# COMMERCIAL DEVELOPMENT
# 1850 WALKLEY ROAD
# OTTAWA, ONTARIO

## TRANSPORTATION IMPACT ASSESSMENT

Prepared for:

Marcello's Market & Deli Inc.

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118-674
TIA Report.doc

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# OTTAWA, ONTARIO

## TRANSPORTATION IMPACT ASSESSMENT

## STEP 1 - SCREENING

A Screening Form has been prepared which is included as Exhibit 1 in the Appendix. The Trip Generation Trigger, Location Trigger and Safety Trigger have all been met in the Screening Form, with the City of Ottawa staff review recommending that the assessment study proceed to the Scoping Document.

## STEP 2 - SCOPING

### MODULE 2.1 – Existing and Planned Conditions

#### Element 2.1.1 – Proposed Development

A Site Plan has been prepared for the development of a parcel of land at 1850 Walkley Road, Ottawa. The site is 7,417.5 $m^2$ in size and is located along the south side of Walkley Road approximately 240 m east of the intersection of Walkley Road and Heron Road. The land is zoned "Light Industrial" IL[939] S240 which will support the proposed development. The location of the proposed development is shown in Figure 2.1 which is expected to be completed and occupied by the year 2019.

The site will comprise of two land uses. At the north portion of the site adjacent to Walkley Road is Marcello's Market & Deli which will provide some sit-down seating and a drive-through window. The building has a gross floor area of 700 $m^2$. At the south portion of the site will be a two storey office building with a gross floor area of 1,100 $m^2$. Both uses will share the same access located along the west property limit of the site. The access will be a full movement access which will also be shared with the existing Dymon Storage facility. The drive-through window aisle will have a separate egress onto Walkley Road at the east portion of the site. The total site will provide 92 parking spaces of which 4 will be designated as barrier free spaces.

Figure 2.2 provides a conceptual site plan of the development showing the layout of the site and site access points onto Walkley Road.

#### Element 2.1.2 – Existing Conditions

The site will have direct access onto Walkley Road. Walkley Road (Ottawa Road 74) is a four lane east-west divided arterial road under the jurisdiction of the City of Ottawa. The centre median along the roadway is depressed allowing full movement access to the residential and

**FIGURE 2.1**
**SITE LOCATION PLAN**

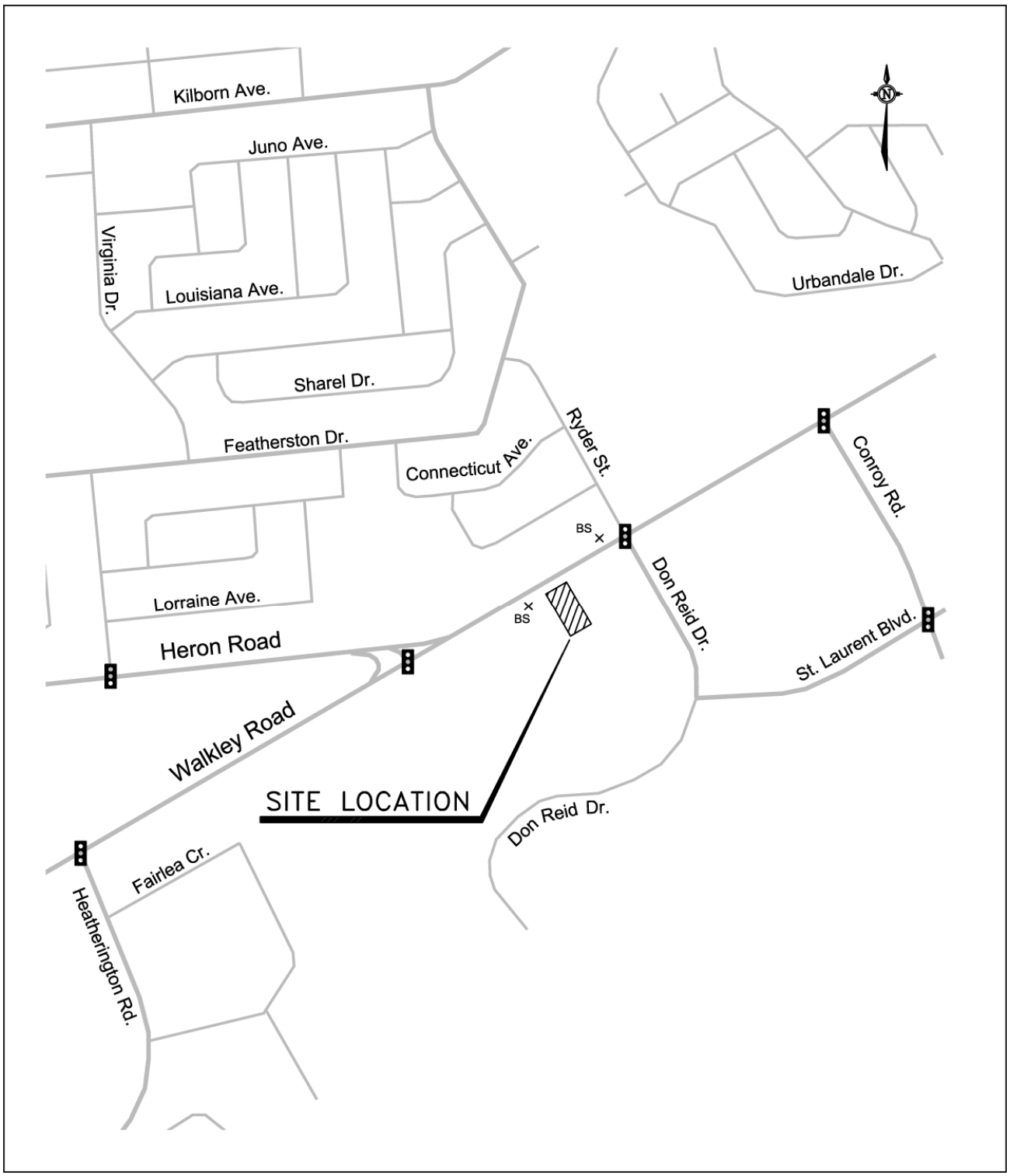


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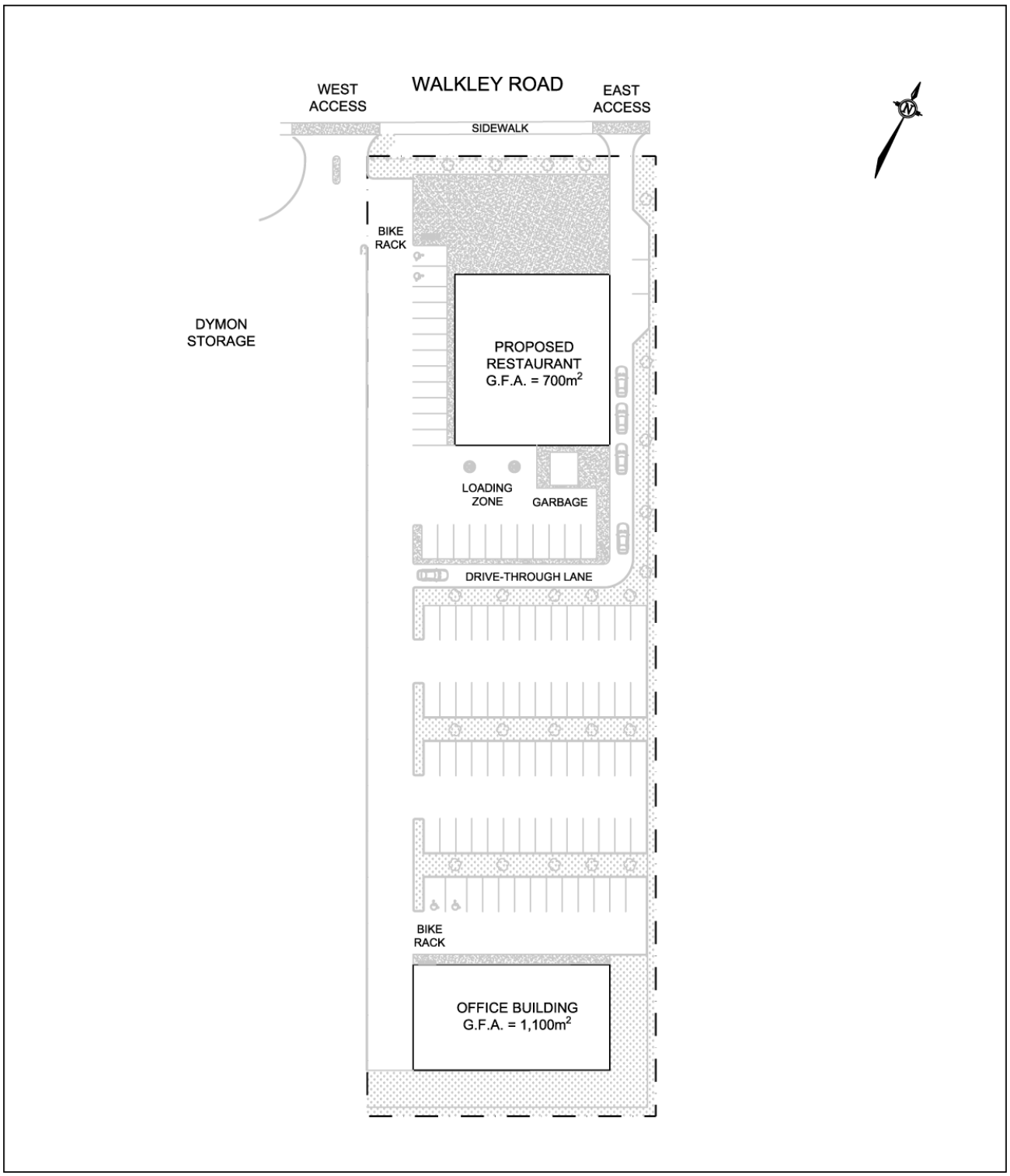
**FIGURE 2.2**
**CONCEPTUAL SITE PLAN**

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commercial properties in the vicinity of the site. The road has sidewalks along both sides if the road. The City of Ottawa *Transportation Master Plan* (TMP) has identified Walkley Road as a "Spine Route" in the Cycling Network - Primary Urban plan. There are no dedicated cycling lanes along the road in the vicinity of the site. The posted speed limit along the road is 50 km./h.

Approximately 135 m east of the site is Don Reid Drive (Ryder Street). Don Reid Drive is the portion of the road south of Walkley Road and Ryder Street is the portion north of Walkley Road. Don Reid Drive is a north-south two lane collector road with a sidewalk along the east side of the road. Ryder Street is a two lane local street with a sidewalk along the east side of the street. The speed limit along Don Reid Drive and Ryder Street is unposted at 50 km./h.

Approximately 240 m west of the site is Heron Road. Heron Road (Ottawa Road 16) is a four lane east-west arterial road intersection Walkley Road at an angle. The City of Ottawa traffic counts at the Walkley/Heron intersection designate Heron Road as a north-south road. There are no cycling lanes along Heron Road, which is designated as a Spine Route in the City's Cycling Network – Primary Urban Plan. There is a sidewalk along the north-east side of the road. The posted speed limit along the road is 50 km./h.

The intersection of Heron Road and Walkley Road is located approximately 240 m west of the site and is a "T" intersection which is controlled by traffic signals. Walkley Road forms the east and west approaches to the intersection, and Heron Road, which curves from an east-west alignment to north-south at the intersection, forms the north approach. The intersection has the following lane configuration:

| | |
|---|---|
| Heron north approach - | 2 left turn lanes |
| | 1 channelized right turn lane |
| Walkley east approach - | 2 through lanes |
| | 2 channelized right turn lanes |
| Walkley west approach - | 2 through lanes |
| | 1 left turn lane (designated for buses and taxis) |

The intersection of Walkley Road and Don Reid Drive is located approximately 135 m east of the site and is controlled by traffic signals. Traffic signs are posted prohibiting trucks and northbound through movements onto Ryder Street. The following is the lane configuration:

| | |
|---|---|
| Ryder north approach - | 1 left turn lane |
| | 1 shared through/right lane |
| Don Reid south approach - | 1 left turn lane |
| | 1 shared through/right lane |
| [1] Walkley east approach - | 1 left turn lane |
| | 1 through lanes |
| | 1 shared through/right lane |
| Walkley west approach - | 1 left turn lane |
| | 1 through lane |
| | 1 shared through/right lane |

1 The receiving lanes from the east approach (westbound lanes) comprises of three lanes consisting of 2 westbound Walkley Road lanes and 1 lane being developed for a right turn movement onto Heron Road.

OC Transpo provides regular and peak hour routes along Walkley Road past the site. Bus stops are located approximately 50 m west of the site for eastbound service, and approximately 95 m east and west of the site for westbound bus service. Figure 1.1 shows the location of the bus stops.

Traffic counts were obtained from the City of Ottawa for the Walkley/Heron and Walkley/Don Reid intersections. The time period for the peak volume of traffic was applicable to vehicular, cycling and pedestrian traffic. Figure 2.3 shows the peak AM and PM hour traffic counts for the signalized intersections, with the City of Ottawa count summary provided in the Appendix as Exhibit 2 for the Walkley/Heron intersection and Exhibit 3 for the Walkley/Don Reid intersection.

### Element 2.1.3 – Planned Conditions

The surrounding area comprises mainly of commercial along the south side of Walkley Road and residential along the north side of Walkley Road. Development along Don Reid Drive comprises of commercial uses and residential development along Ryder Street.

The TMP has identified an at-grade BRT connecting the Bayshore Transit Station to the St. Laurent Transit Station with service travelling along Walkley Road past the site. The BRT is in the City's 2031 Network Concept Projects. There are no road or transit projects within the 2031 Affordable projects. The study has assumed that there are no plans for changes to the transportation network in the area within the horizon years of the TIA study, and no plans for large development in the immediate area.

## MODULE 2.2 – Study Area and Time Periods

### Element 2.2.1 – Study Area

The study area of the project has been determined through discussions with City staff. The study area would be along Walkley Road between and including the intersections of Walkley/Heron and Walkley/Don Reid.

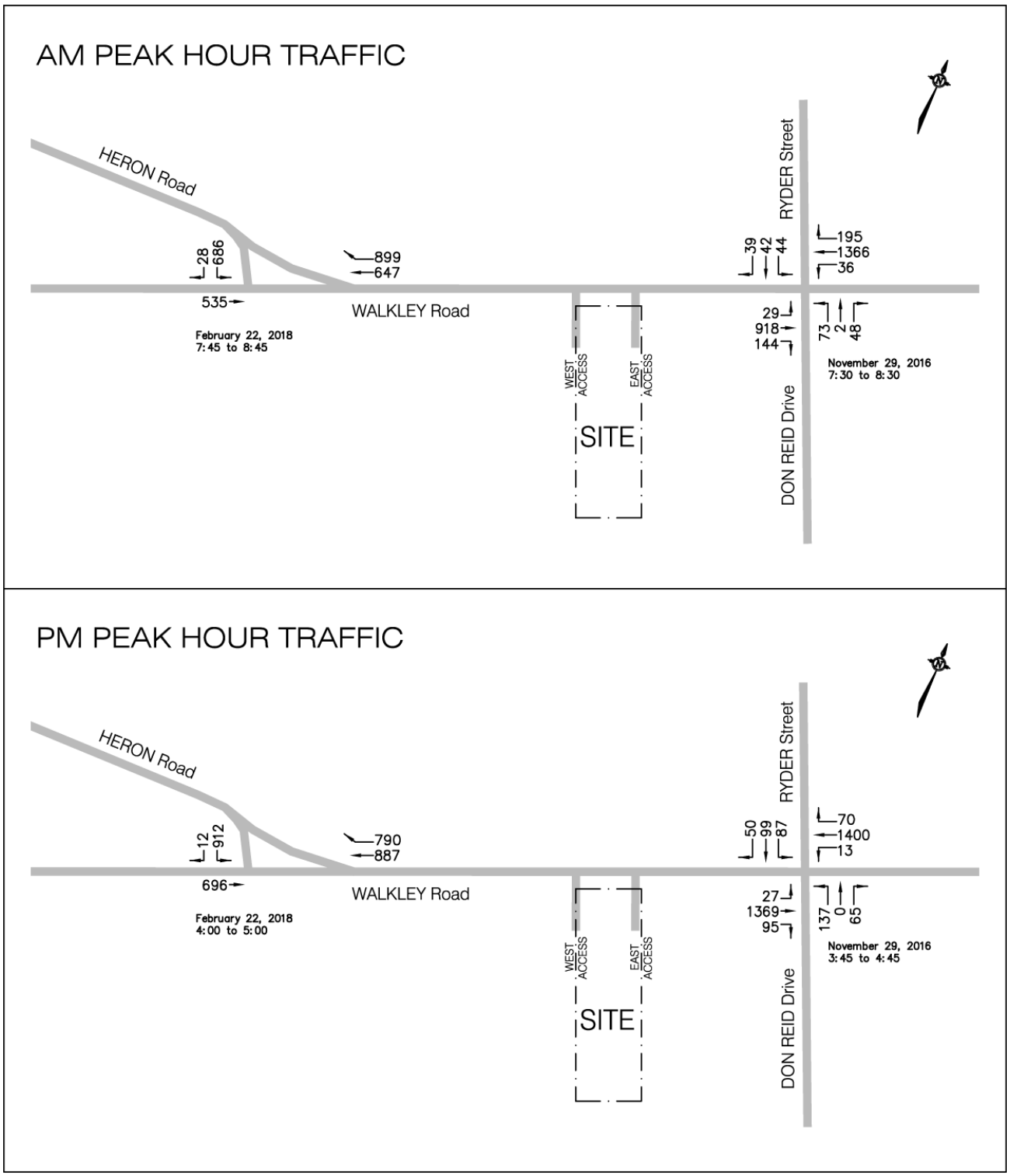
### Element 2.2.2 – Time Periods

The TIA will examine the operation of the site access and road segments/intersections for the weekday peak AM and PM hours of the adjacent roads. With the site comprising of an office building and a deli, the peak hour of the site would coincide with commuters travelling to/from work. The peak AM and PM hours were determined from the City of Ottawa traffic counts.

### Element 2.2.3 – Horizon Years

The Marcello's Market & Deli and office building are expected to be completed and occupied by the year 2019. The TIA study will examine the operation of the roads and intersections at completion in 2019, and at five years beyond completion in 2024.

**FIGURE 2.3**
**EXISTING PEAK AM AND PM HOUR TRAFFIC COUNTS**



## MODULE 2.3 – Exemptions Review

The exemptions, which provide possible reductions to the scope of work of the TIA Study, were examined using Table 4: Possible Exemptions which is provided in the City's *Transportation Impact Assessment Guidelines (2017).* Utilizing the table in the TIA Guidelines, the possible exemptions proposed for the 1850 Walkley Road study report are shown in Table 2.1.

**TABLE 2.1**
**EXEMPTIONS TO THE TIA STUDY REPORT**

| MODULE | ELEMENT | EXEMPTION CONSIDERATIONS |
|---|---|---|
| **Design Review Component** | | |
| 4.1 Development Design | 4.1.2 Circulation and Access | No - Access to the development and will be examined. |
| | 4.1.3 New Street Networks | Yes - Only required for subdivisions. |
| 4.2 Parking | 4.2.1 Parking Supply | No - the supply of parking will be discussed. |
| | 4.2.2 Spillover Parking | Yes - No spillover expected. |
| **Network Impact Component** | | |
| 4.5 Transportation Demand Management | All Elements | Yes – The site is expected to have fewer than 60 employees. |
| 4.6 Neighbourhood Traffic Management | 4.6.1 Adjacent Neighbourhoods | Yes – The site will have access onto an arterial road. Trips are expected to exceed ATM capacity of the adjacent roads. |
| 4.8 Network Concept | | Yes - The site would not generate more than 200 person-trips per peak hour in excess of the volume permitted by established zoning. |

## STEP 3 - FORECASTING

## MODULE 3.1 – Development-Generated Travel Demand

### Element 3.1.1 – Trip Generation and Mode Shares

The commercial development consists of a high-turnover deli restaurant with a drive-through, and an office building at the rear of the property. The size and uses are shown below:

| | | |
|---|---|---|
| Marcello's Market & Deli | 700 $m^2$ | 7,534.7 $ft^2$ |
| Single Tenant Office Building | 1,100 $m^2$ | 11,840.3 $ft^2$ |

The trips for both the deli and office building were determined using the statistical trip data documented in the Institute of Transportation Engineers (ITE) publication, *Trip Generation Manual*.

