0.1
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	707	-	-	37	164	67	883	-	-
HCM Lane V/C Ratio	0.211	-	-	0.865	0.171	1.313	0.009	-	-
HCM Control Delay (s)	11.4	-	-	268.8	31.4	$ 320.9	9.1	-	-
HCM Lane LOS	B	-	-	F	D	F	A	-	-
HCM 95th %tile Q(veh)	0.8	-	-	3.2	0.6	7.2	0	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	2.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	23	0	65	169	0	33
Future Vol, veh/h	23	0	65	169	0	33
Conflicting Peds, #/hr	0	1	1	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	6	0	0	6	0	0
Mvmt Flow	23	0	65	169	0	33

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	24	0	323	24
Stage 1	-	-	-	-	24	-
Stage 2	-	-	-	-	299	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1604	-	675	1058
Stage 1	-	-	-	-	1004	-
Stage 2	-	-	-	-	757	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1602	-	644	1057
Mov Cap-2 Maneuver	-	-	-	-	644	-
Stage 1	-	-	-	-	1003	-
Stage 2	-	-	-	-	723	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2	8.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1057	-	-	1602	-
HCM Lane V/C Ratio	0.031	-	-	0.041	-
HCM Control Delay (s)	8.5	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	28	0	808	938	21
Future Vol, veh/h	0	28	0	808	938	21
Conflicting Peds, #/hr	0	0	1	0	0	1
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	6	4	0
Mvmt Flow	0	28	0	808	938	21

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	939	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.2	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	323	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	323	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.2	0	0
HCM LOS	C		

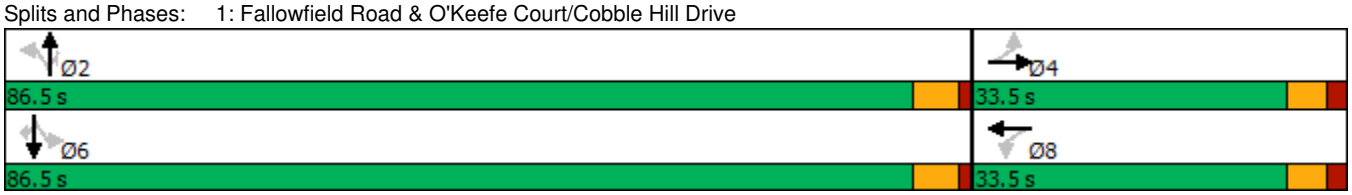
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	323	-	-
HCM Lane V/C Ratio	-	0.087	-	-
HCM Control Delay (s)	-	17.2	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.3	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	6	22	39	7	42	149	648	9	8	892	95
Future Volume (vph)	32	6	22	39	7	42	149	648	9	8	892	95
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	50.0		0.0	0.0		0.0	140.0		0.0	60.0		25.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98			1.00				0.98	1.00		0.98
Frt		0.882			0.936				0.850			0.850
Flt Protected	0.950				0.978		0.950			0.950		
Satd. Flow (prot)	1729	1452	0	0	1626	0	1729	1733	992	1544	1750	1547
Flt Permitted	0.677				0.844		0.282			0.393		
Satd. Flow (perm)	1232	1452	0	0	1402	0	513	1733	969	638	1750	1512
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			36				23			42
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		201.1			305.1			207.2			300.4	
Travel Time (s)		14.5			22.0			12.4			18.0	
Confl. Peds. (#/hr)			1	1			1		1	1		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	11%	3%	14%	0%	0%	5%	56%	12%	4%	0%
Adj. Flow (vph)	32	6	22	39	7	42	149	648	9	8	892	95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	28	0	0	88	0	149	648	9	8	892	95
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	33.5	33.5		33.5	33.5		27.4	27.4	27.4	27.4	27.4	27.4
Total Split (s)	33.5	33.5		33.5	33.5		86.5	86.5	86.5	86.5	86.5	86.5
Total Split (%)	27.9%	27.9%		27.9%	27.9%		72.1%	72.1%	72.1%	72.1%	72.1%	72.1%
Maximum Green (s)	28.0	28.0		28.0	28.0		81.1	81.1	81.1	81.1	81.1	81.1
Yellow Time (s)	3.6	3.6		3.6	3.6		4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	1.9	1.9		1.9	1.9		1.3	1.3	1.3	1.3	1.3	1.3
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5			5.5		5.4	5.4	5.4	5.4	5.4	5.4
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	21.0	21.0		21.0	21.0		15.0	15.0	15.0	15.0	15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	9.5	9.5			9.5		88.4	88.4	88.4	88.4	88.4	88.4
Actuated g/C Ratio	0.09	0.09			0.09		0.84	0.84	0.84	0.84	0.84	0.84
v/c Ratio	0.29	0.19			0.56		0.35	0.45	0.01	0.01	0.61	0.07