There are several Marcello's Market & Deli restaurants in the Ottawa area. The hours of operation are from 6:00 AM to 5:00 PM and they are open to serve breakfasts and sit-down meals including a buffet at the restaurant. The deli is also a market which sells fresh produce and grocery items, prepared meals and bakery goods. The site proposes to provide a drive-through window for customers to purchase take-out food and baked goods. With a Tim Horton located 300 m east of the site and a McDonald's 400 m west of the site, the drive-through will not be utilized as a coffee/fast food window, but would be a convenience for customers for the pickup of take-out food. The trip generation rates were determined for an ITE Land Use 932 for a "High-Turnover (Sit-Down) Restaurant". The trips would be based on the average trip rate for the total gross floor area of the building. The drive-through aisle was considered as a convenience for the pickup of take-out.

The office building at the rear of the property will be a general use office building which would likely have only one tenant due to the size of the building. The trips would be based on the ITE Land Use 715 for a "Single Tenant Office Building". The analysis used the average trip rate since the building size is outside the statistical sample size.

The analysis used the average trip rate for each ITE Land Use. The trip rates for all uses are shown in Table 3.1.

**TABLE 3.1**
**TRIP GENERATION RATES**

| BUILDING USE | ITE LAND USE | TRIP GENERATION RATE | |
|---|---|---|---|
| | | Peak AM Hr. | Peak PM Hr. |
| Marcello's Market & Deli | High-Turnover (Sit-Down) Restaurant – ITE 932 | 10.81 T/1000/ft$^2$ | 9.85 T/1000/ft$^2$ |
| Office Building | Single Tenant Office Building - ITE 715 | 1.80 T/1000/ft$^2$ | 1.74 T/1000/ft$^2$ |

The trip generation rates of Table 3.1 were applied to the gross floor area of the deli and office building. The product is the weekday peak AM and PM hour site generated vehicle-trips which are shown in Table 3.2.

**TABLE 3.2**
**PEAK HOUR SITE TRIPS GENERATED VEHICLE-TRIPS**

| PEAK HOUR TRIPS / BUILDING USE | WEEKDAY PEAK AM HR. | | | WEEKDAY PEAK PM HR. | | |
|---|---|---|---|---|---|---|
| | TOTAL | ENTER | EXIT | TOTAL | ENTER | EXIT |
| Marcello's Market & Deli | 82 | 45 (55%) | 37 (45%) | 74 | 44 (.60%) | 30 (40%) |
| Office Building | 21 | 19 (89%) | 2 (11%) | 21 | 3 (15%) | 18 (85%) |
| **Total New Trips** | 103 | **64** | **39** | 95 | **47** | **48** |

The peak AM and PM hour person-trips were determined using the total new vehicle-trips shown in Table 3.2 and a conversion rate of 1.28 as provided in Element 3.1.1 of the City's TIA Guidelines. The peak AM and PM hour vehicle-trips and person-trips are shown below:

| | Peak AM Hour | Peak PM Hour |
|---|---|---|
| Vehicle-Trips | 103 | 95 |
| Person-Trips | 132 | 122 |

The future transit mode share was determined from reviewing the *National Capital Region Travel Trends* document prepared by IBI Group which provides the mode share trends from the Alta Vista area during the 2011 peak AM hour. Table 3.3 presents the modal shared summary which will be used in the TIA Submission.

**TABLE 3.3**
**FUTURE MODE SHARE SUMMARY**

| Future Mode Share Targets for the Development | | |
|---|---|---|
| **Travel Mode** | **Mode Share Target** | **Rationale** |
| Transit | 24% | Consistent with the TMP Transit Priority Network 2031 Affordable Network |
| Walking | 9% | Due to the close proximity to the surrounding residential areas |
| Cycling | 4% | Consistent with young patrons of the athletic facilities |
| Auto Passenger | 12% | Consistent with modal share targets and travel trends to athletic related land uses |
| Auto Driver | 51% | |

The peak hour person-trips for the various travel modes were determined by the product of the total peak hour person-trips previously determined (132 Peak AM & 122 Peak PM Hour) and the future mode share from Table 3.3. The results are shown in Table 3.4.

**TABLE 3.4**
**FUTURE DEVELOPMENT GENERATED PERSON-TRIPS**

| TRAVEL MODE | DEVELOPMENT GENERATED PERSON-TRIPS | |
|---|---|---|
| | PEAK AM HOUR | PEAK PM HOUR |
| Transit | 32 person-trips | 29 person-trips |
| Walking | 12 person-trips | 11 person-trips |
| Cycling | 5 person-trips | 5 person-trips |
| Auto Passenger | 16 person-trips | 15 person-trips |
| Auto Driver | 67 person-trips | 62 person-trips |
| **Total Person-Trips** | **132 person-trips** | **122 person-trips** |

The TIA Guidelines allow for three Trip Reduction Factors that may be applied to the expected development trips. Below discusses the three factors, with the third factor being the only factor which would provide a trip reduction for the development:

1. Deduction of Existing Development Trips - The proposed site is currently vacant with no existing uses or site trips which would be replaced by proposed trips from the commercial development. The reduction for existing development trips would not apply.

2. Pass-by Vehicular Trips - The total number of site generated trips is a combination of primary trips and pass-by trips. Primary trips are trips where the primary destination is to/from the proposed development, and pass-by trips can be defined as traffic already on the adjacent street, which "stops off" at the development while passing by "on-route" to its primary destination. Pass-by trips would only apply to the Marcello's Market & Deli. The statistical data in the *Trip Generation Manual, Volume 1* document states that for a High-Turnover (Sit-Down) Restaurant, ITE Land Use 932, the average pass-by and diverted linked trips is 60% for the total peak PM hour trips. The TIA analysis has utilized a 60% pass-by trip factor for the peak AM and PM hour trips along Walkley Road and Heron Road for the deli use.

   The analysis has assumed that one auto driver trip would equal one vehicle-trip. The site would generate 67 auto driver or vehicular trips during the peak AM hour and 62 trips during the peak PM hours as shown in Table 3.4. Table 3.5 presents the expected primary and pass-by vehicular trips to the development.

**TABLE 3.5**
**PRIMARY AND PASS-BY TRIPS**

| UNIT TYPE | WEEKDAY PEAK AM HR. | | | WEEKDAY PEAK PM HR. | | |
|---|---|---|---|---|---|---|
| | TOTAL | ENTER | EXIT | TOTAL | ENTER | EXIT |
| Marcello's Market & Deli | | | | | | |
| Primary Trips (40%) | 21 | 12 | 9 | 19 | 11 | 8 |
| Pass-By Trips (60%) | 32 | 18 | 14 | 29 | 17 | 12 |
| Office Building | | | | | | |
| Primary Trips (100%) | 14 | 12 | 2 | 14 | 2 | 12 |
| **Total Trips** | 67 | **42** | **25** | 62 | **30** | **32** |

3. Synergy of Internalization – It is expected that there would be shared trips within the development. A portion of the office trips would be shared with trips to/from Marcello's Market & Deli. The percentage would be small which would result in a reduction along Walkley Road of only a couple of vehicles. With the small number of shared trips resulting in a negligible impact on the Walkley Road traffic, the analysis has not applied a shared trip reduction to the site generated trips.

## Element 3.1.2 – Trip Distribution

The direction of site generated trips to/from the office building would be represented by the distribution of commuters travelling to/from work during peak hours. The distribution of trips to/from the deli with a high pass-by trip ratio would be from the same direction as existing traffic along Walkley Road. The analysis has distributed the site generated primary and pass-by trips to the same peak hour proportion as were determined from the traffic counts taken by the City of Ottawa. The trip distribution utilized in the study for both the weekday peak AM hour and PM hour time periods is shown in Figure 3.1.

## Element 3.1.3 – Trip Assignment

The trip assignment has utilized the trip distribution of Figure 3.1 and assigned the expected primary and pass-by trips for the total development of the commercial development. The East Access will be the drive-through exit for trips from the Marcello's Market & Deli. The study has assumed that 25 percent of the primary and pass-by trips would use the drive-through, entering at the West Access and exiting at the East Access. All office trips would enter and exit at the West Access. Figure 3.2 presents the expected primary trips for the site and Figure 3.3 the pass-by trips for the total development.

**FIGURE 3.1**
**PEAK AM AND PM HOUR SITE GENERATED TRIP DISTRIBUTION**

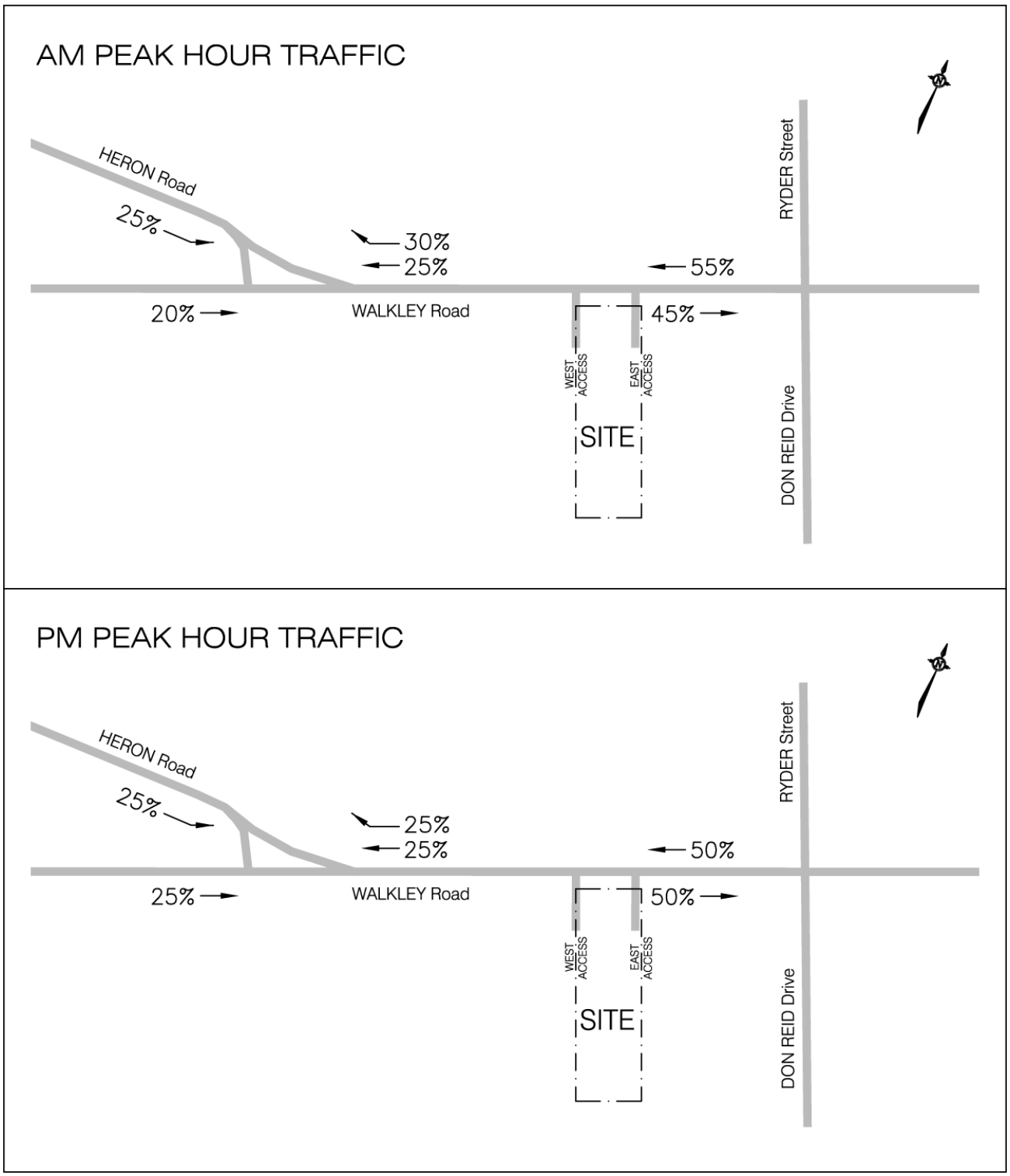



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**FIGURE 3.2**
**PEAK AM AND PM HOUR SITE GENERATED PRIMARY TRIPS**

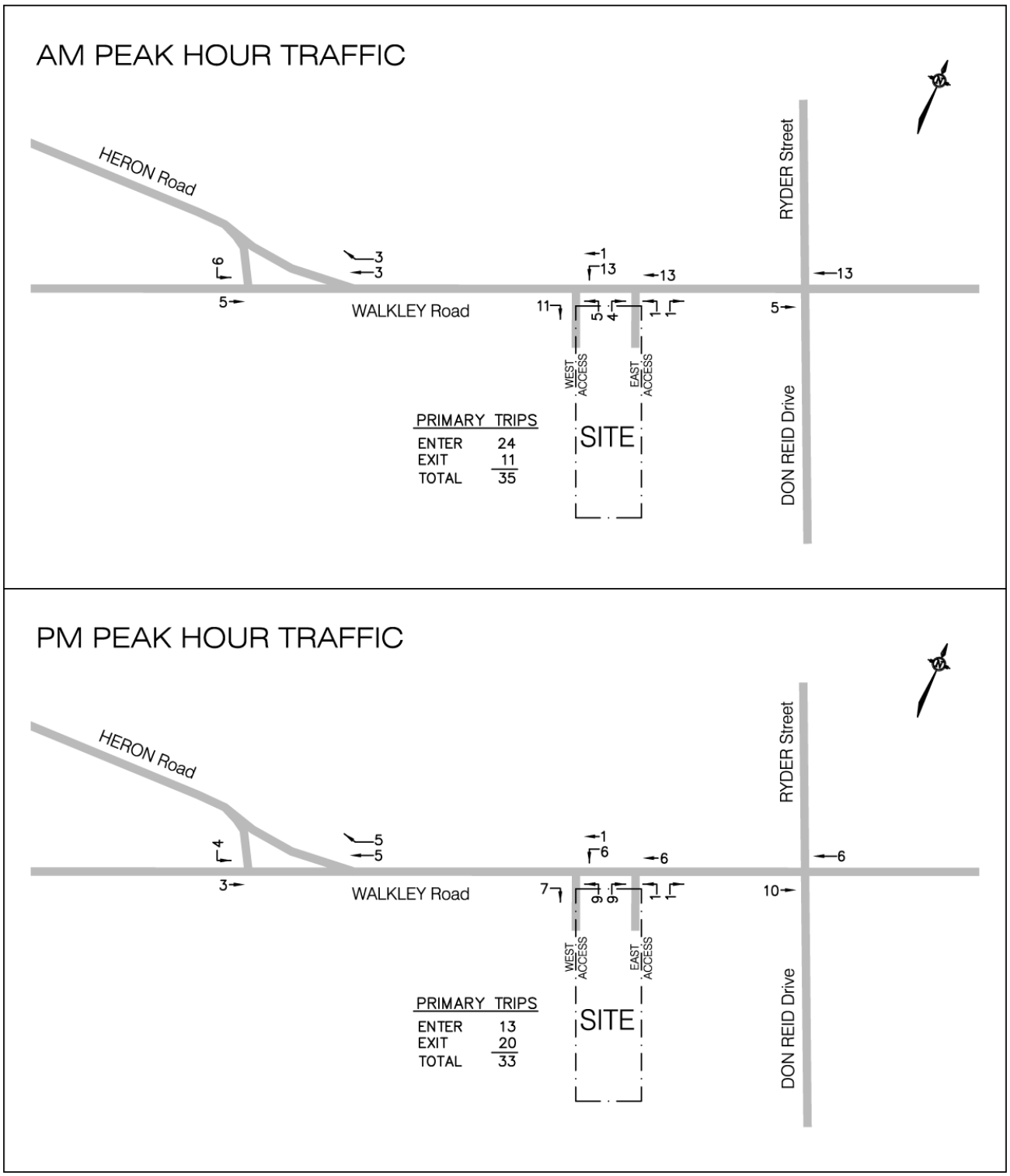


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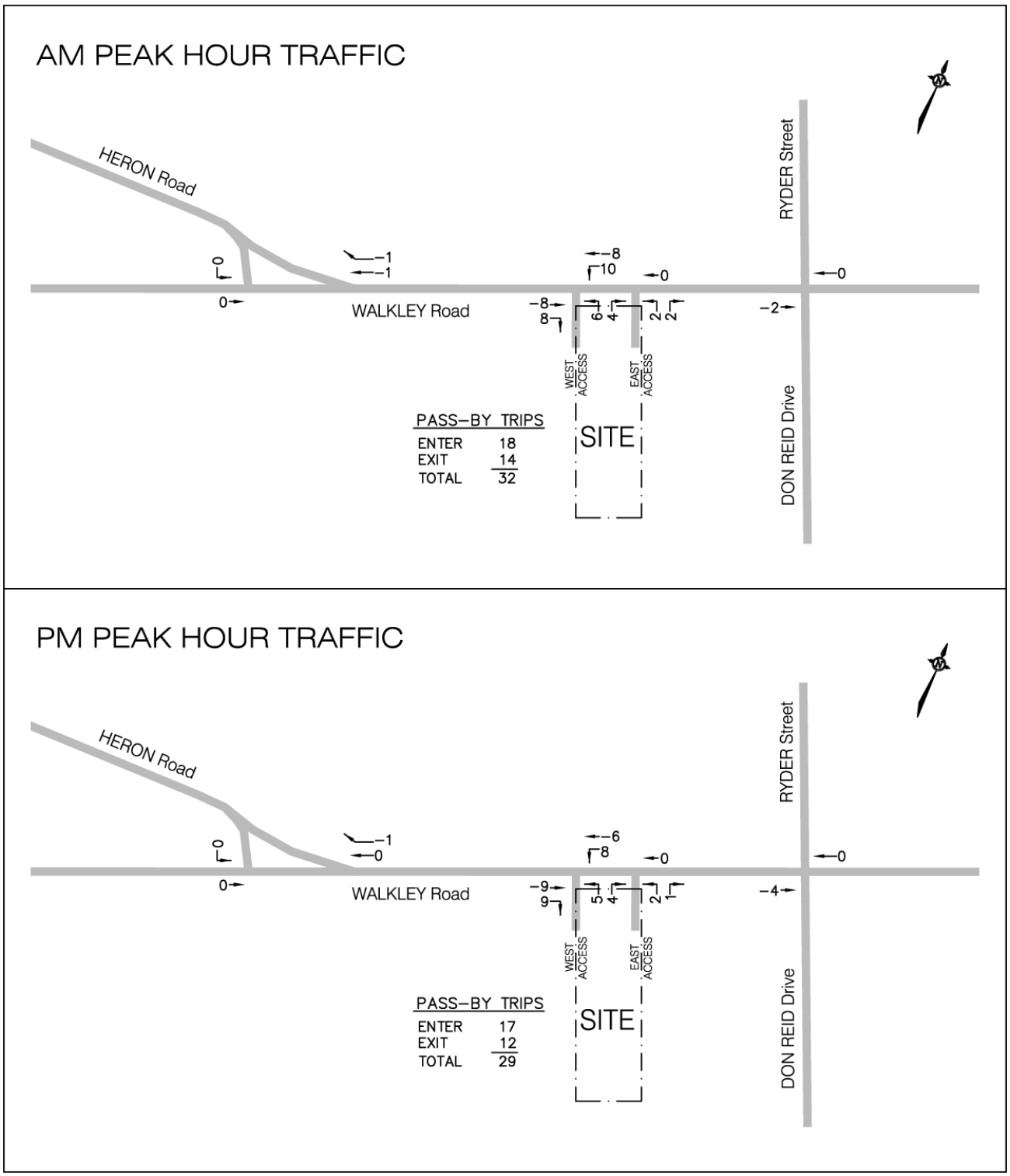
**FIGURE 3.3**
**PEAK AM AND PM HOUR SITE GENERATED PASS-BY TRIPS**

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## MODULE 3.2 – Background Network Travel Demands

### Element 3.2.1 – Transportation Network Plans

The City of Ottawa TMP has not identified any changes in the affordable road network of the surrounding area within the horizon years of the study. The study has utilized the existing transportation network in the vicinity of the site and applied a background traffic growth factor to account for the expected increase in traffic from outside the study area.

### Element 3.2.2 – Background Growth

The background growth in traffic represents the increase in traffic due to development outside the study area. The trip trend of trips to/from the Alta Vista area for all purposes was examined in the *National Capital Region Travel Trends* document prepared by IBI Group. The document showed that for all purposes the number of trips has decreased between the years 2005 and 2011.

Traffic counts were obtained from the City of Ottawa at the Walkley Heron intersection. The counts were taken on June 26, 2013 and February 22, 2018. The counts determined that the traffic along Walkley Road past the site increased at approximately 2 percent in the eastbound and westbound directions during both the peak AM and PM hours.

The study has assumed that the background traffic would experience an annual compounded increase of 2.0 percent which translates to the following growth factors which were applied to all approaches of the Walkley/Heron and Walkley/Don Reid intersections:

| Walkley/Heron | Walkley/Don Reid |
|---|---|
| 2018 → 2019 = 1.020 | 2016 → 2019 = 1.061 |
| 2018 → 2024 = 1.126 | 2016 → 2024 = 1.172 |

Figure 3.4 shows the expected 2019 unbalanced peak AM and PM hour background traffic volumes at the Walkley/Heron and Walkley/Don Reid intersections, and Figure 3.5 the 2024 peak hour traffic.

Adjacent to the west limit of the site is the Dymon Storage facility. The site is a storage facility where patrons rent a storage locker to store personal items. The facility is open Monday to Friday from 8:00 AM to 9:00 PM. The storage facility has two accesses with the main access at the west side of their property, and a secondary access at the east side which will be a shared access with the Marcello's Market & Deli site's West Access. The Dymon storage facility does not generate many trips. The study analysis has not assumed any peak AM or PM hour trips to be generated by the storage facility at the secondary access (shared with the proposed site's West Access).

### Element 3.2.3 – Other Developments

There are no significant developments within the surrounding area which would add additional trips to the background traffic.

**FIGURE 3.4**
**2019 PEAK AM AND PM HOUR BACKGROUND TRAFFIC**

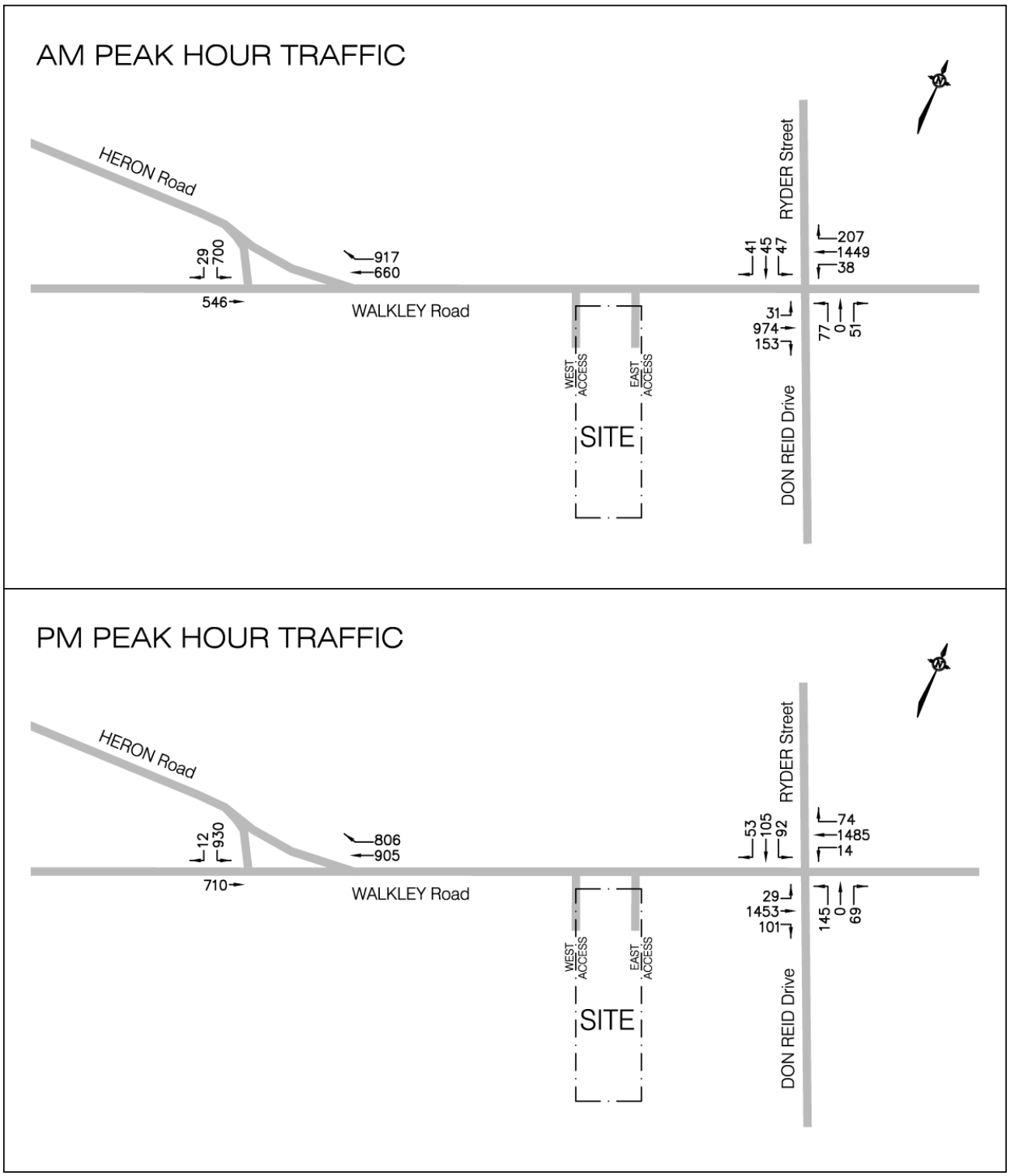
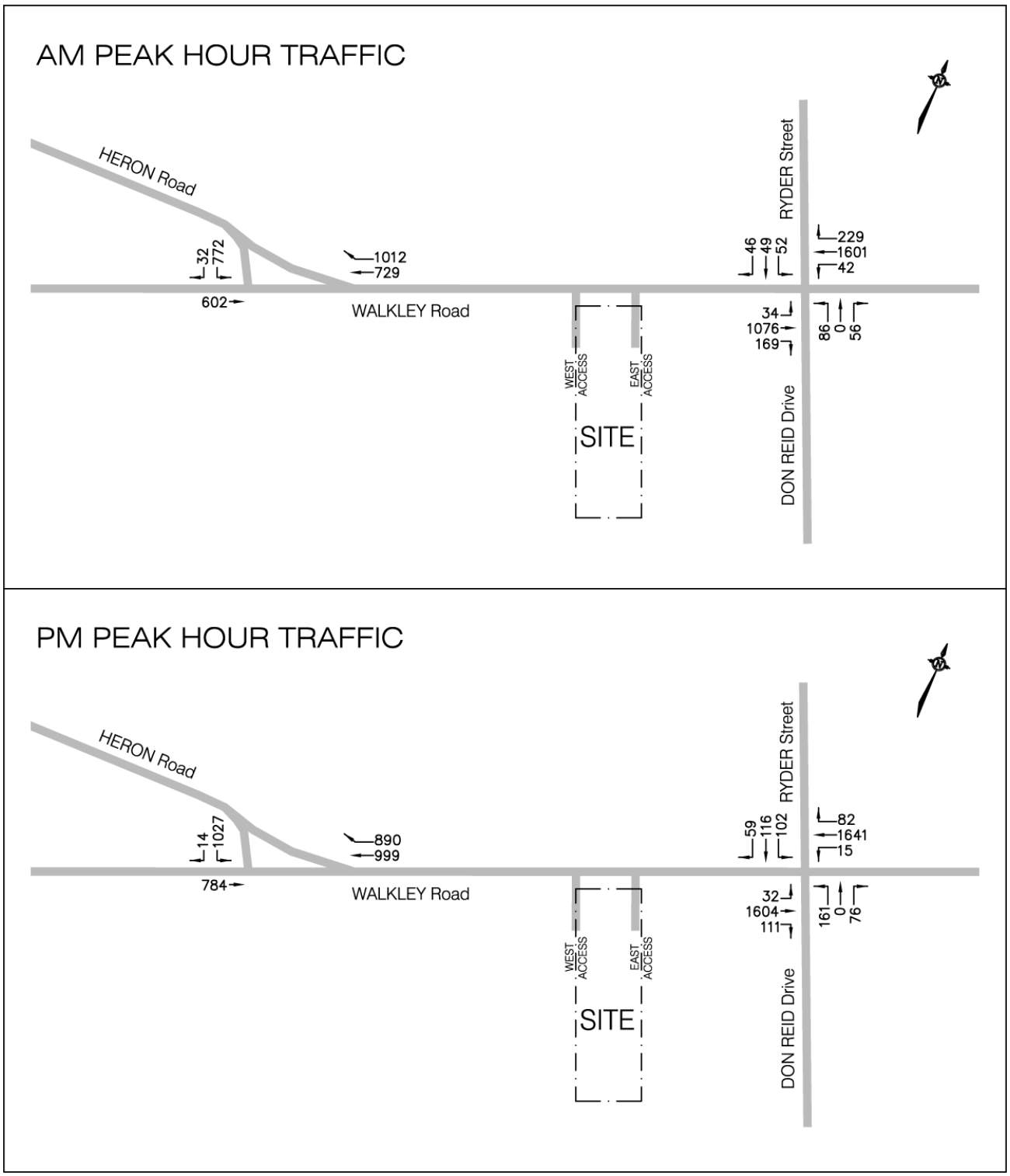


**FIGURE 3.5**
**2024 PEAK AM AND PM HOUR BACKGROUND TRAFFIC**

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## MODULE 3.3 – Demand Rationalization

The proposed site is relatively small and would generate a low volume of new site generated trips. The Marcello's Market & Deli use would also produce a significant number of pass-by trips which would not add to the background traffic. Preliminary analysis has determined that future traffic within the study area including the expected trips from the proposed site would not exceed the capacity of the roads and intersections. There would be no justification to shift travel demands or make changes to the trip generation assumptions within the study area.

## STEP 4 - ANALYSIS

## MODULE 4.1 – Development Design

### Element 4.1.1 – Design for Sustainable Modes

The Marcello's Market & Deli has a front door at the north side of the building facing Walkley Road which provides easy access to the building from the pedestrian sidewalks along Walkley Road. Interior sidewalks through the parking lot provide access to the proposed office building at the rear of the site.

Bicycle racks are provided close to the main door to the deli and main entrance to the office building.

OC Transpo bus service exists along Walkley Road. The bus stop for eastbound service is located at a 65 m walk from the building entrances to a stop just west of the site. Westbound bus stops are a 210 m walk where westbound riders must cross at the Walkley/Don Reid intersection to access a stop on the north side of Walkley Road. The location of the bus stops is shown in Figure 2.1.

### Element 4.1.2 – Circulation and Access

The site will share an access with Dymon Storage. The west access will have a total width of 10.0 m with a 1.0 m median and 4.5 m entering and exiting lanes. Service vehicles to the site would consist of small delivery trucks and a garbage truck. Both vehicles are able to enter, circulate and exit the site without a problem. The loading area and garbage area for the deli are at the rear (south side) of the building.

The East Access will be a one-way exit from the drive-through. The aisle will have a width of 3.75 m, and will have sufficient storage for 11 vehicles from the pickup window. The storage of vehicles and drive-through design would satisfy the City of Ottawa *Urban Design Guidelines for Drive-Through Facilities*.

### Element 4.1.3 – New Street Networks

Exempt as determined in the Scoping module.

## MODULE 4.2 – Parking

### Element 4.2.1 – Parking Supply

The Site Plan provides 92 parking spaces which include 4 barrier free spaces for both the Marcello's Market & Deli and office building uses. The site meets the City of Ottawa Zoning By-law which requires a minimum of 83 parking spaces.

### Element 4.2.2 – Spillover Parking

Exempt as determined in the Scoping module.

## MODULE 4.3 – Boundary Street Design

The City of Ottawa Complete Streets concept allows for the safe movement of everyone whether they choose to walk, bike, drive or take public transit. The boundary roads to the site would consist of the existing street of Walkley Road.

Walkley Road provides a 2 m sidewalk along both sides of the road. The intersections of Walkley/Heron and Walkley/Don Reid are both controlled by traffic signals with pedestrian cross walks and pedestrian signal heads.

OC Transpo bus service and bus stops are in close proximity to the site and would be sufficient to accommodate the proposed development.

Table 4.1 shows the collision history over a three year period between 2014 and 2016 which was obtained from the City of Ottawa site, *Open Data Ottawa*. The collision data was obtained for the boundary street of Walkley Road and the Walkley/Heron and Walkley/Don Reid intersections. The data of Table 4.1 determined a pattern of rear end collisions being the most prominent form of collision which would be mainly attributed to a high volume of traffic along Walkley Road.

Walkley Road provides the elements which would maximize the objectives of the Multi-Modal Level of Service (MMLOS).

## MODULE 4.4 – Access Intersection Design

### Element 4.4.1 – Location and Design of Access

The site contains two accesses. The West Access is the main access to the development and will be shared with the Dymon Storage facility. The East Access to the site is the exit to the drive-through aisle which is located approximately 35 m from the access to the Cornerstone Children's Centre located at the southwest corner of the Walkley/Don Reid intersection. The main access to the Cornerstone Children's Centre is located off of Don Reid Drive.

On the north side of Walkley Road across from the site, the land uses comprise of residential homes with private driveways onto Walkley Road.

**TABLE 4.1**
**WALKLEY ROAD COLLISION SUMMARY (2014 to 2016)**

| YEAR | COLLISION TYPE | | | | | TOTAL |
|---|---|---|---|---|---|---|
| | REAR END | ANGULAR | TURNING | SIDESWIPE | OTHER | |
| **Walkley Road at Heron Road Intersection** | | | | | | |
| 2014 | 3 | 1 | 0 | 1 | 0 | 5 |
| 2015 | 3 | 1 | 0 | 2 | 1 | 7 |
| 2016 | 3 | 1 | 0 | 3 | 1 | 8 |
| **Walkley Road at Don Reid Drive** | | | | | | |
| 2014 | 4 | 1 | 2 | 0 | 0 | 7 |
| 2015 | 2 | 5 | 1 | 1 | 1 | 10 |
| 2016 | 0 | 5 | 0 | 0 | 0 | 5 |
| **Walkley Road (Heron Road to Don Reid Drive)** | | | | | | |
| 2014 | 1 | 0 | 0 | 0 | 0 | 1 |
| 2015 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2016 | 0 | 0 | 0 | 2 | 0 | 2 |

Walkley Road is a four lane divided road with a centre median. The median is a depressed median which will allow left turning movements into the residential homes on the north side and commercial on the south side. The median is 5.0 m in width and provides a refuge for left turning vehicles.

The accesses to the site are located 240 m east of the Walkley/Heron intersection and 135 m west of the Walkley/Don Reid intersection.

The site accesses would have a minor impact on the accesses to adjacent uses and intersections. The location and design of the accesses would have no safety concerns and would be consistent with the City's Access Management Guidelines.

**Element 4.4.2 – Intersection Control**

The accesses would experience a relatively low volume of traffic entering and exiting the site. The access intersections would not trigger a warrant for the installation of traffic control signals or a roundabout.

The East and West accesses would be controlled by a stop sign or an implied stop at the northbound site exit approach.

## Element 4.4.3 – Intersection Design

The intersection analysis will use the *Highway Capacity Software, Version 7.4,* which utilizes the intersection capacity analysis procedure as documented in the *Highway Capacity Manual 2010 and 6th Edition*. For unsignalized intersections the level of service of each lane movement and approach is determined as a function of the delay of vehicles at the approach. The following relates the level of service of each lane movement with the expected control delay at the approach.

| LEVEL OF SERVICE | CONTROL DELAY | |
|---|---|---|
| Level of Service A | 0-10 sec./vehicle | Little or No Delay |
| Level of Service B | >10-15 sec./vehicle | Short Traffic Delays |
| Level of Service C | >15-25 sec./vehicle | Average Traffic Delays |
| Level of Service D | >25-35 sec./vehicle | Long Traffic Delays |
| Level of Service E | >35-50 sec./vehicle | Very Long Traffic Delays |
| Level of Service F | >50 sec./vehicle | Extreme Delays – Demand Exceeds Capacity |

The expected length of queue at the critical lane movements for an unsignalized intersection was determined by the calculation of the 95th percentile queue at the lane approach. The 95th percentile queue length is the calculated 95th greatest queue length out of 100 occurrences at a movement during a 15-minute peak period. The 95th percentile queue length is a function of the capacity of a movement and the total expected traffic, with the calculated value determining the magnitude of the queue by representing the queue length as fractions of vehicles.

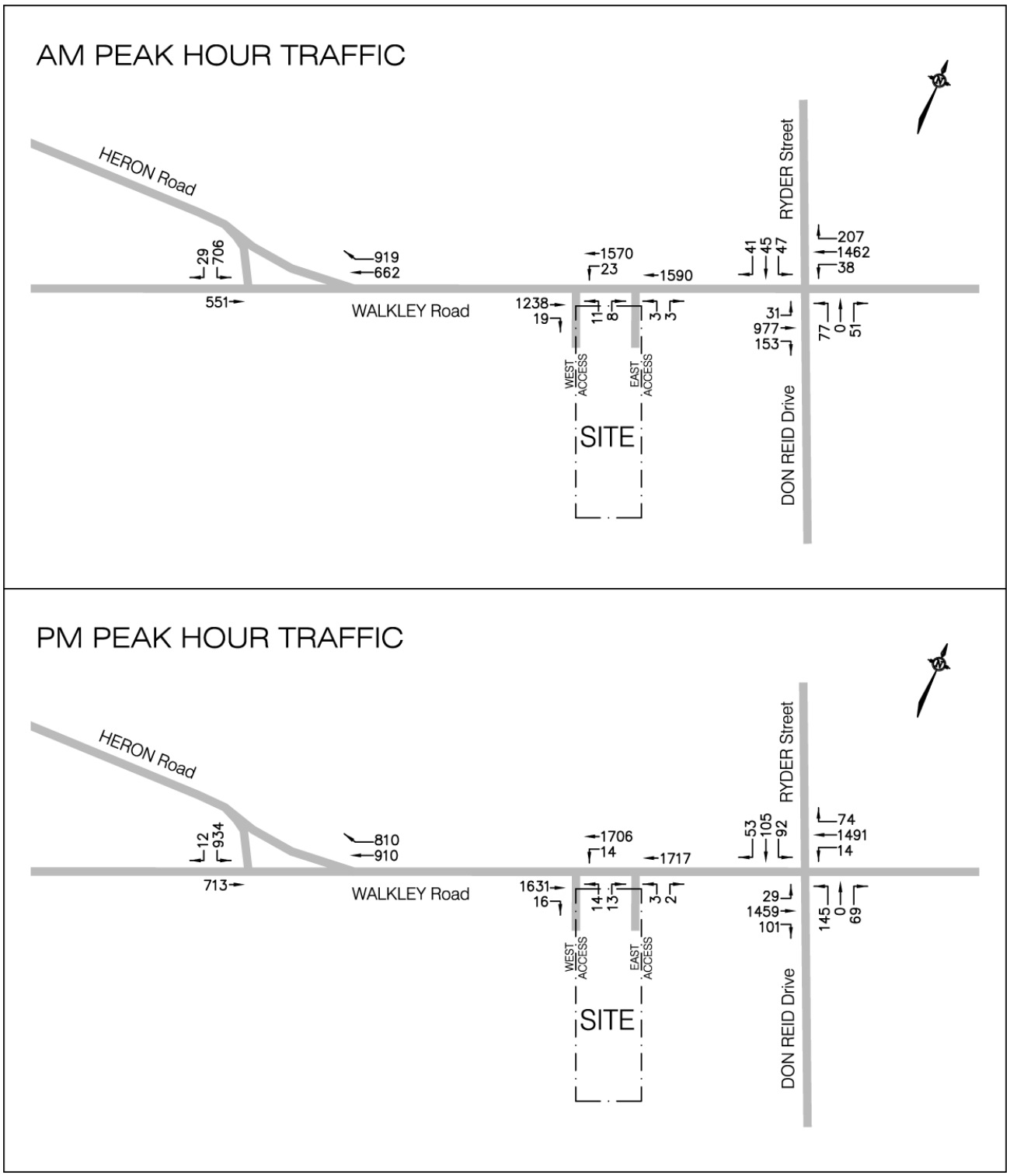
For a signalized intersection, the operation or level of service of an intersection is determined from the volume to capacity ratio (v/c) for each lane movement as documented by the City of Ottawa in the *Transportation Impact Assessment Guidelines (2017).* The following relates the level of service with the volume to capacity ratio at each lane movement.

| LEVEL OF SERVICE | VOLUME TO CAPACITY RATIO |
|---|---|
| Level of Service A | 0 to 0.60 |
| Level of Service B | 0.61 to 0.70 |
| Level of Service C | 0.71 to 0.80 |
| Level of Service D | 0.81 to 0.90 |
| Level of Service E | 0.91 to 1.00 |
| Level of Service F | > 1.00 |

The number of new site generated auto-trips was determined utilizing the Peak Hour Future Development Generated Person-Trips (Table 3.4) which were discussed in Element 3.1.1. One auto-trip was assumed to be the same as one auto driver trip from Table 3.4. The distribution of trips entering the site and trips exiting the site (Table 3.5) was determined for the primary trips in Figure 3.1 and for the pass-by trips in Figure 3.2.