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	50.1	22.9			41.6		5.7	4.4	0.4	2.8	6.4	1.7
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.1	22.9			41.6		5.7	4.4	0.4	2.8	6.4	1.7
LOS	D	C			D		A	A	A	A	A	A
Approach Delay		37.4			41.6			4.6			5.9	
Approach LOS		D			D			A			A	
Queue Length 50th (m)	6.1	1.1			10.1		6.3	31.0	0.0	0.3	54.2	1.6
Queue Length 95th (m)	14.9	9.2			24.9		18.0	60.1	0.5	1.4	108.2	5.6
Internal Link Dist (m)		177.1			281.1			183.2			276.4	
Turn Bay Length (m)	50.0						140.0			60.0		25.0
Base Capacity (vph)	327	402			399		430	1453	816	535	1468	1275
Starvation Cap Reductn	0	0			0		0	0	0	0	0	0
Spillback Cap Reductn	0	0			0		0	0	0	0	0	0
Storage Cap Reductn	0	0			0		0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.07			0.22		0.35	0.45	0.01	0.01	0.61	0.07

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 105.4			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.61			
Intersection Signal Delay: 7.9		Intersection LOS: A	
Intersection Capacity Utilization 83.9%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 1: Fallowfield Road & O'Keefe Court/Cobble Hill Drive



Intersection	
Int Delay, s/veh	31.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	119	2	107	9	1	20	71	663	23	17	778	24
Future Vol, veh/h	119	2	107	9	1	20	71	663	23	17	778	24
Conflicting Peds, #/hr	2	0	0	0	0	2	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	500	-	-	-	-	-	1400	-	0	600	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	4	0	6	4	0
Mvmt Flow	119	2	107	9	1	20	71	663	23	17	778	24

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1641	1640	778	1684	1641	665	802	0	0	686	0	0
Stage 1	812	812	-	805	805	-	-	-	-	-	-	-
Stage 2	829	828	-	879	836	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.16	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.254	-	-
Pot Cap-1 Maneuver	~ 81	101	400	75	101	464	830	-	-	889	-	-
Stage 1	376	395	-	379	398	-	-	-	-	-	-	-
Stage 2	368	389	-	345	385	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 71	91	400	50	91	463	830	-	-	889	-	-
Mov Cap-2 Maneuver	~ 71	91	-	50	91	-	-	-	-	-	-	-
Stage 1	344	387	-	346	364	-	-	-	-	-	-	-
Stage 2	320	356	-	247	378	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	246.6	41.5	0.9	0.2
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	830	-	-	71	377	128	889	-	-
HCM Lane V/C Ratio	0.086	-	-	1.676	0.289	0.234	0.019	-	-
HCM Control Delay (s)	9.7	-	-	$ 455.6	18.4	41.5	9.1	-	-
HCM Lane LOS	A	-	-	F	C	E	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	10.3	1.2	0.9	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	2.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	171	0	55	23	0	37
Future Vol, veh/h	171	0	55	23	0	37
Conflicting Peds, #/hr	0	2	2	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	171	0	55	23	0	37

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	173	0	306	173
Stage 1	-	-	-	-	173	-
Stage 2	-	-	-	-	133	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1416	-	690	876
Stage 1	-	-	-	-	862	-
Stage 2	-	-	-	-	898	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1413	-	662	874
Mov Cap-2 Maneuver	-	-	-	-	662	-
Stage 1	-	-	-	-	860	-
Stage 2	-	-	-	-	863	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.4	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	874	-	-	1413	-
HCM Lane V/C Ratio	0.042	-	-	0.039	-
HCM Control Delay (s)	9.3	-	-	7.7	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

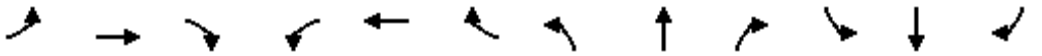
Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	54	0	762	872	25
Future Vol, veh/h	0	54	0	762	872	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	250
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	3	4	0
Mvmt Flow	0	54	0	762	872	25