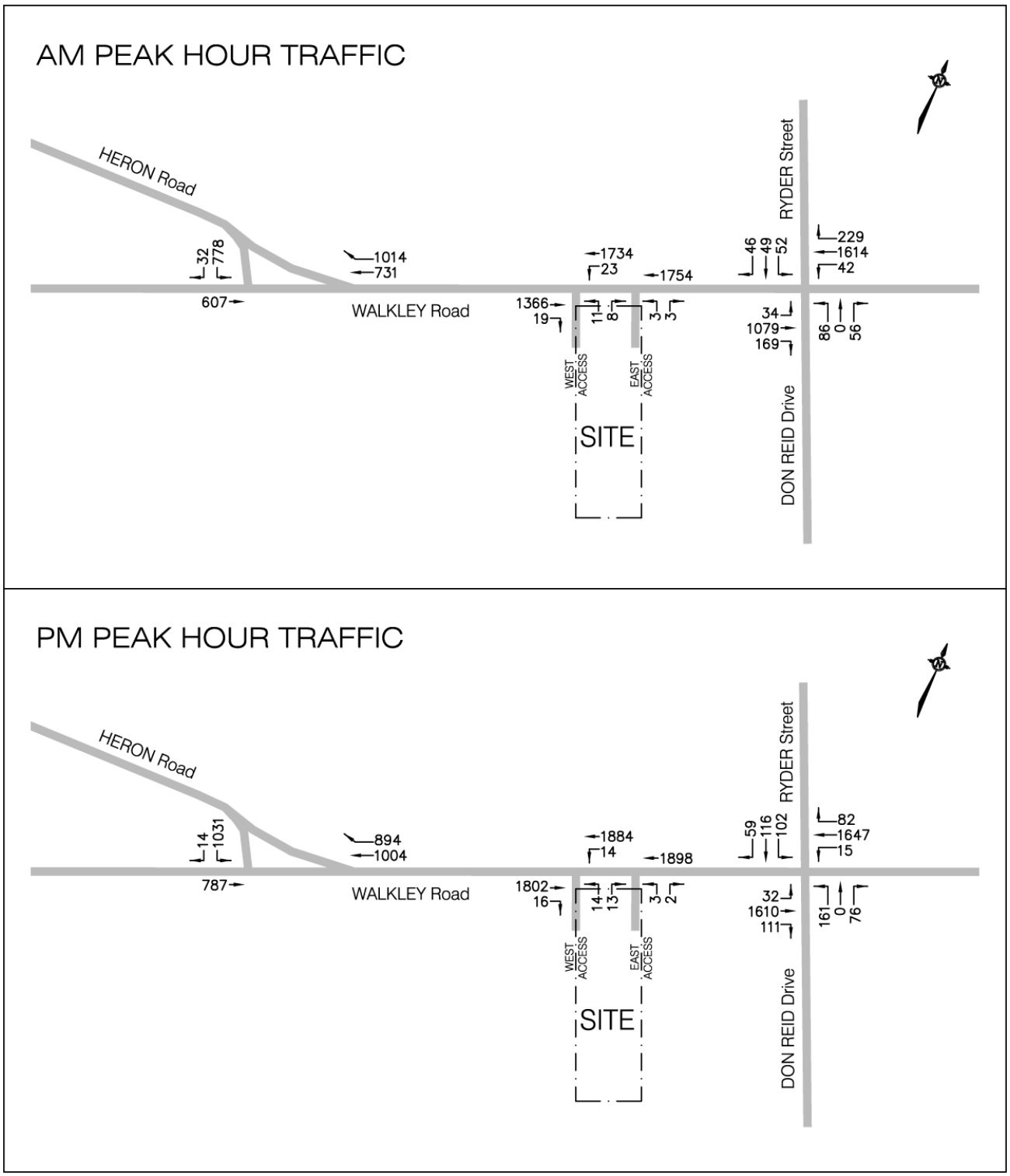
The total traffic is the sum of the peak hour site generated trips (Figure 3.1) and pass-by trips (Figure 3.2), and the peak hour background traffic (Figure 3.3 for the year 2019 and Figure 3.4 for the year 2024). Figure 4.1 presents the total 2019 peak hour vehicular traffic and Figure 4.2 the total 2024 peak hour vehicular traffic.

**FIGURE 4.1**
**2019 PEAK AM AND PM HOUR TOTAL TRAFFIC**




NOT TO SCALE

**FIGURE 4.2**
**2024 PEAK AM AND PM HOUR TOTAL TRAFFIC**




NOT TO SCALE

## VEHICULAR LEVEL OF SERVICE (LOS) - Intersection Capacity Analysis

East Access and Walkley Road Intersection

The East Access is a one-way exit from the drive-through aisle. The access is controlled by the installation of an implied stop at the northbound left/right turn movement.

For the expected 2019 traffic, the northbound left/right turn movement functioned at a Level of Service (LoS) "C" during the peak AM hour and at a LoS "D" during the peak PM hour. The 2019 operation of the intersection is summarized in Table 4.2 with the analysis sheets provided in the Appendix as Exhibit 4 for the peak AM hour and Exhibit 5 for the peak PM hour.

**TABLE 4.2**
**EAST ACCESS AND WALKLEY INTERSECTION – LoS & Control Delay**

| Intersection Approach | WEEKDAY PEAK AM HOUR YEAR 2019 (2024) | | WEEKDAY PEAK PM HOUR YEAR 2019 (2024) | |
|---|---|---|---|---|
| | LoS | Delay (sec/veh) | LoS | Delay (sec/veh) |
| NB Left/Right – Access (Exit) | C (C) | 20.4 (22.8) | D (E) | 31.2 (37.6) |

At the year 2024 the northbound movement would function at a LoS "C" during the peak AM hour and at a LoS "E" during the peak PM hour. The LoS "E" during the peak PM hour is due to the increasing volume of background traffic. The PM hour approach delay was determined to be 37.6 seconds which would be considered acceptable. The operation of the intersection is summarized in Table 4.2 with the analysis sheets provided as Exhibit 6 and Exhibit 7.

The 95$^{th}$ percentile queue was determined to be 0.1 vehicles during both the 2024 peak AM and PM hours. The site exit would provide a clear throat distance of 35 m between the pickup window and the sidewalk. The clear throat distance exceeded the guidelines documented in the Transportation Association of Canada, *Geometric Design Guide for Canadian Roads*.

The East Access would operate at an acceptable level of service and there would be no requirement for roadway modifications to Walkley Road.

West Access and Walkley Road Intersection

The West Access is the main access to both Marcello's Market & Deli and to the office building at the south portion of the site. All trips to the drive-through aisle would enter at the West Access.

The West Access is 10 m in width with a centre median which would provide a 4.5 m lane entering and a 4.5 m lane exiting the site. The access is shared with the Dymon Storage facility

adjacent to the property. The storage facility generates a very small number of trips, especially during the peak AM and PM hours. The analysis has not applied any site trips generated by the storage facility.

The analysis using the expected 2019 traffic determined that the westbound left turn movement would function at a LoS "B" and northbound site exit at a LoS "C" during the peak AM hour. During the peak PM hour the westbound left turn movement would function at a LoS "C" and site exit at a LoS "D". Table 4.3 summarizes the 2019 operation of the intersection with the analysis sheets provided as Exhibit 8 for the peak AM hour and Exhibit 9 for the peak PM hour.

**TABLE 4.3**
**WEST ACCESS AND WALKLEY INTERSECTION – LoS & Control Delay**

| Intersection Approach | WEEKDAY PEAK AM HOUR YEAR 2019 (2024) | | WEEKDAY PEAK PM HOUR YEAR 2019 (2024) | |
|---|---|---|---|---|
| | LoS | Delay (sec/veh) | LoS | Delay (sec/veh) |
| WB Left – Walkley | B (B) | 12.4 (13.5) | C (C) | 15.7 (17.8) |
| NB Left/Right – Access (Exit) | C (D) | 22.6 (25.8) | D (E) | 34.2 (42.7) |

For the expected 2024 traffic, the westbound left turn movement functioned at a LoS "B" and the northbound exit movement at a LoS "D" during the peak AM hour. During the peak PM hour the westbound left turn movement functioned at a LoS "C" and the northbound site exit at a LoS "E" with an approach delay of 42.7 seconds. Table 4.3 summarizes the operation of the intersection with the analysis sheets provided as Exhibits 10 and 11.

The 95$^{th}$ percentile queue during the peak PM hour at the westbound left turn movement was 0.2 vehicles and 0.9 vehicles at the northbound site exit. The clear throat length at the site exit is approximately 20 m.

The West Access would operate at an acceptable level of service and there would be no requirement for roadway modifications to Walkley Road.

Walkley Road and Heron Road Intersection

The intersection of Walkley Road and Heron Road is controlled by traffic signals. The Walkley Road westbound right turn movement and southbound Heron Road right turn movement are channelized. The eastbound Walkley Road left turn movement is prohibited with the exception of buses and taxis.

The operational analysis using the 2018 traffic counts determined that all approaches to the intersection functioned at a LoS "A" during the peak AM hour and a LoS "A" to LoS "C" during

the peak PM hour. Table 4.4 summarizes the operation of the intersection with the analysis sheets provided as Exhibit 12 and Exhibit 13.

**TABLE 4.4**
**WALKLEY ROAD AND HERON INTERSECTION – LoS & v/c Ratio**

| Intersection Approach | WEEKDAY PEAK AM HOUR YEAR *2018* 2019 (2024) | | WEEKDAY PEAK PM HOUR YEAR *2018* 2019 (2024) | |
|---|---|---|---|---|
| | LoS | v/c Ratio | LoS | v/c Ratio |
| EB Through – Walkley | *A* A (A) | *0.357* 0.368 (0.406) | *A* A (A) | *0.468* 0.479 (0.529) |
| WB Through – Walkley | *A* A (A) | *0.436* 0.446 (0.492) | *A* A (B) | *0.582* 0.597 (0.659) |
| SB Left – Heron | *A* A (B) | *0.567* 0.584 (0.643) | *C* C (D) | *0.728* 0.745 (0.823) |

The analysis using the expected 2019 traffic following the development of the site determined that all approaches functioned at a LoS "A" during the peak AM hour, and at a LoS "A" to "C" during the peak PM hour. Table 4.4 summarizes the operation of the intersection with the analysis sheets provided as Exhibit 14 for the peak AM hour and Exhibit 15 the peak PM hour.

For the expected 2024 traffic, all approaches to the intersection would function at a LoS "A" to LoS "B" during the peak AM hour, and LoS "A" to LoS "D" during the peak PM hour. The lower level of service during the peak PM hour is attributed to the increasing growth in background traffic. Table 4.4 summarizes the operation of the intersection with the analysis sheets provided as Exhibits 16 and 17.

The Walkley/Heron intersection would operate at an acceptable level of service with no requirement for intersection modifications due to the development of the site.

Walkley Road and Don Reid Drive (Ryder Street) Intersection

The intersection of Walkley Road and Don Reid Drive is controlled by traffic signals. Don Reid Drive forms the northbound-southbound street south of Walkley Road, and Ryder Street the northbound-southbound street north of Walkley Road. Signs prohibit trucks from travelling north on Ryder Street from the Walkley/Don Reid intersection. Signs are also installed which prohibit all northbound through movements from Don Reid Drive onto Ryder Street.

The operational analysis using the 2016 traffic counts determined that all approaches to the intersection would function between a LoS "A" and LoS "B" during both the peak AM and PM hours. Table 4.5 summarizes the operation of the intersection with the analysis sheets provided as Exhibit 18 and Exhibit 19.

**TABLE 4.5**
**WALKLEY AND DON REID INTERSECTION – LoS & v/c Ratio**

| Intersection Approach | WEEKDAY PEAK AM HOUR YEAR *2016* 2019 (2024) | | WEEKDAY PEAK PM HOUR YEAR *2016* 2019 (2024) | |
|---|---|---|---|---|
| | LoS | v/c Ratio | LoS | v/c Ratio |
| EB Left – Walkley | *A* A (A) | *0.145* 0.181 (0.262) | A A (A) | *0.151* 0.191 (0.294) |
| EB Through – Walkley | *A* A (A) | *0.452* 0.484 (0.543) | *B* C (D) | *0.674* 0.730 (0.832) |
| EB Right – Walkley | *A* A (A) | *0.453* 0.486 (0.547) | *B* C (D) | *0.681* 0.741 (0.851) |
| WB Left – Walkley | *A* A (A) | *0.103* 0.118 (0.153) | *A* A (A) | *0.073* 0.093 (0.140) |
| WB Through – Walkley | *B* B (C) | *0.660* 0.707 (0.789) | *B* C (D) | *0.670* 0.725 (0.829) |
| WB Right – Walkley | *B* C (D) | *0.678* 0.734 (0.830) | *B* C (D) | *0.675* 0.733 (0.843) |
| NB Left – Don Reid | *A* A (A) | *0.397* 0.410 (0.440) | *A* B (C) | *0.587* 0.602 (0.629) |
| NB Through/Right – Don Reid | *A* A (A) | *0.242* 0.239 (0.242) | *A* A (A) | *0.201* 0.202 (0.203) |
| SB Left – Ryder | *A* A (A) | *0.208* 0.215 (0.226) | *A* A (A) | *0.289* 0.294 (0.303) |
| SB Through/Right – Ryder | *A* A (A) | *0.360* 0.367 (0.376) | *A* A (A) | *0.414* 0.417 (0.421) |

All approaches to the intersection would function between a LoS "A" and LoS "C" for the 2019 peak AM and PM traffic. Table 4.5 summarizes the operation of the intersection with the analysis sheets provided as Exhibits 20 and 21 for the 2019 traffic.

For the year 2024 traffic, the approaches to the intersection would function between a LoS "A" and LoS "D" for both the peak AM and PM hours. Table 4.5 summarizes the operation of the intersection with the analysis sheets provided as Exhibit 22 for the peak AM hour and Exhibit 23 for the peak PM hour.

The Walkley/Don Reid intersection would operate at an acceptable level of service with no requirement for intersection modifications due to the development of the site.

## PEDESTRIAN LEVEL OF SERVICE (PLOS)

The pedestrian level of service (PLOS) was determined utilizing the City of Ottawa publication, *Multi-Modal Level of Service (MMLOS) Guidelines*. Table 4.6 presents the level of service for street segments and signalized intersections within the study area, with the analysis for the 2024 PLOS street segment evaluation provided in the Appendix as Exhibit 24.

The level of service for the two signalized intersections is provided as Exhibit 25 for the Walkley/Heron intersection and Exhibit 26 for the Walkley/Don Reid.

**TABLE 4.6**
**PEDESTRIAN LEVEL OF SERVICE (PLOS) – Street Segments & Intersections**

| Street | Segment | Level of Service | Analysis |
|---|---|---|---|
| Walkley Road | Heron Road to Don Reid Drive | E | Exhibit 24 |
| **Intersection** | | **Level of Service** | **Analysis** |
| Walkley Road and Heron Road | | D | Exhibit 25 |
| Walkley Road and Don Reid Drive | | E | Exhibit 26 |

**BICYCLE LEVEL OF SERVICE (BLOS) - Street Segments & Intersections**

The bicycle level of service (BLOS) was determined utilizing the City of Ottawa publication, *Multi-Modal Level of Service (MMLOS) Guidelines*. Walkley Road is classified as an arterial road which is identified as a "Spine Route" in the Cycling Network - Primary Urban plan. Walkley Road does not contain cycling lanes along the road. Table 4.7 presents the level of service for Walkley Road, with the analysis for the 2024 traffic provided as Exhibit 27.

The BLOS was examined for the signalized intersections of Walkley/Heron and Walkley/Don Reid. Table 4.7 presents the level of service for intersections, with the analysis for the 2024 traffic provided as Exhibit 28 and Exhibit 29.

**TABLE 4.7**
**BICYCLE LEVEL OF SERVICE (BLOS) – Street Segments & Intersections**

| Street | Segment | Level of Service | Analysis |
|---|---|---|---|
| Walkley Road | Heron Road to Don Reid Drive | E | Exhibit 27 |
| **Intersection** | | **Level of Service** | **Analysis** |
| Walkley Road and Heron Road | | B | Exhibit 28 |
| Walkley Road and Don Reid Drive | | F | Exhibit 29 |

**TRANSIT LEVEL OF SERVICE (TLOS) - Street Segment**

OC Transpo provides transit service along Walkley Road past the site with bus stop within close proximity to the site.

The transit level of service (TLOS) evaluation methodology and table in the MMLOS Guidelines are intended primarily to be applied along corridors with existing or planned rapid transit or transit priority measures, or along mixed traffic areas which experience parked vehicles,

congestion and private driveways. A TLOS road segment evaluation was conducted for Walkley Road between Heron Road and Don Reid Drive intersections with the results shown in Table 4.8. The evaluation form is provided as Exhibit 30.

The TLOS was examined for the signalized intersections of Walkley/Heron and Walkley/Don Reid. Table 4.8 presents the level of service for intersections, with the analysis for the 2024 traffic provided as Exhibit 31 and Exhibit 32.

**TABLE 4.8**
**TRANSIT LEVEL OF SERVICE (TLOS) – Street Segment**

| **Street** | **Segment** | **Level of Service** | **Analysis** |
|---|---|---|---|
| Walkley Road | Heron Road to Don Reid Drive | D | Exhibit 30 |
| **Intersection** | | **Level of Service** | **Analysis** |
| Walkley Road and Heron Road | | C | Exhibit 31 |
| Walkley Road and Don Reid Drive | | C | Exhibit 32 |

**TRUCK LEVEL OF SERVICE (TkLOS) - Street Segments & Intersections**

The truck level of service (TkLOS) was determined utilizing the City of Ottawa publication, *Multi-Modal Level of Service (MMLOS) Guidelines*. The truck LoS was determined for the Walkley Road street segment between the Heron Road and Don Reid Drive, and the Walkley/Heron and Walkley/Don Reid intersections. Table 4.9 presents the truck level of service for street segments and intersections within the study area, with the analysis for the 2024 traffic provided as Exhibit 33, Exhibit 34 and Exhibit 35.

**TABLE 4.9**
**TRUCK LEVEL OF SERVICE (TkLOS) – Street Segments & Intersections**

| **Street** | **Segment** | **Level of Service** | **Analysis** |
|---|---|---|---|
| Walkley Road | Heron Road to Don Reid Drive | A | Exhibit 33 |
| **Intersection** | | **Level of Service** | **Analysis** |
| Walkley Road and Heron Road | | A | Exhibit 34 |
| Walkley Road and Don Reid Drive | | C | Exhibit 35 |

**MODULE 4.5 – Transportation Demand Management**

Exempt as determined in the Scoping module.

**MODULE 4.6 – Neighbourhood Traffic Management**

**Element 4.6.1 – Adjacent Neighbourhoods**

Exempt as determined in the Scoping module.

**MODULE 4.7 – Transit**

**Element 4.7.1 – Route Capacity**

OC Transpo routes exist along Walkley Road which provides access to the Walkley Transit Station and to other transit route to employment areas, retail and downtown centres. Any transit demand by the development would not exceed the capacity of the surrounding transit network.

**Element 4.7.2 – Transit Priority**

There would be no impact on the travel time of transit due to the access to the development and addition of trips by patrons of the Marcello's Market & Deli and employees of the office building.

**MODULE 4.8 – Review of Network Concept**

Exempt as determined in the Scoping module.

**MODULE 4.9 – Intersection Design**

**Element 4.9.1 – Intersection Control**

The two intersections within the study area are the Walkley/Heron and Walkley/Don Reid intersections. Both intersections are currently controlled by traffic signals. No further modifications are required due to the development.

The site accesses to the development would be low volume accesses which would not trigger the requirement of traffic signals. The East and West Accesses would be controlled by a stop sign installed or implied at the northbound approaches to Walkley Road.

**Element 4.9.2 – Intersection Design**

The intersections and road segments within the study area were analyzed to determine the level of service and operation at the horizon years of the study. The Walkley/Heron and Walkley/Don Reid intersections were examined utilizing the most current City of Ottawa traffic counts and for the expected traffic at the years of 2019 and 2024. The proposed East Access and West Access (existing access and will be shared with Dymon Storage) were analyzed for the expected traffic

at the years of 2019 following the completion of the development, and at the year 2024. A summary of the level of service for the various modes of transportation are summarized in Table 4.10, with the results detailed in the analysis sheets provided as Exhibits in the Appendix.

The analysis determined that the development of the Marcello's Market & Deli would not trigger any modifications to the Walkley/Heron and Walkley/Don Reid intersections or along Walkley Road at the two site access points.

**TABLE 4.10**
**MULTI-MODAL (MMLOS) SUMMARY TABLE**

| **SEGMENTS** | **Level of Service (LoS) – *2016/2018* 2019 (2024)** | | | | |
|---|---|---|---|---|---|
| | **Pedestrian** | **Cyclist** | **Transit** | **Auto** | **Truck** |
| Walkley Road | (E) | (E) | (D) | - | (A) |
| **INTERSECTIONS** | **Level of Service (LoS) – *2016-2018* 2019 (2024)** | | | | |
| | **Pedestrian** | **Cyclist** | **Transit** | **Auto** | **Truck** |
| Walkley/Heron | (D) | (B) | (C) | *A* A (A) | (A) |
| Walkley/Don Reid | (E) | (F) | (C) | *A* A (A) | (C) |

**TIA STRATEGY REPORT**

The study determined that the full development of the site would not trigger the requirement for roadway modifications to Walkley Road or the Walkley/Heron and Walkley/Don Reid intersections.

The two site accesses would function at an acceptable level of service and each access would comprise of one lane entering and one lane exiting the site. The accesses would be full movement accesses which would utilize the centreline depressed median along Walkley Road for the storage of westbound left turning vehicles into the site. Both accesses would be a "T" intersection with the access forming the northbound stop controlled approach. There would be no requirement for modifications to Walkley Road to accommodate the accesses.

The Multi-Modal Level of Service (MMLOS) was examined for the street segment of Walkley Road and the Walkley/Heron and Walkley/Don Reid intersections. A summary of the operation of the roads and intersections within the study area are shown in Table 4.10. The minimum desirable MMLOS targets by Official Plan Policy/Designation & Road Class was compared to that calculated for the roadway element and it was determined that the Transit, Auto and Truck target were met for an Arterial Employment Area. The pedestrian (PLOS) and the cycling (BLOS) targets for a "Spine Route" were not met. The reasons for not meeting the target for the pedestrian calculation were the speed of traffic along Walkley Road and the absence of a

boulevard between the roadway and the sidewalk. For the BLOS the target was not met due to the speed of traffic along Walkley Road and the lack of any cycling facilities along the road. Any improvements to the PLOS and BLOS could be addressed under various roadway modification programs, but would not be the responsibility of the owners of the 1850 Walkley Road site.

Prepared by:

David J. Halpenny, M. Eng., P. Eng.

# APPENDIX

## SCREENING FORM

## TRAFFIC COUNTS

## VEHICULAR TRAFFIC ANALYSIS

## PLOS, BLOS, TLOS and TkLOS SEGMENT EVALUATIONS

**EXHIBIT 1**
**SCREENING FORM**

# TIA SCREENING FORM

| **1. Description of Proposed Development** | |
|---|---|
| Municipal Address | 1850 Walkley Road, Ottawa |
| Description of Location | The development will consist of a sit-down restaurant with a drive-through window, and an office building at the rear. The site is located on the south side of Walkley Road approximately 250m east of the Walkley/Heron intersection. |
| Land Use Classification | The property is currently zoned IL[939] S240 "Light Industrial Zone". The zoning will support the proposed development. |
| Development Size (units) | |
| Development Size ($m^2$) | Total Land = 7,417.5 $m^2$ |
| Number of Accesses and Locations | One access to be shared with Dymon Storage on west side of property, and one drive-through exit. |
| Phase of Development | Single Phase |
| Buildout Year | 2019 |

| **2. Trip Generation Trigger** | |
|---|---|
| Land Use Type | Restaurant with drive-through, plus office. |
| Development Size | GFA = Restaurant 700 $m^2$, GFA = Office 1,100 $m^2$ |
| Trip Generation Trigger Satisfied? | Yes |

| **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? | Yes |
| Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone? | No |
| Location Trigger Satisfied? | Yes |

| **4. Safety Triggers** | |
|---|---|
| | Yes/No |
| Are posted speed limits on a boundary road 80 km/h or greater? | No |
| Are there any horizontal/vertical curvatures on a boundary street which limits sight lines at a proposed driveway? | No |
| Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (300 m rural conditions or 150 m urban/suburban conditions)?<br>**140 m (centreline of property to centreline of Don Reid Drive)** | Yes |
| Is the proposed driveway within the auxiliary lanes of an intersection? | No |
| Does the proposed driveway make use of an existing median break that serves an existing site? | No |
| Is there a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development? | No |
| Does the development include a drive-thru facility? | Yes |
| Safety Trigger Satisfied? | Yes |

| **5. Summary** | |
|---|---|
| | Yes/No |
| Does the development satisfy the Trip Generation Trigger? | Yes |
| Does the development satisfy the Location Trigger? | Yes |
| Does the development satisfy the Safety Trigger? | Yes |

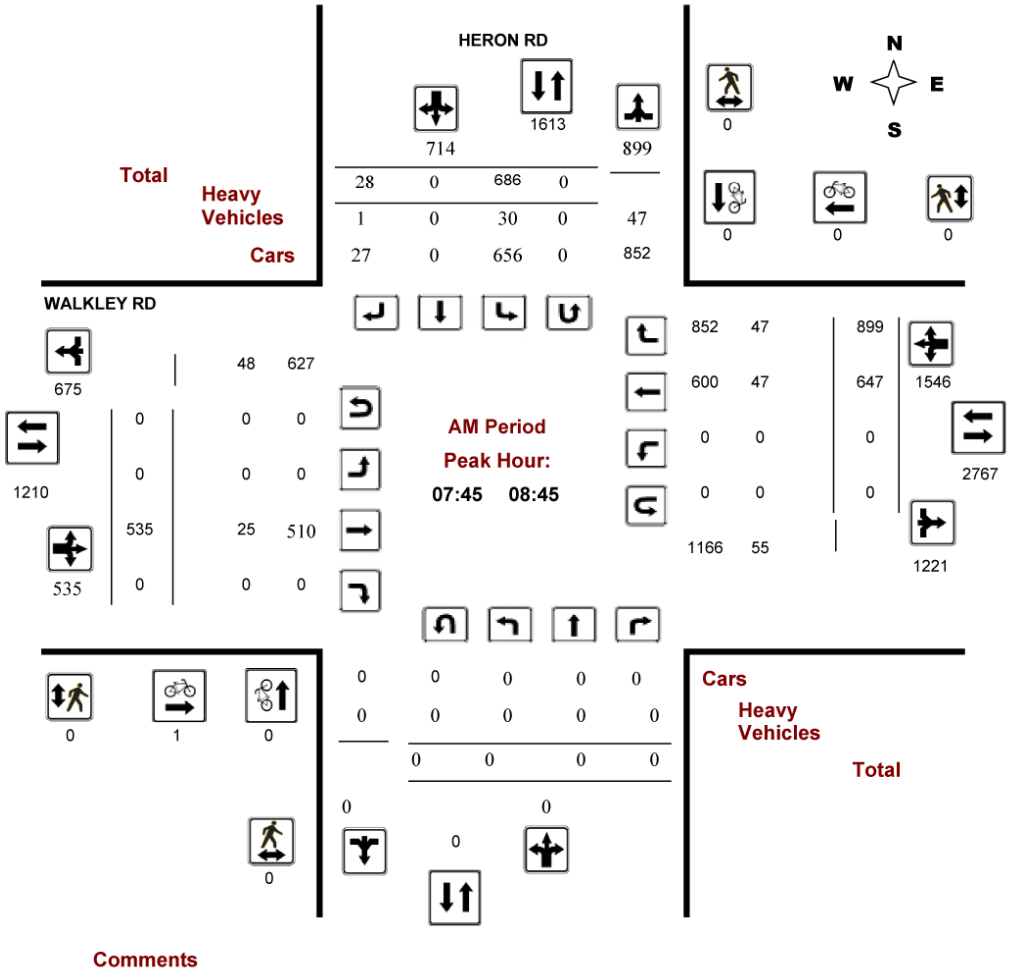
**EXHIBIT 2**
**2018 PEAK AM HOUR TRAFFIC COUNTS – Heron/Walkley**

## Transportation Services - Traffic Services

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

### HERON RD @ WALKLEY RD

**Survey Date:** Thursday, February 22, 2018 **WO No:** 37562
**Start Time:** 07:00 **Device:** Miovision




**Comments**

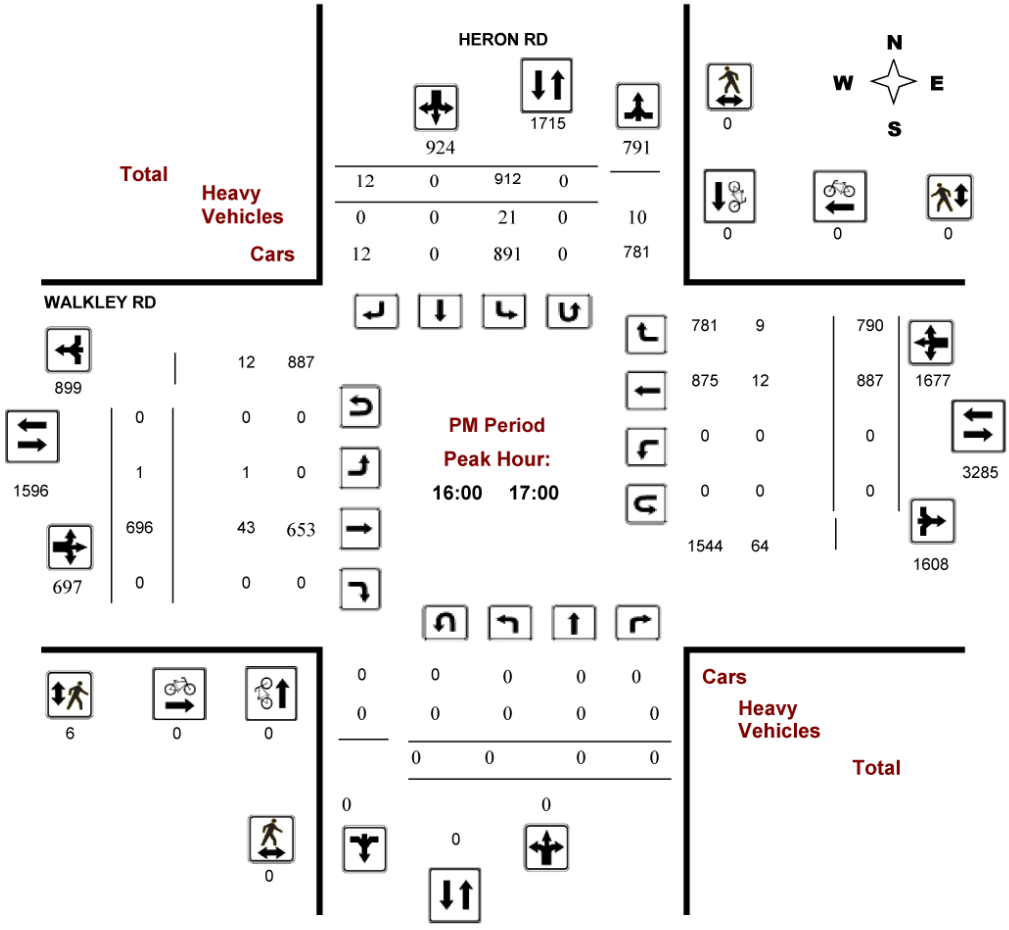
## Transportation Services - Traffic Services

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

### HERON RD @ WALKLEY RD

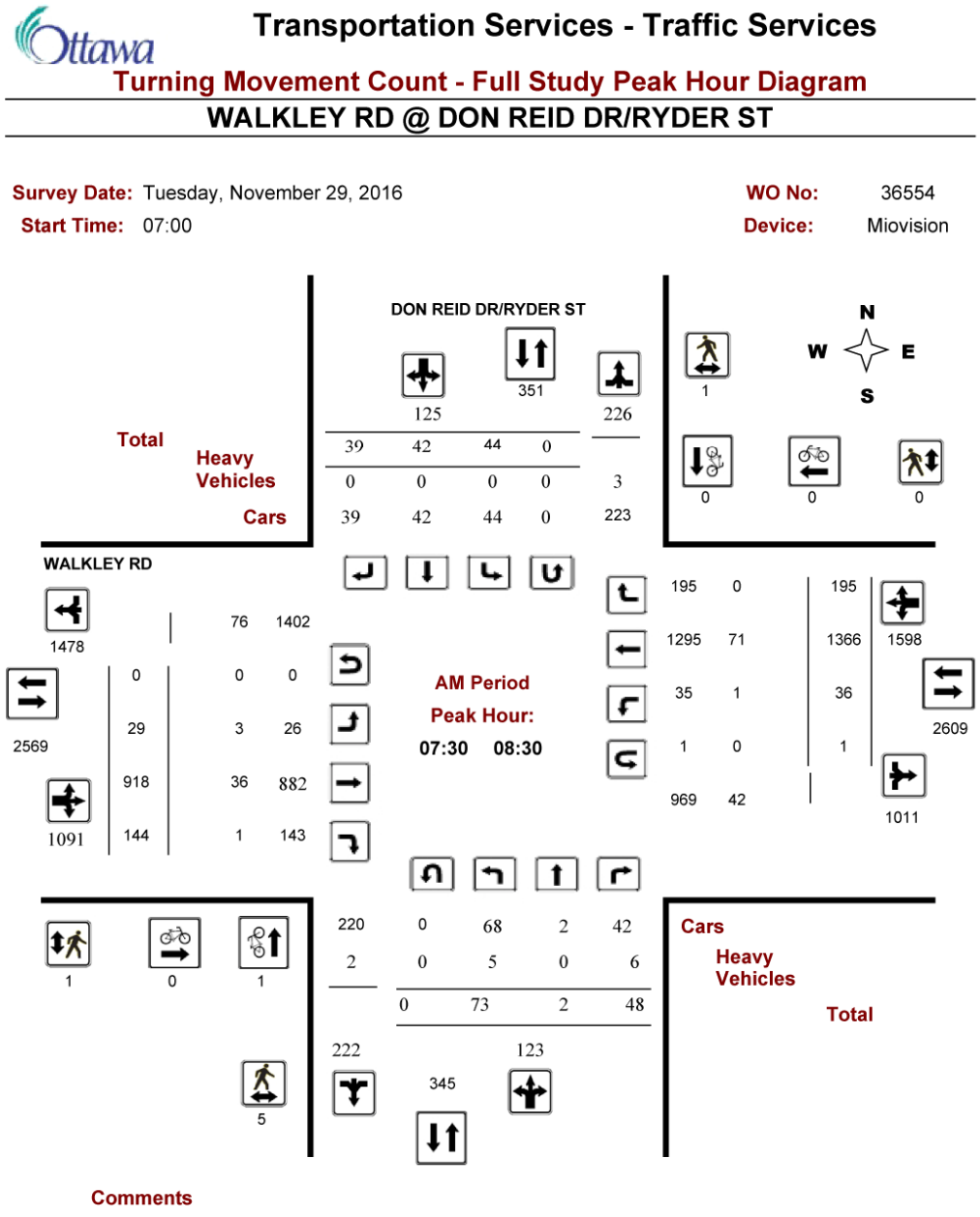
**Survey Date:** Thursday, February 22, 2018 **WO No:** 37562

**Start Time:** 07:00 **Device:** Miovision




**Comments**

**EXHIBIT 3**
**2016 PEAK AM HOUR TRAFFIC COUNTS – Walkley/Don Reid**



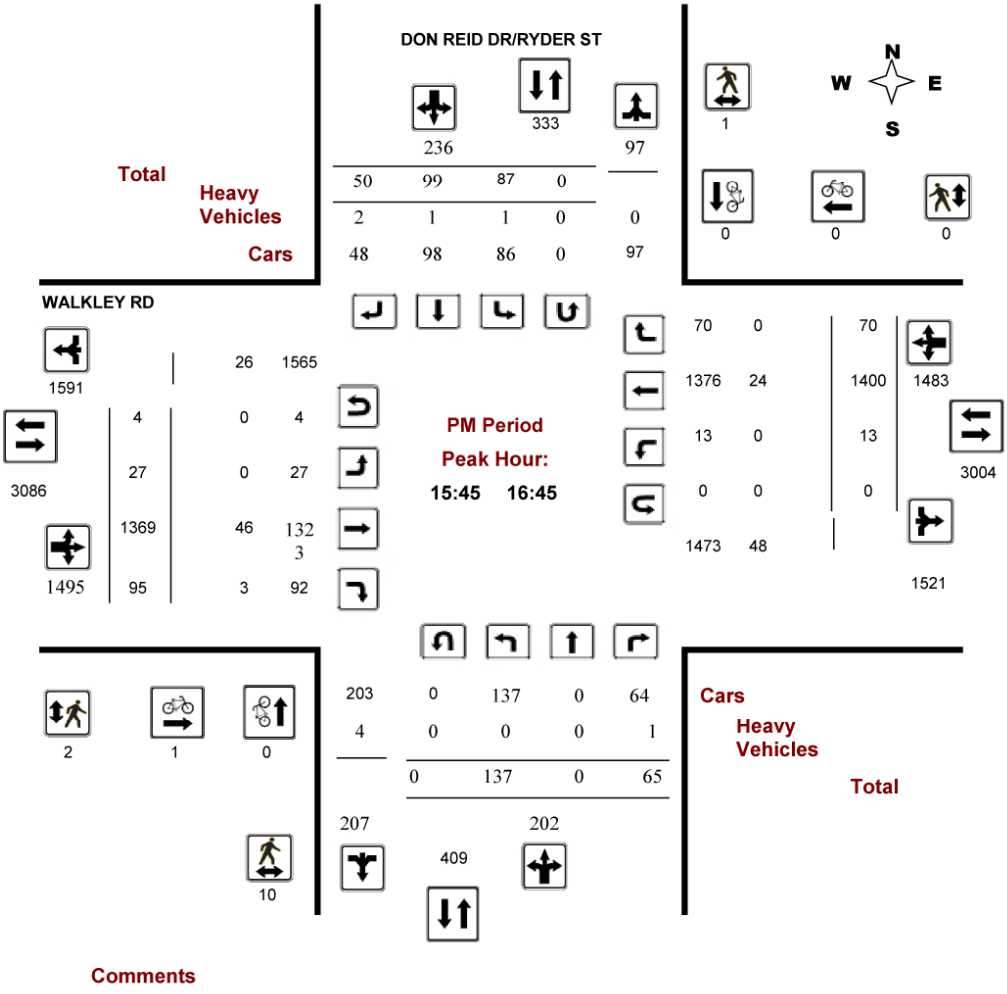
## Transportation Services - Traffic Services

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

### WALKLEY RD @ DON REID DR/RYDER ST

**Survey Date:** Tuesday, November 29, 2016 **WO No:** 36554

**Start Time:** 07:00 **Device:** Miovision




**Comments**

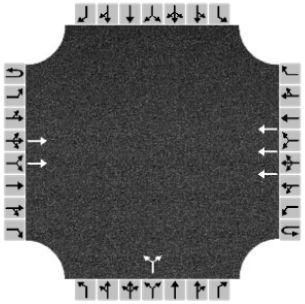
# EXHIBIT 4
# 2019 PEAK AM HOUR TRAFFIC ANALYSIS – East Access/Walkley

## HCS7 Two-Way Stop-Control Report

### General Information / Site Information

| | | | |
|---|---|---|---|
| Analyst | | Intersection | Walkley/East Access |
| Agency/Co. | | Jurisdiction | City of Ottawa |
| Date Performed | 5/26/2018 | East/West Street | Walkley Road |
| Analysis Year | 2019 | North/South Street | East Access |
| Time Analyzed | Peak AM Hour | Peak Hour Factor | 0.92 |
| Intersection Orientation | East-West | Analysis Time Period (hrs) | 0.25 |
| Project Description | 1850 Walkely Road | | |

### Lanes




### Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 0 | 2 | 0 | 0 | 0 | 3 | 0 | | 0 | 1 | 0 | | 0 | 0 | 0 |
| Configuration | | | T | | | | T | | | | LR | | | | | |
| Volume, V (veh/h) | | | 1246 | | | | 1590 | | | 3 | | 3 | | | | |
| Percent Heavy Vehicles (%) | | | | | | | | | | 0 | | 0 | | | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | 0 | | | | | | |
| Right Turn Channelized | | No | | | | No | | | | No | | | | No | | |
| Median Type/Storage | | Left Only | | | | | | | | 2 | | | | | | |

### Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | | | | | | | | | 6.4 | | 6.9 | | | | |
| Critical Headway (sec) | | | | | | | | | | 5.70 | | 6.90 | | | | |
| Base Follow-Up Headway (sec) | | | | | | | | | | 3.8 | | 3.9 | | | | |
| Follow-Up Headway (sec) | | | | | | | | | | 3.80 | | 3.90 | | | | |

### Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | | | | | | | | | | 7 | | | | | |
| Capacity, c (veh/h) | | | | | | | | | | | 241 | | | | | |
| v/c Ratio | | | | | | | | | | | 0.03 | | | | | |
| 95% Queue Length, $Q_{95}$ (veh) | | | | | | | | | | | 0.1 | | | | | |
| Control Delay (s/veh) | | | | | | | | | | | 20.4 | | | | | |
| Level of Service, LOS | | | | | | | | | | | C | | | | | |
| Approach Delay (s/veh) | | | | | | | | | | 20.4 | | | | | | |
| Approach LOS | | | | | | | | | | C | | | | | | |