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	872	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.2	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	353	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	353	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	353	-	-
HCM Lane V/C Ratio	-	0.153	-	-
HCM Control Delay (s)	-	17	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.5	-	-

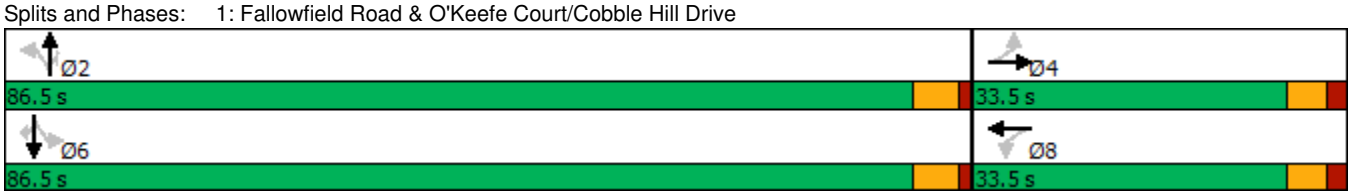


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	119	2	107	9	1	20	71	663	23	17	778	24
Future Volume (vph)	119	2	107	9	1	20	71	663	23	17	778	24
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	50.0		0.0	0.0		0.0	140.0		0.0	60.0		25.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				0.98							
Frt		0.853			0.910				0.850			0.850
Flt Protected	0.950				0.985		0.950			0.950		
Satd. Flow (prot)	1729	1552	0	0	1605	0	1729	1750	1547	1631	1750	1547
Flt Permitted	0.738				0.904		0.308			0.365		
Satd. Flow (perm)	1338	1552	0	0	1473	0	561	1750	1547	627	1750	1547
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		107			20				23			23
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		201.1			305.1			207.2			300.4	
Travel Time (s)		14.5			22.0			12.4			18.0	
Confl. Peds. (#/hr)	2					2						
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	6%	4%	0%
Adj. Flow (vph)	119	2	107	9	1	20	71	663	23	17	778	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	119	109	0	0	30	0	71	663	23	17	778	24
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	33.5	33.5		33.5	33.5		27.4	27.4	27.4	27.4	27.4	27.4
Total Split (s)	33.5	33.5		33.5	33.5		86.5	86.5	86.5	86.5	86.5	86.5
Total Split (%)	27.9%	27.9%		27.9%	27.9%		72.1%	72.1%	72.1%	72.1%	72.1%	72.1%
Maximum Green (s)	28.0	28.0		28.0	28.0		81.1	81.1	81.1	81.1	81.1	81.1
Yellow Time (s)	3.6	3.6		3.6	3.6		4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	1.9	1.9		1.9	1.9		1.3	1.3	1.3	1.3	1.3	1.3
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5			5.5		5.4	5.4	5.4	5.4	5.4	5.4
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	21.0	21.0		21.0	21.0		15.0	15.0	15.0	15.0	15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	15.0	15.0			15.0		84.1	84.1	84.1	84.1	84.1	84.1
Actuated g/C Ratio	0.14	0.14			0.14		0.76	0.76	0.76	0.76	0.76	0.76
v/c Ratio	0.65	0.36			0.14		0.17	0.50	0.02	0.04	0.58	0.02

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	61.0	11.4			22.4		5.4	7.1	1.8	4.4	8.3	1.8
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.0	11.4			22.4		5.4	7.1	1.8	4.4	8.3	1.8
LOS	E	B			C		A	A	A	A	A	A
Approach Delay		37.3			22.4			6.7			8.1	
Approach LOS		D			C			A			A	
Queue Length 50th (m)	23.7	0.4			1.8		3.4	44.3	0.0	0.7	58.1	0.1
Queue Length 95th (m)	42.2	14.9			10.0		9.9	85.0	2.1	3.1	112.3	2.3
Internal Link Dist (m)		177.1			281.1			183.2			276.4	
Turn Bay Length (m)	50.0						140.0			60.0		25.0
Base Capacity (vph)	341	475			390		428	1337	1188	479	1337	1188
Starvation Cap Reductn	0	0			0		0	0	0	0	0	0
Spillback Cap Reductn	0	0			0		0	0	0	0	0	0
Storage Cap Reductn	0	0			0		0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.23			0.08		0.17	0.50	0.02	0.04	0.58	0.02