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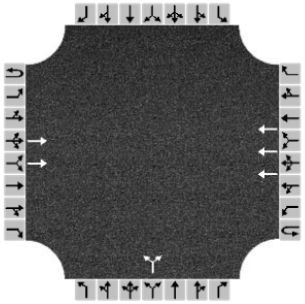
# EXHIBIT 5
# 2019 PEAK PM HOUR TRAFFIC ANALYSIS – East Access/Walkley

## HCS7 Two-Way Stop-Control Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | | Intersection | Walkley/East Access |
| Agency/Co. | | Jurisdiction | City of Ottawa |
| Date Performed | 5/26/2018 | East/West Street | Walkley Road |
| Analysis Year | 2019 | North/South Street | East Access |
| Time Analyzed | Peak PM Hour | Peak Hour Factor | 0.92 |
| Intersection Orientation | East-West | Analysis Time Period (hrs) | 0.25 |
| Project Description | 1850 Walkely Road | | |

### Lanes




### Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 0 | 2 | 0 | 0 | 0 | 3 | 0 | | 0 | 1 | 0 | | 0 | 0 | 0 |
| Configuration | | | T | | | | T | | | | LR | | | | | |
| Volume, V (veh/h) | | | 1644 | | | | 1717 | | | 3 | | 2 | | | | |
| Percent Heavy Vehicles (%) | | | | | | | | | | 0 | | 0 | | | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | 0 | | | | | | |
| Right Turn Channelized | | | No | | | | No | | | | No | | | | No | |
| Median Type/Storage | | | Left Only | | | | | | | | 2 | | | | | |

### Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | | | | | | | | | 6.4 | | 6.9 | | | | |
| Critical Headway (sec) | | | | | | | | | | 5.70 | | 6.90 | | | | |
| Base Follow-Up Headway (sec) | | | | | | | | | | 3.8 | | 3.9 | | | | |
| Follow-Up Headway (sec) | | | | | | | | | | 3.80 | | 3.90 | | | | |

### Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | | | | | | | | | | 5 | | | | | |
| Capacity, c (veh/h) | | | | | | | | | | | 143 | | | | | |
| v/c Ratio | | | | | | | | | | | 0.04 | | | | | |
| 95% Queue Length, $Q_{95}$ (veh) | | | | | | | | | | | 0.1 | | | | | |
| Control Delay (s/veh) | | | | | | | | | | | 31.2 | | | | | |
| Level of Service, LOS | | | | | | | | | | | D | | | | | |
| Approach Delay (s/veh) | | | | | | | | | | | 31.2 | | | | | |
| Approach LOS | | | | | | | | | | | D | | | | | |



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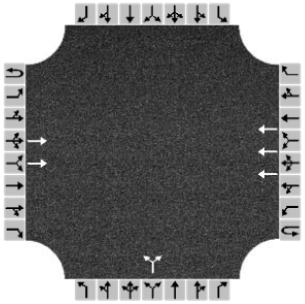
# EXHIBIT 6
# 2024 PEAK AM HOUR TRAFFIC ANALYSIS – East Access/Walkley

## HCS7 Two-Way Stop-Control Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | | Intersection | Walkley/East Access |
| Agency/Co. | | Jurisdiction | City of Ottawa |
| Date Performed | 5/26/2018 | East/West Street | Walkley Road |
| Analysis Year | 2024 | North/South Street | East Access |
| Time Analyzed | Peak AM Hour | Peak Hour Factor | 0.92 |
| Intersection Orientation | East-West | Analysis Time Period (hrs) | 0.25 |
| Project Description | 1850 Walkely Road | | |

### Lanes




### Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 0 | 2 | 0 | 0 | 0 | 3 | 0 | | 0 | 1 | 0 | | 0 | 0 | 0 |
| Configuration | | | T | | | | T | | | | LR | | | | | |
| Volume, V (veh/h) | | | 1374 | | | | 1754 | | | 3 | | 3 | | | | |
| Percent Heavy Vehicles (%) | | | | | | | | | | 0 | | 0 | | | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | 0 | | | | | | |
| Right Turn Channelized | | No | | | | No | | | | No | | | | No | | |
| Median Type/Storage | | Left Only | | | | | | | | 2 | | | | | | |

### Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | | | | | | | | | 6.4 | | 6.9 | | | | |
| Critical Headway (sec) | | | | | | | | | | 5.70 | | 6.90 | | | | |
| Base Follow-Up Headway (sec) | | | | | | | | | | 3.8 | | 3.9 | | | | |
| Follow-Up Headway (sec) | | | | | | | | | | 3.80 | | 3.90 | | | | |

### Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | | | | | | | | | | 7 | | | | | |
| Capacity, c (veh/h) | | | | | | | | | | | 208 | | | | | |
| v/c Ratio | | | | | | | | | | | 0.03 | | | | | |
| 95% Queue Length, $Q_{95}$ (veh) | | | | | | | | | | | 0.1 | | | | | |
| Control Delay (s/veh) | | | | | | | | | | | 22.8 | | | | | |
| Level of Service, LOS | | | | | | | | | | | C | | | | | |
| Approach Delay (s/veh) | | | | | | | | | | 22.8 | | | | | | |
| Approach LOS | | | | | | | | | | C | | | | | | |



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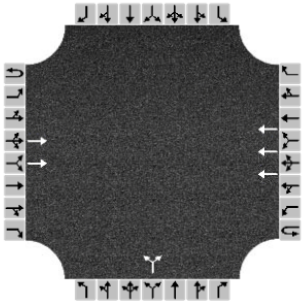
# EXHIBIT 7
# 2024 PEAK PM HOUR TRAFFIC ANALYSIS – East Access/Walkley

## HCS7 Two-Way Stop-Control Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | | Intersection | Walkley/East Access |
| Agency/Co. | | Jurisdiction | City of Ottawa |
| Date Performed | 5/26/2018 | East/West Street | Walkley Road |
| Analysis Year | 2024 | North/South Street | East Access |
| Time Analyzed | Peak PM Hour | Peak Hour Factor | 0.92 |
| Intersection Orientation | East-West | Analysis Time Period (hrs) | 0.25 |
| Project Description | 1850 Walkely Road | | |

### Lanes




### Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 0 | 2 | 0 | 0 | 0 | 3 | 0 | | 0 | 1 | 0 | | 0 | 0 | 0 |
| Configuration | | | T | | | | T | | | | LR | | | | | |
| Volume, V (veh/h) | | | 1815 | | | | 1898 | | | 3 | | 2 | | | | |
| Percent Heavy Vehicles (%) | | | | | | | | | | 0 | | 0 | | | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | 0 | | | | | | |
| Right Turn Channelized | | No | | | | No | | | | No | | | | No | | |
| Median Type/Storage | | Left Only | | | | | | | | 2 | | | | | | |

### Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | | | | | | | | | 6.4 | | 6.9 | | | | |
| Critical Headway (sec) | | | | | | | | | | 5.70 | | 6.90 | | | | |
| Base Follow-Up Headway (sec) | | | | | | | | | | 3.8 | | 3.9 | | | | |
| Follow-Up Headway (sec) | | | | | | | | | | 3.80 | | 3.90 | | | | |

### Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | | | | | | | | | | 5 | | | | | |
| Capacity, c (veh/h) | | | | | | | | | | | 116 | | | | | |
| v/c Ratio | | | | | | | | | | | 0.05 | | | | | |
| 95% Queue Length, $Q_{95}$ (veh) | | | | | | | | | | | 0.1 | | | | | |
| Control Delay (s/veh) | | | | | | | | | | | 37.6 | | | | | |
| Level of Service, LOS | | | | | | | | | | | E | | | | | |
| Approach Delay (s/veh) | | | | | | | | | | 37.6 | | | | | | |
| Approach LOS | | | | | | | | | | E | | | | | | |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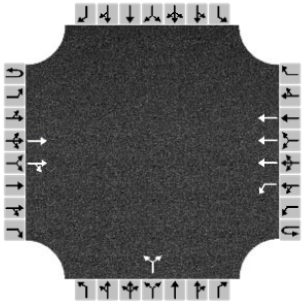
# EXHIBIT 8
# 2019 PEAK AM HOUR TRAFFIC ANALYSIS – West Access/Walkley

## HCS7 Two-Way Stop-Control Report

### General Information / Site Information

| | | | |
|---|---|---|---|
| Analyst | | Intersection | Walkley/West Access |
| Agency/Co. | | Jurisdiction | City of Ottawa |
| Date Performed | 5/26/2018 | East/West Street | Walkley Road |
| Analysis Year | 2019 | North/South Street | West Access |
| Time Analyzed | Peak AM Hour | Peak Hour Factor | 0.92 |
| Intersection Orientation | East-West | Analysis Time Period (hrs) | 0.25 |
| Project Description | 1850 Walkely Road | | |

### Lanes




### Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 0 | 2 | 0 | 0 | 1 | 3 | 0 | | 0 | 1 | 0 | | 0 | 0 | 0 |
| Configuration | | | T | TR | | L | T | | | | LR | | | | | |
| Volume, V (veh/h) | | | 1238 | 19 | | 23 | 1570 | | | 11 | | 8 | | | | |
| Percent Heavy Vehicles (%) | | | | | | 0 | | | | 0 | | 0 | | | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | 0 | | | | | | |
| Right Turn Channelized | | No | | | | No | | | | No | | | | No | | |
| Median Type/Storage | | Left Only | | | | | | | | 2 | | | | | | |

### Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | | | | | 4.1 | | | | 6.4 | | 6.9 | | | | |
| Critical Headway (sec) | | | | | | 4.10 | | | | 5.70 | | 6.90 | | | | |
| Base Follow-Up Headway (sec) | | | | | | 2.2 | | | | 3.8 | | 3.9 | | | | |
| Follow-Up Headway (sec) | | | | | | 2.20 | | | | 3.80 | | 3.90 | | | | |

### Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | | | | | 25 | | | | | 21 | | | | | |
| Capacity, c (veh/h) | | | | | | 509 | | | | | 225 | | | | | |
| v/c Ratio | | | | | | 0.05 | | | | | 0.09 | | | | | |
| 95% Queue Length, $Q_{95}$ (veh) | | | | | | 0.2 | | | | | 0.3 | | | | | |
| Control Delay (s/veh) | | | | | | 12.4 | | | | | 22.6 | | | | | |
| Level of Service, LOS | | | | | | B | | | | | C | | | | | |
| Approach Delay (s/veh) | | | | | | 0.2 | | | | 22.6 | | | | | | |
| Approach LOS | | | | | | | | | | C | | | | | | |



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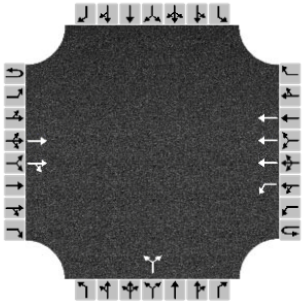
## EXHIBIT 9
## 2019 PEAK PM HOUR TRAFFIC ANALYSIS – West Access/Walkley

### HCS7 Two-Way Stop-Control Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | | Intersection | Walkley/West Access |
| Agency/Co. | | Jurisdiction | City of Ottawa |
| Date Performed | 5/26/2018 | East/West Street | Walkley Road |
| Analysis Year | 2019 | North/South Street | West Access |
| Time Analyzed | Peak PM Hour | Peak Hour Factor | 0.92 |
| Intersection Orientation | East-West | Analysis Time Period (hrs) | 0.25 |
| Project Description | 1850 Walkely Road | | |

**Lanes**




**Vehicle Volumes and Adjustments**

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 0 | 2 | 0 | 0 | 1 | 3 | 0 | | 0 | 1 | 0 | | 0 | 0 | 0 |
| Configuration | | | T | TR | | L | T | | | | LR | | | | | |
| Volume, V (veh/h) | | | 1631 | 16 | | 14 | 1706 | | | 14 | | 13 | | | | |
| Percent Heavy Vehicles (%) | | | | | | 0 | | | | 0 | | 0 | | | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | 0 | | | | | | |
| Right Turn Channelized | | No | | | | No | | | | No | | | | No | | |
| Median Type/Storage | | Left Only | | | | | | | | 2 | | | | | | |

**Critical and Follow-up Headways**

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | | | | | 4.1 | | | | 6.4 | | 6.9 | | | | |
| Critical Headway (sec) | | | | | | 4.10 | | | | 5.70 | | 6.90 | | | | |
| Base Follow-Up Headway (sec) | | | | | | 2.2 | | | | 3.8 | | 3.9 | | | | |
| Follow-Up Headway (sec) | | | | | | 2.20 | | | | 3.80 | | 3.90 | | | | |

**Delay, Queue Length, and Level of Service**

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | | | | | 15 | | | | | 29 | | | | | |
| Capacity, c (veh/h) | | | | | | 351 | | | | | 152 | | | | | |
| v/c Ratio | | | | | | 0.04 | | | | | 0.19 | | | | | |
| 95% Queue Length, $Q_{95}$ (veh) | | | | | | 0.1 | | | | | 0.7 | | | | | |
| Control Delay (s/veh) | | | | | | 15.7 | | | | | 34.2 | | | | | |
| Level of Service, LOS | | | | | | C | | | | | D | | | | | |
| Approach Delay (s/veh) | | | | | | 0.1 | | | | 34.2 | | | | | | |
| Approach LOS | | | | | | | | | | D | | | | | | |



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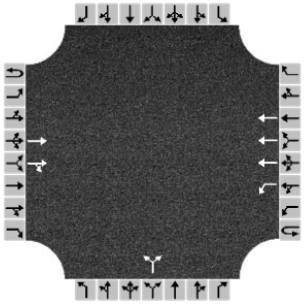
## EXHIBIT 10
## 2024 PEAK AM HOUR TRAFFIC ANALYSIS – West Access/Walkley

### HCS7 Two-Way Stop-Control Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | | Intersection | Walkley/West Access |
| Agency/Co. | | Jurisdiction | City of Ottawa |
| Date Performed | 5/26/2018 | East/West Street | Walkley Road |
| Analysis Year | 2024 | North/South Street | West Access |
| Time Analyzed | Peak AM Hour | Peak Hour Factor | 0.92 |
| Intersection Orientation | East-West | Analysis Time Period (hrs) | 0.25 |
| Project Description | 1850 Walkely Road | | |

**Lanes**




**Vehicle Volumes and Adjustments**

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 0 | 2 | 0 | 0 | 1 | 3 | 0 | | 0 | 1 | 0 | | 0 | 0 | 0 |
| Configuration | | | T | TR | | L | T | | | | LR | | | | | |
| Volume, V (veh/h) | | | 1366 | 19 | | 23 | 1734 | | | 11 | | 8 | | | | |
| Percent Heavy Vehicles (%) | | | | | | 0 | | | | 0 | | 0 | | | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | 0 | | | | | | |
| Right Turn Channelized | | No | | | | No | | | | No | | | | No | | |
| Median Type/Storage | | Left Only | | | | | | | | 2 | | | | | | |

**Critical and Follow-up Headways**

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | | | | | 4.1 | | | | 6.4 | | 6.9 | | | | |
| Critical Headway (sec) | | | | | | 4.10 | | | | 5.70 | | 6.90 | | | | |
| Base Follow-Up Headway (sec) | | | | | | 2.2 | | | | 3.8 | | 3.9 | | | | |
| Follow-Up Headway (sec) | | | | | | 2.20 | | | | 3.80 | | 3.90 | | | | |

**Delay, Queue Length, and Level of Service**

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | | | | | 25 | | | | | 21 | | | | | |
| Capacity, c (veh/h) | | | | | | 451 | | | | | 194 | | | | | |
| v/c Ratio | | | | | | 0.06 | | | | | 0.11 | | | | | |
| 95% Queue Length, $Q_{95}$ (veh) | | | | | | 0.2 | | | | | 0.4 | | | | | |
| Control Delay (s/veh) | | | | | | 13.5 | | | | | 25.8 | | | | | |
| Level of Service, LOS | | | | | | B | | | | | D | | | | | |
| Approach Delay (s/veh) | | | | | | 0.2 | | | | 25.8 | | | | | | |
| Approach LOS | | | | | | | | | | D | | | | | | |



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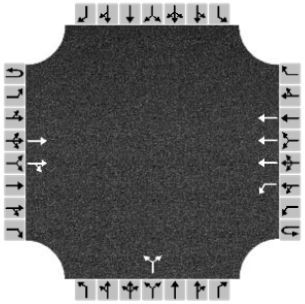
## EXHIBIT 11
## 2024 PEAK PM HOUR TRAFFIC ANALYSIS – West Access/Walkley

### HCS7 Two-Way Stop-Control Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | | Intersection | Walkley/West Access |
| Agency/Co. | | Jurisdiction | City of Ottawa |
| Date Performed | 5/26/2018 | East/West Street | Walkley Road |
| Analysis Year | 2024 | North/South Street | West Access |
| Time Analyzed | Peak PM Hour | Peak Hour Factor | 0.92 |
| Intersection Orientation | East-West | Analysis Time Period (hrs) | 0.25 |
| Project Description | 1850 Walkely Road | | |

**Lanes**




**Vehicle Volumes and Adjustments**

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 0 | 2 | 0 | 0 | 1 | 3 | 0 | | 0 | 1 | 0 | | 0 | 0 | 0 |
| Configuration | | | T | TR | | L | T | | | | LR | | | | | |
| Volume, V (veh/h) | | | 1802 | 16 | | 14 | 1884 | | | 14 | | 13 | | | | |
| Percent Heavy Vehicles (%) | | | | | | 0 | | | | 0 | | 0 | | | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | 0 | | | | | | |
| Right Turn Channelized | | | No | | | | No | | | | No | | | | No | |
| Median Type/Storage | | | Left Only | | | | | | | | 2 | | | | | |

**Critical and Follow-up Headways**

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | | | | | 4.1 | | | | 6.4 | | 6.9 | | | | |
| Critical Headway (sec) | | | | | | 4.10 | | | | 5.70 | | 6.90 | | | | |
| Base Follow-Up Headway (sec) | | | | | | 2.2 | | | | 3.8 | | 3.9 | | | | |
| Follow-Up Headway (sec) | | | | | | 2.20 | | | | 3.80 | | 3.90 | | | | |

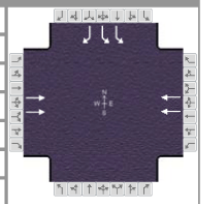
**Delay, Queue Length, and Level of Service**

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | | | | | 15 | | | | | 29 | | | | | |
| Capacity, c (veh/h) | | | | | | 297 | | | | | 124 | | | | | |
| v/c Ratio | | | | | | 0.05 | | | | | 0.24 | | | | | |
| 95% Queue Length, $Q_{95}$ (veh) | | | | | | 0.2 | | | | | 0.9 | | | | | |
| Control Delay (s/veh) | | | | | | 17.8 | | | | | 42.7 | | | | | |
| Level of Service, LOS | | | | | | C | | | | | E | | | | | |
| Approach Delay (s/veh) | | | | | | 0.1 | | | | 42.7 | | | | | | |
| Approach LOS | | | | | | | | | | E | | | | | | |

## EXHIBIT 12
## 2018 PEAK AM HOUR TRAFFIC ANALYSIS – Walkley/Heron

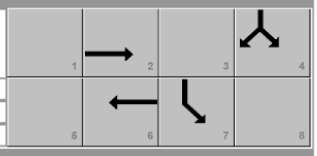
### HCS7 Signalized Intersection Results Summary

| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | | | | Duration, h | 0.25 |
| Analyst | | Analysis Date | May 17, 2018 | Area Type | Other |
| Jurisdiction | City of Ottawa | Time Period | Peak AM Hour | PHF | 0.92 |
| Urban Street | 1850 Walkley Road | Analysis Year | 2018 | Analysis Period | 1> 7:00 |
| Intersection | Walkley/Heron | File Name | 2018_ex_am.xus | | |
| Project Description | Commercial Development | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( *v* ), veh/h | | 535 | | | 647 | | | | | 686 | | 0 |

| Signal Information | | | |
|---|---|---|---|
| Cycle, s | 100.0 | Reference Phase | 2 |
| Offset, s | 0 | Reference Point | End |
| Uncoordinated | No | Simult. Gap E/W | On |
| Force Mode | Float | Simult. Gap N/S | On |



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Green | 48.0 | 40.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Yellow | 3.7 | 3.7 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Red | 2.3 | 2.3 | 0.0 | 0.0 | 0.0 | 0.0 | |

| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | | 2 | | 6 | | | | 4 |
| Case Number | | 8.0 | | 8.0 | | | | 9.0 |
| Phase Duration, s | | 54.0 | | 54.0 | | | | 46.0 |
| Change Period, ( *Y+R c* ), s | | 6.0 | | 6.0 | | | | 6.0 |
| Max Allow Headway ( *MAH* ), s | | 0.0 | | 0.0 | | | | 3.1 |
| Queue Clearance Time ( *g s* ), s | | | | | | | | 19.9 |
| Green Extension Time ( *g e* ), s | | 0.0 | | 0.0 | | | | 1.9 |
| Phase Call Probability | | | | | | | | 1.00 |
| Max Out Probability | | | | | | | | 0.00 |

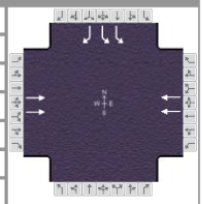
| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | | 2 | | | 6 | | | | | 7 | | 14 |
| Adjusted Flow Rate ( *v* ), veh/h | | 582 | | | 703 | | | | | 746 | | 0 |
| Adjusted Saturation Flow Rate ( *s* ), veh/h/ln | | 1660 | | | 1647 | | | | | 1603 | | 1525 |
| Queue Service Time ( *g s* ), s | | 10.8 | | | 13.8 | | | | | 17.9 | | 0.0 |
| Cycle Queue Clearance Time ( *g c* ), s | | 10.8 | | | 13.8 | | | | | 17.9 | | 0.0 |
| Green Ratio ( *g/C* ) | | 0.49 | | | 0.49 | | | | | 0.41 | | 0.41 |
| Capacity ( *c* ), veh/h | | 1627 | | | 1614 | | | | | 1314 | | 625 |
| Volume-to-Capacity Ratio ( *X* ) | | 0.357 | | | 0.436 | | | | | 0.567 | | 0.000 |
| Back of Queue ( *Q* ), ft/ln ( 50 th percentile) | | 104 | | | 133.5 | | | | | 167.9 | | 0 |
| Back of Queue ( *Q* ), veh/ln ( 50 th percentile) | | 4.0 | | | 5.1 | | | | | 6.5 | | 0.0 |
| Queue Storage Ratio ( *RQ* ) ( 50 th percentile) | | 0.00 | | | 0.00 | | | | | 0.00 | | 0.00 |
| Uniform Delay ( *d 1* ), s/veh | | 15.8 | | | 16.5 | | | | | 22.7 | | 0.0 |
| Incremental Delay ( *d 2* ), s/veh | | 0.6 | | | 0.9 | | | | | 0.4 | | 0.0 |
| Initial Queue Delay ( *d 3* ), s/veh | | 0.0 | | | 0.0 | | | | | 0.0 | | 0.0 |
| Control Delay ( *d* ), s/veh | | 16.4 | | | 17.4 | | | | | 23.0 | | 0.0 |
| Level of Service (LOS) | | B | | | B | | | | | C | | |
| Approach Delay, s/veh / LOS | 16.4 | B | | 17.4 | B | | 0.0 | | | 23.0 | C | |
| Intersection Delay, s/veh / LOS | 19.2 | | | | | | B | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 0.70 | A | 1.90 | B | 2.15 | B | 2.15 | B |
| Bicycle LOS Score / LOS | 0.97 | A | 1.07 | A | | | | F |

## EXHIBIT 13
## 2018 PEAK PM HOUR TRAFFIC ANALYSIS – Walkley/Heron

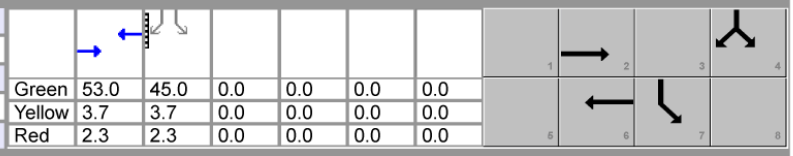
### HCS7 Signalized Intersection Results Summary

| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | | | | Duration, h | 0.25 |
| Analyst | | Analysis Date | May 17, 2018 | Area Type | Other |
| Jurisdiction | City of Ottawa | Time Period | Peak PM Hour | PHF | 0.92 |
| Urban Street | 1850 Walkley Road | Analysis Year | 2018 | Analysis Period | 1> 7:00 |
| Intersection | Walkley/Heron | File Name | 2018_ex_pm.xus | | |
| Project Description | Commercial Development | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( *v* ), veh/h | | 696 | | | 887 | | | | | 912 | | 0 |

| Signal Information | | | |
|---|---|---|---|
| Cycle, s | 110.0 | Reference Phase | 2 |
| Offset, s | 0 | Reference Point | End |
| Uncoordinated | No | Simult. Gap E/W | On |
| Force Mode | Float | Simult. Gap N/S | On |



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Green | 53.0 | 45.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Yellow | 3.7 | 3.7 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Red | 2.3 | 2.3 | 0.0 | 0.0 | 0.0 | 0.0 | |

| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | | 2 | | 6 | | | | 4 |
| Case Number | | 8.0 | | 8.0 | | | | 9.0 |
| Phase Duration, s | | 59.0 | | 59.0 | | | | 51.0 |
| Change Period, ( *Y+R c* ), s | | 6.0 | | 6.0 | | | | 6.0 |
| Max Allow Headway ( *MAH* ), s | | 0.0 | | 0.0 | | | | 3.1 |
| Queue Clearance Time ( *g s* ), s | | | | | | | | 30.0 |
| Green Extension Time ( *g e* ), s | | 0.0 | | 0.0 | | | | 2.5 |
| Phase Call Probability | | | | | | | | 1.00 |
| Max Out Probability | | | | | | | | 0.01 |

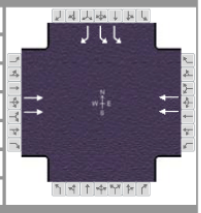
| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | | 2 | | | 6 | | | | | 7 | | 14 |
| Adjusted Flow Rate ( *v* ), veh/h | | 757 | | | 964 | | | | | 991 | | 0 |
| Adjusted Saturation Flow Rate ( *s* ), veh/h/ln | | 1647 | | | 1687 | | | | | 1629 | | 1525 |
| Queue Service Time ( *g s* ), s | | 16.7 | | | 22.4 | | | | | 28.0 | | 0.0 |
| Cycle Queue Clearance Time ( *g c* ), s | | 16.7 | | | 22.4 | | | | | 28.0 | | 0.0 |
| Green Ratio ( *g/C* ) | | 0.49 | | | 0.49 | | | | | 0.42 | | 0.42 |
| Capacity ( *c* ), veh/h | | 1617 | | | 1656 | | | | | 1362 | | 638 |
| Volume-to-Capacity Ratio ( *X* ) | | 0.468 | | | 0.582 | | | | | 0.728 | | 0.000 |
| Back of Queue ( *Q* ), ft/ln ( 50 th percentile) | | 164.4 | | | 222 | | | | | 273.4 | | 0 |
| Back of Queue ( *Q* ), veh/ln ( 50 th percentile) | | 6.3 | | | 8.7 | | | | | 10.8 | | 0.0 |
| Queue Storage Ratio ( *RQ* ) ( 50 th percentile) | | 0.00 | | | 0.00 | | | | | 0.00 | | 0.00 |
| Uniform Delay ( *d 1* ), s/veh | | 18.5 | | | 20.0 | | | | | 26.8 | | 0.0 |
| Incremental Delay ( *d 2* ), s/veh | | 1.0 | | | 1.5 | | | | | 1.7 | | 0.0 |
| Initial Queue Delay ( *d 3* ), s/veh | | 0.0 | | | 0.0 | | | | | 0.0 | | 0.0 |
| Control Delay ( *d* ), s/veh | | 19.5 | | | 21.5 | | | | | 28.5 | | 0.0 |
| Level of Service (LOS) | | B | | | C | | | | | C | | |
| Approach Delay, s/veh / LOS | 19.5 | B | | 21.5 | C | | 0.0 | | | 28.5 | C | |
| Intersection Delay, s/veh / LOS | 23.5 | | | | | | C | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 0.71 | A | 1.91 | B | 2.15 | B | 2.15 | B |
| Bicycle LOS Score / LOS | 1.11 | A | 1.28 | A | | | | F |

# EXHIBIT 14
# 2019 PEAK AM HOUR TRAFFIC ANALYSIS – Walkley/Heron

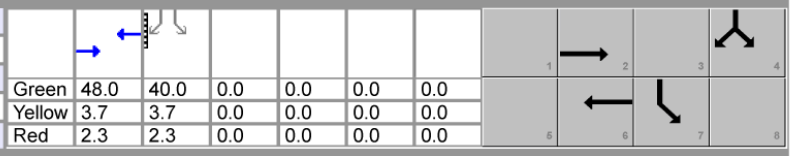
## HCS7 Signalized Intersection Results Summary

| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | | | | Duration, h | 0.25 |
| Analyst | | Analysis Date | May 17, 2018 | Area Type | Other |
| Jurisdiction | City of Ottawa | Time Period | Peak AM Hour | PHF | 0.92 |
| Urban Street | 1850 Walkley Road | Analysis Year | 2019 | Analysis Period | 1> 7:00 |
| Intersection | Walkley/Heron | File Name | 2019_tot_am.xus | | |
| Project Description | Commercial Development | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( *v* ), veh/h | | 551 | | | 662 | | | | | 706 | | 0 |

| Signal Information | | | |
|---|---|---|---|
| Cycle, s | 100.0 | Reference Phase | 2 |
| Offset, s | 0 | Reference Point | End |
| Uncoordinated | No | Simult. Gap E/W | On |
| Force Mode | Float | Simult. Gap N/S | On |



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Green | 48.0 | 40.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Yellow | 3.7 | 3.7 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Red | 2.3 | 2.3 | 0.0 | 0.0 | 0.0 | 0.0 | |

| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | | 2 | | 6 | | | | 4 |
| Case Number | | 8.0 | | 8.0 | | | | 9.0 |
| Phase Duration, s | | 54.0 | | 54.0 | | | | 46.0 |
| Change Period, ( *Y+R c* ), s | | 6.0 | | 6.0 | | | | 6.0 |
| Max Allow Headway ( *MAH* ), s | | 0.0 | | 0.0 | | | | 3.1 |
| Queue Clearance Time ( *g s* ), s | | | | | | | | 20.6 |
| Green Extension Time ( *g e* ), s | | 0.0 | | 0.0 | | | | 2.0 |
| Phase Call Probability | | | | | | | | 1.00 |
| Max Out Probability | | | | | | | | 0.00 |

| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | | 2 | | | 6 | | | | | 7 | | 14 |
| Adjusted Flow Rate ( *v* ), veh/h | | 599 | | | 720 | | | | | 767 | | 0 |
| Adjusted Saturation Flow Rate ( *s* ), veh/h/ln | | 1660 | | | 1647 | | | | | 1603 | | 1525 |
| Queue Service Time ( *g s* ), s | | 11.2 | | | 14.3 | | | | | 18.6 | | 0.0 |
| Cycle Queue Clearance Time ( *g c* ), s | | 11.2 | | | 14.3 | | | | | 18.6 | | 0.0 |
| Green Ratio ( *g/C* ) | | 0.49 | | | 0.49 | | | | | 0.41 | | 0.41 |
| Capacity ( *c* ), veh/h | | 1627 | | | 1614 | | | | | 1314 | | 625 |
| Volume-to-Capacity Ratio ( *X* ) | | 0.368 | | | 0.446 | | | | | 0.584 | | 0.000 |
| Back of Queue ( *Q* ), ft/ln ( 50 th percentile) | | 107.8 | | | 137.5 | | | | | 174.8 | | 0 |
| Back of Queue ( *Q* ), veh/ln ( 50 th percentile) | | 4.2 | | | 5.3 | | | | | 6.8 | | 0.0 |
| Queue Storage Ratio ( *RQ* ) ( 50 th percentile) | | 0.00 | | | 0.00 | | | | | 0.00 | | 0.00 |
| Uniform Delay ( *d 1* ), s/veh | | 15.9 | | | 16.6 | | | | | 22.9 | | 0.0 |
| Incremental Delay ( *d 2* ), s/veh | | 0.6 | | | 0.9 | | | | | 0.4 | | 0.0 |
| Initial Queue Delay ( *d 3* ), s/veh | | 0.0 | | | 0.0 | | | | | 0.0 | | 0.0 |
| Control Delay ( *d* ), s/veh | | 16.5 | | | 17.5 | | | | | 23.3 | | 0.0 |
| Level of Service (LOS) | | B | | | B | | | | | C | | |
| Approach Delay, s/veh / LOS | 16.5 | B | | 17.5 | B | | 0.0 | | | 23.3 | C | |
| Intersection Delay, s/veh / LOS | 19.4 | | | | | | B | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 0.70 | A | 1.90 | B | 2.15 | B | 2.15 | B |
| Bicycle LOS Score / LOS | 0.98 | A | 1.08 | A | | | | F |



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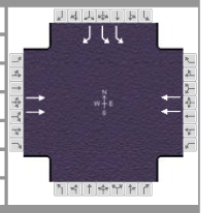
# EXHIBIT 15
# 2019 PEAK PM HOUR TRAFFIC ANALYSIS – Walkley/Heron

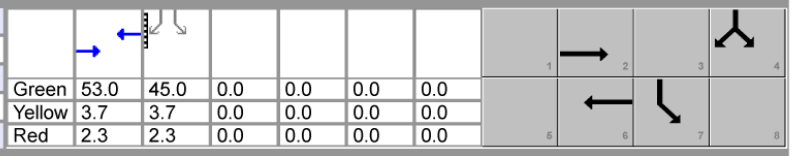
## HCS7 Signalized Intersection Results Summary

| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | | | | Duration, h | 0.25 |
| Analyst | | Analysis Date | May 17, 2018 | Area Type | Other |
| Jurisdiction | City of Ottawa | Time Period | Peak PM Hour | PHF | 0.92 |
| Urban Street | 1850 Walkley Road | Analysis Year | 2019 | Analysis Period | 1> 7:00 |
| Intersection | Walkley/Heron | File Name | 2019_tot_pm.xus | | |
| Project Description | Commercial Development | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( *v* ), veh/h | | 713 | | | 910 | | | | | 934 | | 0 |

| Signal Information | | | |
|---|---|---|---|
| Cycle, s | 110.0 | Reference Phase | 2 |
| Offset, s | 0 | Reference Point | End |
| Uncoordinated | No | Simult. Gap E/W | On |
| Force Mode | Float | Simult. Gap N/S | On |



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Green | 53.0 | 45.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Yellow | 3.7 | 3.7 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Red | 2.3 | 2.3 | 0.0 | 0.0 | 0.0 | 0.0 | |

| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | | 2 | | 6 | | | | 4 |
| Case Number | | 8.0 | | 8.0 | | | | 9.0 |
| Phase Duration, s | | 59.0 | | 59.0 | | | | 51.0 |
| Change Period, ( $Y+R_c$ ), s | | 6.0 | | 6.0 | | | | 6.0 |
| Max Allow Headway ( *MAH* ), s | | 0.0 | | 0.0 | | | | 3.1 |
| Queue Clearance Time ( $g_s$ ), s | | | | | | | | 31.0 |
| Green Extension Time ( $g_e$ ), s | | 0.0 | | 0.0 | | | | 2.6 |
| Phase Call Probability | | | | | | | | 1.00 |
| Max Out Probability | | | | | | | | 0.02 |

| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | | 2 | | | 6 | | | | | 7 | | 14 |
| Adjusted Flow Rate ( *v* ), veh/h | | 775 | | | 989 | | | | | 1015 | | 0 |
| Adjusted Saturation Flow Rate ( *s* ), veh/h/ln | | 1647 | | | 1687 | | | | | 1629 | | 1525 |
| Queue Service Time ( $g_s$ ), s | | 17.2 | | | 23.2 | | | | | 29.0 | | 0.0 |
| Cycle Queue Clearance Time ( $g_c$ ), s | | 17.2 | | | 23.2 | | | | | 29.0 | | 0.0 |
| Green Ratio ( *g/C* ) | | 0.49 | | | 0.49 | | | | | 0.42 | | 0.42 |
| Capacity ( *c* ), veh/h | | 1617 | | | 1656 | | | | | 1362 | | 638 |
| Volume-to-Capacity Ratio ( *X* ) | | 0.479 | | | 0.597 | | | | | 0.745 | | 0.000 |
| Back of Queue ( *Q* ), ft/ln ( 50 th percentile) | | 169.7 | | | 230.2 | | | | | 284.4 | | 0 |
| Back of Queue ( *Q* ), veh/ln ( 50 th percentile) | | 6.5 | | | 9.1 | | | | | 11.2 | | 0.0 |
| Queue Storage Ratio ( *RQ* ) ( 50 th percentile) | | 0.00 | | | 0.00 | | | | | 0.00 | | 0.00 |
| Uniform Delay ( $d_1$ ), s/veh | | 18.6 | | | 20.2 | | | | | 27.0 | | 0.0 |
| Incremental Delay ( $d_2$ ), s/veh | | 1.0 | | | 1.6 | | | | | 2.0 | | 0.0 |
| Initial Queue Delay ( $d_3$ ), s/veh | | 0.0 | | | 0.0 | | | | | 0.0 | | 0.0 |
| Control Delay ( *d* ), s/veh | | 19.7 | | | 21.8 | | | | | 29.1 | | 0.0 |
| Level of Service (LOS) | | B | | | C | | | | | C | | |
| Approach Delay, s/veh / LOS | 19.7 | B | | 21.8 | C | | 0.0 | | | 29.1 | C | |
| Intersection Delay, s/veh / LOS | 23.8 | | | | | | C | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 0.71 | A | 1.91 | B | 2.15 | B | 2.15 | B |
| Bicycle LOS Score / LOS | 1.13 | A | 1.30 | A | | | | F |



HCS7™ Streets Version 7.4

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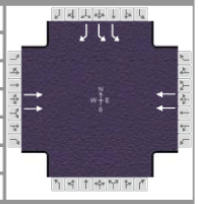
# EXHIBIT 16
# 2024 PEAK AM HOUR TRAFFIC ANALYSIS – Walkley/Heron

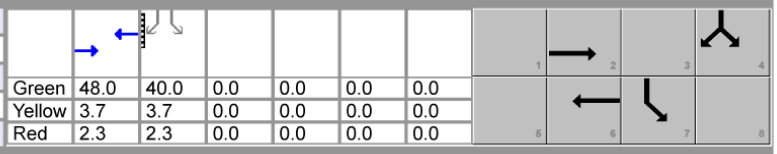
## HCS7 Signalized Intersection Results Summary

| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | | | | Duration, h | 0.25 |
| Analyst | | Analysis Date | May 17, 2018 | Area Type | Other |
| Jurisdiction | City of Ottawa | Time Period | Peak AM Hour | PHF | 0.92 |
| Urban Street | 1850 Walkley Road | Analysis Year | 2024 | Analysis Period | 1> 7:00 |
| Intersection | Walkley/Heron | File Name | 2024_tot_am.xus | | |
| Project Description | Commercial Development | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( *v* ), veh/h | | 607 | | | 731 | | | | | 778 | | 0 |

| Signal Information | | | |
|---|---|---|---|
| Cycle, s | 100.0 | Reference Phase | 2 |
| Offset, s | 0 | Reference Point | End |
| Uncoordinated | No | Simult. Gap E/W | On |
| Force Mode | Float | Simult. Gap N/S | On |



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Green | 48.0 | 40.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Yellow | 3.7 | 3.7 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Red | 2.3 | 2.3 | 0.0 | 0.0 | 0.0 | 0.0 | |

| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | | 2 | | 6 | | | | 4 |
| Case Number | | 8.0 | | 8.0 | | | | 9.0 |
| Phase Duration, s | | 54.0 | | 54.0 | | | | 46.0 |
| Change Period, ( *Y+R c* ), s | | 6.0 | | 6.0 | | | | 6.0 |
| Max Allow Headway ( *MAH* ), s | | 0.0 | | 0.0 | | | | 3.1 |
| Queue Clearance Time ( *g s* ), s | | | | | | | | 23.1 |
| Green Extension Time ( *g e* ), s | | 0.0 | | 0.0 | | | | 2.1 |
| Phase Call Probability | | | | | | | | 1.00 |
| Max Out Probability | | | | | | | | 0.00 |