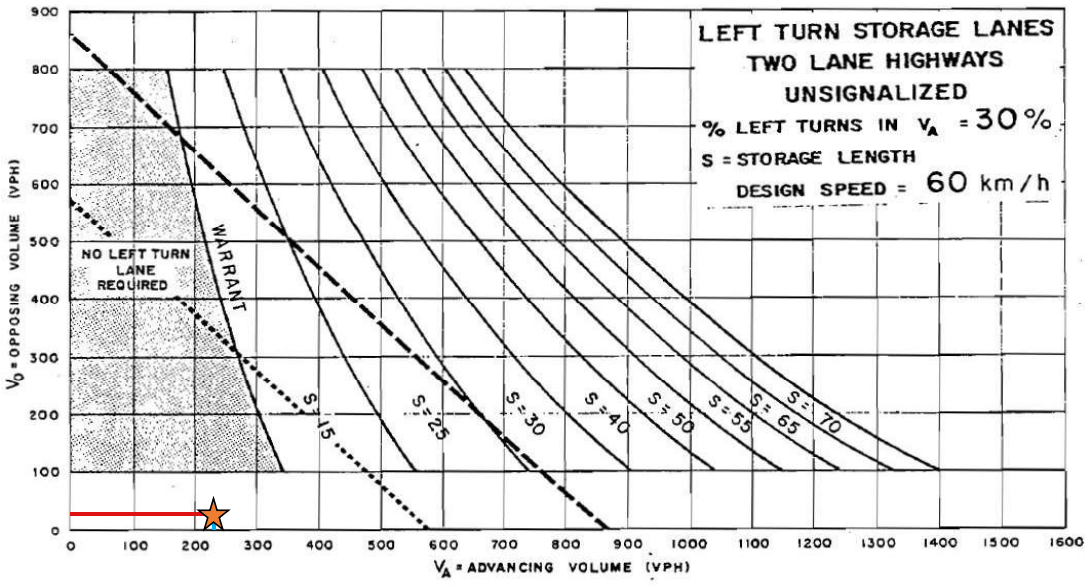
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 110			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 11.4		Intersection LOS: B	
Intersection Capacity Utilization 74.6%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Fallowfield Road & O'Keefe Court/Cobble Hill Drive



Appendix K – Auxiliary Lane Analyses

O'Keefe Court Lusk Street - Future (2028) Total Traffic - AM Peak Hour



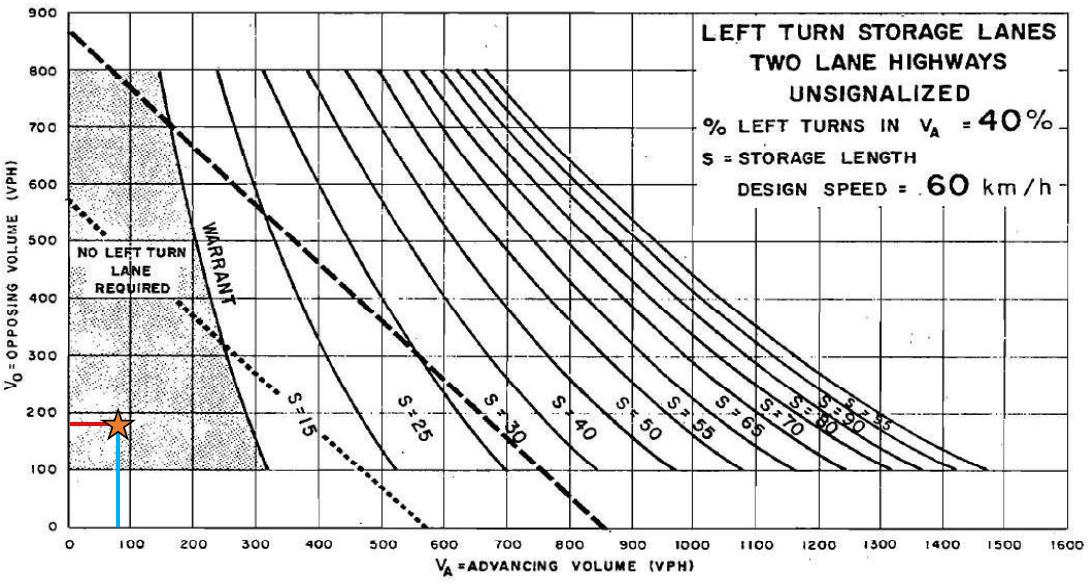
TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

Opposing Volume

Advancing Volume

O'Keefe Court Lusk Street - Future (2028) Total Traffic - PM Peak Hour



TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

Opposing Volume

Advancing Volume