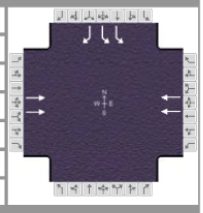
| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | | 2 | | | 6 | | | | | 7 | | 14 |
| Adjusted Flow Rate ( *v* ), veh/h | | 660 | | | 795 | | | | | 846 | | 0 |
| Adjusted Saturation Flow Rate ( *s* ), veh/h/ln | | 1660 | | | 1647 | | | | | 1603 | | 1525 |
| Queue Service Time ( *g s* ), s | | 12.6 | | | 16.2 | | | | | 21.1 | | 0.0 |
| Cycle Queue Clearance Time ( *g c* ), s | | 12.6 | | | 16.2 | | | | | 21.1 | | 0.0 |
| Green Ratio ( *g/C* ) | | 0.49 | | | 0.49 | | | | | 0.41 | | 0.41 |
| Capacity ( *c* ), veh/h | | 1627 | | | 1614 | | | | | 1314 | | 625 |
| Volume-to-Capacity Ratio ( *X* ) | | 0.406 | | | 0.492 | | | | | 0.643 | | 0.000 |
| Back of Queue ( *Q* ), ft/ln ( 50 th percentile) | | 121.7 | | | 156.6 | | | | | 200.6 | | 0 |
| Back of Queue ( *Q* ), veh/ln ( 50 th percentile) | | 4.7 | | | 6.0 | | | | | 7.8 | | 0.0 |
| Queue Storage Ratio ( *RQ* ) ( 50 th percentile) | | 0.00 | | | 0.00 | | | | | 0.00 | | 0.00 |
| Uniform Delay ( *d 1* ), s/veh | | 16.2 | | | 17.1 | | | | | 23.6 | | 0.0 |
| Incremental Delay ( *d 2* ), s/veh | | 0.8 | | | 1.1 | | | | | 0.8 | | 0.0 |
| Initial Queue Delay ( *d 3* ), s/veh | | 0.0 | | | 0.0 | | | | | 0.0 | | 0.0 |
| Control Delay ( *d* ), s/veh | | 17.0 | | | 18.2 | | | | | 24.5 | | 0.0 |
| Level of Service (LOS) | | B | | | B | | | | | C | | |
| Approach Delay, s/veh / LOS | 17.0 | | B | 18.2 | | B | 0.0 | | | 24.5 | | C |
| Intersection Delay, s/veh / LOS | 20.2 | | | | | | C | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 0.70 | A | 1.90 | B | 2.15 | B | 2.15 | B |
| Bicycle LOS Score / LOS | 1.03 | A | 1.14 | A | | | | F |

## EXHIBIT 17
## 2024 PEAK PM HOUR TRAFFIC ANALYSIS – Walkley/Heron

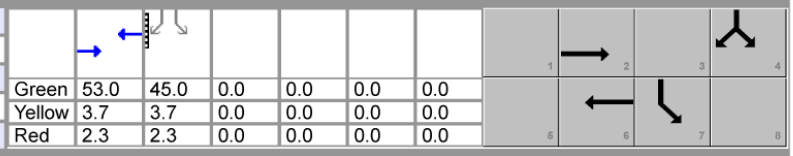
### HCS7 Signalized Intersection Results Summary

| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | | | | Duration, h | 0.25 |
| Analyst | | Analysis Date | May 17, 2018 | Area Type | Other |
| Jurisdiction | City of Ottawa | Time Period | Peak PM Hour | PHF | 0.92 |
| Urban Street | 1850 Walkley Road | Analysis Year | 2024 | Analysis Period | 1> 7:00 |
| Intersection | Walkley/Heron | File Name | 2024_tot_pm.xus | | |
| Project Description | Commercial Development | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( *v* ), veh/h | | 787 | | | 1004 | | | | | 1031 | | 0 |

| Signal Information | | | |
|---|---|---|---|
| Cycle, s | 110.0 | Reference Phase | 2 |
| Offset, s | 0 | Reference Point | End |
| Uncoordinated | No | Simult. Gap E/W | On |
| Force Mode | Float | Simult. Gap N/S | On |



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Green | 53.0 | 45.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Yellow | 3.7 | 3.7 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Red | 2.3 | 2.3 | 0.0 | 0.0 | 0.0 | 0.0 | |

| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | | 2 | | 6 | | | | 4 |
| Case Number | | 8.0 | | 8.0 | | | | 9.0 |
| Phase Duration, s | | 59.0 | | 59.0 | | | | 51.0 |
| Change Period, ( *Y+R c* ), s | | 6.0 | | 6.0 | | | | 6.0 |
| Max Allow Headway ( *MAH* ), s | | 0.0 | | 0.0 | | | | 3.1 |
| Queue Clearance Time ( *g s* ), s | | | | | | | | 35.6 |
| Green Extension Time ( *g e* ), s | | 0.0 | | 0.0 | | | | 2.5 |
| Phase Call Probability | | | | | | | | 1.00 |
| Max Out Probability | | | | | | | | 0.14 |

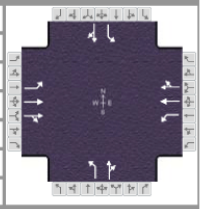
| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | | 2 | | | 6 | | | | | 7 | | 14 |
| Adjusted Flow Rate ( *v* ), veh/h | | 855 | | | 1091 | | | | | 1121 | | 0 |
| Adjusted Saturation Flow Rate ( *s* ), veh/h/ln | | 1647 | | | 1687 | | | | | 1629 | | 1525 |
| Queue Service Time ( *g s* ), s | | 19.6 | | | 26.8 | | | | | 33.6 | | 0.0 |
| Cycle Queue Clearance Time ( *g c* ), s | | 19.6 | | | 26.8 | | | | | 33.6 | | 0.0 |
| Green Ratio ( *g/C* ) | | 0.49 | | | 0.49 | | | | | 0.42 | | 0.42 |
| Capacity ( *c* ), veh/h | | 1617 | | | 1656 | | | | | 1362 | | 638 |
| Volume-to-Capacity Ratio ( *X* ) | | 0.529 | | | 0.659 | | | | | 0.823 | | 0.000 |
| Back of Queue ( *Q* ), ft/ln ( 50 th percentile) | | 194.1 | | | 267 | | | | | 336.8 | | 0 |
| Back of Queue ( *Q* ), veh/ln ( 50 th percentile) | | 7.5 | | | 10.5 | | | | | 13.3 | | 0.0 |
| Queue Storage Ratio ( *RQ* ) ( 50 th percentile) | | 0.00 | | | 0.00 | | | | | 0.00 | | 0.00 |
| Uniform Delay ( *d 1* ), s/veh | | 19.3 | | | 21.1 | | | | | 28.4 | | 0.0 |
| Incremental Delay ( *d 2* ), s/veh | | 1.2 | | | 2.1 | | | | | 3.9 | | 0.0 |
| Initial Queue Delay ( *d 3* ), s/veh | | 0.0 | | | 0.0 | | | | | 0.0 | | 0.0 |
| Control Delay ( *d* ), s/veh | | 20.5 | | | 23.1 | | | | | 32.3 | | 0.0 |
| Level of Service (LOS) | | C | | | C | | | | | C | | |
| Approach Delay, s/veh / LOS | 20.5 | | C | 23.1 | | C | 0.0 | | | 32.3 | | C |
| Intersection Delay, s/veh / LOS | 25.8 | | | | | | C | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 0.71 | A | 1.91 | B | 2.15 | B | 2.15 | B |
| Bicycle LOS Score / LOS | 1.19 | A | 1.39 | A | | | | F |

## EXHIBIT 18
## 2016 PEAK AM HOUR TRAFFIC ANALYSIS – Walkley/Don Reid

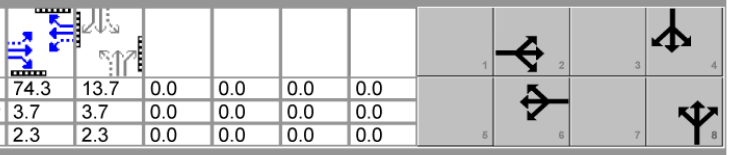
### HCS7 Signalized Intersection Results Summary

| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | | | | Duration, h | 0.25 |
| Analyst | | Analysis Date | May 17, 2018 | Area Type | Other |
| Jurisdiction | City of Ottawa | Time Period | Peak AM Hour | PHF | 0.92 |
| Urban Street | 1850 Walkley Road | Analysis Year | 2016 | Analysis Period | 1> 7:00 |
| Intersection | Walkley/Don Reid | File Name | 2016_ex_am.xus | | |
| Project Description | Commercial Development | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( *v* ), veh/h | 29 | 918 | 144 | 36 | 1366 | 195 | 73 | 2 | 48 | 44 | 42 | 39 |

| Signal Information | | | |
|---|---|---|---|
| Cycle, s | 100.0 | Reference Phase | 2 |
| Offset, s | 0 | Reference Point | End |
| Uncoordinated | No | Simult. Gap E/W | On |
| Force Mode | Float | Simult. Gap N/S | On |



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Green | 74.3 | 13.7 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Yellow | 3.7 | 3.7 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Red | 2.3 | 2.3 | 0.0 | 0.0 | 0.0 | 0.0 | |

| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | | 2 | | 6 | | 8 | | 4 |
| Case Number | | 6.0 | | 6.0 | | 6.0 | | 6.0 |
| Phase Duration, s | | 80.3 | | 80.3 | | 19.7 | | 19.7 |
| Change Period, ( *Y+R c* ), s | | 6.0 | | 6.0 | | 6.0 | | 6.0 |
| Max Allow Headway ( *MAH* ), s | | 0.0 | | 0.0 | | 3.3 | | 3.3 |
| Queue Clearance Time ( *g s* ), s | | | | | | 12.7 | | 8.4 |
| Green Extension Time ( *g e* ), s | | 0.0 | | 0.0 | | 0.5 | | 0.5 |
| Phase Call Probability | | | | | | 1.00 | | 0.98 |
| Max Out Probability | | | | | | 0.00 | | 0.00 |

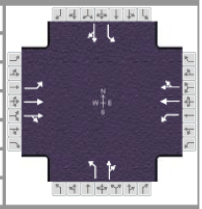
| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | 5 | 2 | 12 | 1 | 6 | 16 | 3 | 8 | 18 | 7 | 4 | 14 |
| Adjusted Flow Rate ( *v* ), veh/h | 32 | 593 | 562 | 39 | 858 | 839 | 79 | 54 | | 48 | 88 | |
| Adjusted Saturation Flow Rate ( *s* ), veh/h/ln | 294 | 1744 | 1649 | 495 | 1730 | 1644 | 1278 | 1520 | | 1360 | 1656 | |
| Queue Service Time ( *g s* ), s | 6.1 | 12.8 | 12.8 | 3.2 | 24.4 | 25.8 | 6.0 | 3.2 | | 3.2 | 4.8 | |
| Cycle Queue Clearance Time ( *g c* ), s | 32.0 | 12.8 | 12.8 | 16.1 | 24.4 | 25.8 | 10.7 | 3.2 | | 6.4 | 4.8 | |
| Green Ratio ( *g/C* ) | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.15 | 0.15 | | 0.15 | 0.15 | |
| Capacity ( *c* ), veh/h | 217 | 1312 | 1240 | 380 | 1301 | 1237 | 200 | 225 | | 230 | 245 | |
| Volume-to-Capacity Ratio ( *X* ) | 0.145 | 0.452 | 0.453 | 0.103 | 0.660 | 0.678 | 0.397 | 0.242 | | 0.208 | 0.360 | |
| Back of Queue ( *Q* ), ft/ln ( 50 th percentile) | 11.8 | 98.1 | 90.6 | 9.2 | 191.5 | 187.1 | 48.8 | 29.3 | | 26.8 | 48.4 | |
| Back of Queue ( *Q* ), veh/ln ( 50 th percentile) | 0.5 | 3.8 | 3.6 | 0.4 | 7.4 | 7.5 | 1.9 | 1.2 | | 1.1 | 1.9 | |
| Queue Storage Ratio ( *RQ* ) ( 50 th percentile) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 | |
| Uniform Delay ( *d 1* ), s/veh | 14.4 | 4.6 | 4.7 | 7.7 | 6.1 | 6.3 | 43.2 | 37.7 | | 40.5 | 38.4 | |
| Incremental Delay ( *d 2* ), s/veh | 1.4 | 1.1 | 1.2 | 0.5 | 2.6 | 3.0 | 0.5 | 0.2 | | 0.2 | 0.3 | |
| Initial Queue Delay ( *d 3* ), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Control Delay ( *d* ), s/veh | 15.8 | 5.8 | 5.8 | 8.2 | 8.7 | 9.3 | 43.6 | 37.9 | | 40.6 | 38.7 | |
| Level of Service (LOS) | B | A | A | A | A | A | D | D | | D | D | |
| Approach Delay, s/veh / LOS | 6.1 | A | | 9.0 | A | | 41.3 | D | | 39.4 | D | |
| Intersection Delay, s/veh / LOS | 10.5 | | | | | | B | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 1.85 | B | 1.85 | B | 2.30 | B | 2.30 | B |
| Bicycle LOS Score / LOS | 1.47 | A | 1.92 | B | 0.71 | A | 0.71 | A |

## EXHIBIT 19
## 2016 PEAK PM HOUR TRAFFIC ANALYSIS – Walkley/Don Reid

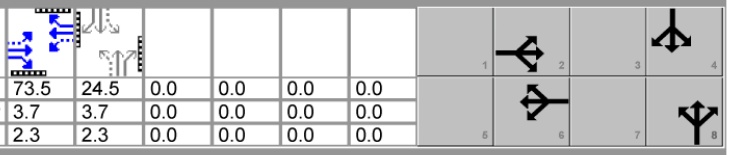
### HCS7 Signalized Intersection Results Summary

| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | | | | Duration, h | 0.25 |
| Analyst | | Analysis Date | May 17, 2018 | Area Type | Other |
| Jurisdiction | City of Ottawa | Time Period | Peak PM Hour | PHF | 0.92 |
| Urban Street | 1850 Walkley Road | Analysis Year | 2016 | Analysis Period | 1> 7:00 |
| Intersection | Walkley/Don Reid | File Name | 2016_ex_pm.xus | | |
| Project Description | Commercial Development | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( *v* ), veh/h | 27 | 1369 | 95 | 13 | 1400 | 70 | 137 | 0 | 65 | 87 | 99 | 50 |

| Signal Information | | | |
|---|---|---|---|
| Cycle, s | 110.0 | Reference Phase | 2 |
| Offset, s | 0 | Reference Point | End |
| Uncoordinated | No | Simult. Gap E/W | On |
| Force Mode | Float | Simult. Gap N/S | On |



| | | | | | | |
|---|---|---|---|---|---|---|
| Green | 73.5 | 24.5 | 0.0 | 0.0 | 0.0 | 0.0 |
| Yellow | 3.7 | 3.7 | 0.0 | 0.0 | 0.0 | 0.0 |
| Red | 2.3 | 2.3 | 0.0 | 0.0 | 0.0 | 0.0 |

| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | | 2 | | 6 | | 8 | | 4 |
| Case Number | | 6.0 | | 6.0 | | 6.0 | | 6.0 |
| Phase Duration, s | | 79.5 | | 79.5 | | 30.5 | | 30.5 |
| Change Period, ( *Y+R c* ), s | | 6.0 | | 6.0 | | 6.0 | | 6.0 |
| Max Allow Headway ( *MAH* ), s | | 0.0 | | 0.0 | | 3.3 | | 3.3 |
| Queue Clearance Time ( *g s* ), s | | | | | | 23.6 | | 12.7 |
| Green Extension Time ( *g e* ), s | | 0.0 | | 0.0 | | 1.0 | | 1.0 |
| Phase Call Probability | | | | | | 1.00 | | 1.00 |
| Max Out Probability | | | | | | 0.00 | | 0.00 |

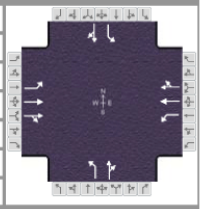
| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | 5 | 2 | 12 | 1 | 6 | 16 | 3 | 8 | 18 | 7 | 4 | 14 |
| Adjusted Flow Rate ( *v* ), veh/h | 29 | 802 | 789 | 14 | 804 | 794 | 149 | 71 | | 95 | 162 | |
| Adjusted Saturation Flow Rate ( *s* ), veh/h/ln | 323 | 1758 | 1711 | 326 | 1772 | 1737 | 1234 | 1516 | | 1334 | 1684 | |
| Queue Service Time ( *g s* ), s | 6.6 | 29.8 | 30.4 | 3.0 | 29.5 | 29.9 | 12.8 | 4.1 | | 6.7 | 9.0 | |
| Cycle Queue Clearance Time ( *g c* ), s | 37.0 | 29.8 | 30.4 | 33.9 | 29.5 | 29.9 | 21.6 | 4.1 | | 10.7 | 9.0 | |
| Green Ratio ( *g/C* ) | 0.68 | 0.68 | 0.68 | 0.68 | 0.68 | 0.68 | 0.23 | 0.23 | | 0.23 | 0.23 | |
| Capacity ( *c* ), veh/h | 195 | 1190 | 1158 | 194 | 1199 | 1176 | 254 | 352 | | 328 | 391 | |
| Volume-to-Capacity Ratio ( *X* ) | 0.151 | 0.674 | 0.681 | 0.073 | 0.670 | 0.675 | 0.587 | 0.201 | | 0.289 | 0.414 | |
| Back of Queue ( *Q* ), ft/ln ( 50 th percentile) | 14.5 | 281.4 | 273.9 | 6.7 | 278.1 | 273.1 | 98.7 | 37.9 | | 55.4 | 92.5 | |
| Back of Queue ( *Q* ), veh/ln ( 50 th percentile) | 0.6 | 11.0 | 11.0 | 0.3 | 11.0 | 10.9 | 3.9 | 1.5 | | 2.2 | 3.7 | |
| Queue Storage Ratio ( *RQ* ) ( 50 th percentile) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 | |
| Uniform Delay ( *d 1* ), s/veh | 21.8 | 10.6 | 10.7 | 21.0 | 10.5 | 10.6 | 44.9 | 34.0 | | 38.2 | 35.9 | |
| Incremental Delay ( *d 2* ), s/veh | 1.6 | 3.1 | 3.2 | 0.7 | 3.0 | 3.1 | 0.8 | 0.1 | | 0.2 | 0.3 | |
| Initial Queue Delay ( *d 3* ), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Control Delay ( *d* ), s/veh | 23.4 | 13.6 | 13.9 | 21.7 | 13.5 | 13.7 | 45.7 | 34.1 | | 38.4 | 36.1 | |
| Level of Service (LOS) | C | B | B | C | B | B | D | C | | D | D | |
| Approach Delay, s/veh / LOS | 13.9 | B | | 13.7 | B | | 42.0 | D | | 37.0 | D | |
| Intersection Delay, s/veh / LOS | 17.1 | | | | | | B | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 1.87 | B | 1.87 | B | 2.30 | B | 2.30 | B |
| Bicycle LOS Score / LOS | 1.82 | B | 1.82 | B | 0.85 | A | 0.91 | A |

## EXHIBIT 20
## 2019 PEAK AM HOUR TRAFFIC ANALYSIS – Walkley/Don Reid

### HCS7 Signalized Intersection Results Summary

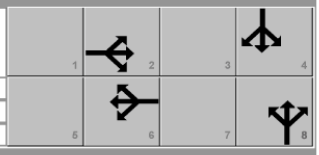
| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | | | | Duration, h | 0.25 |
| Analyst | | Analysis Date | May 17, 2018 | Area Type | Other |
| Jurisdiction | City of Ottawa | Time Period | Peak AM Hour | PHF | 0.92 |
| Urban Street | 1850 Walkley Road | Analysis Year | 2019 | Analysis Period | 1> 7:00 |
| Intersection | Walkley/Don Reid | File Name | 2019_tot_am.xus | | |
| Project Description | Commercial Development | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( *v* ), veh/h | 31 | 977 | 153 | 38 | 1462 | 207 | 77 | 0 | 51 | 47 | 45 | 41 |

| Signal Information | | | |
|---|---|---|---|
| Cycle, s | 100.0 | Reference Phase | 2 |
| Offset, s | 0 | Reference Point | End |
| Uncoordinated | No | Simult. Gap E/W | On |
| Force Mode | Float | Simult. Gap N/S | On |

| | | | | | | |
|---|---|---|---|---|---|---|
| Green | 73.7 | 14.3 | 0.0 | 0.0 | 0.0 | 0.0 |
| Yellow | 3.7 | 3.7 | 0.0 | 0.0 | 0.0 | 0.0 |
| Red | 2.3 | 2.3 | 0.0 | 0.0 | 0.0 | 0.0 |



| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | | 2 | | 6 | | 8 | | 4 |
| Case Number | | 6.0 | | 6.0 | | 6.0 | | 6.0 |
| Phase Duration, s | | 79.7 | | 79.7 | | 20.3 | | 20.3 |
| Change Period, ( *Y+R c* ), s | | 6.0 | | 6.0 | | 6.0 | | 6.0 |
| Max Allow Headway ( *MAH* ), s | | 0.0 | | 0.0 | | 3.3 | | 3.3 |
| Queue Clearance Time ( *g s* ), s | | | | | | 13.3 | | 8.6 |
| Green Extension Time ( *g e* ), s | | 0.0 | | 0.0 | | 0.6 | | 0.6 |
| Phase Call Probability | | | | | | 1.00 | | 0.98 |
| Max Out Probability | | | | | | 0.00 | | 0.00 |

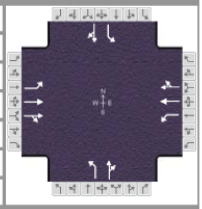
| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | 5 | 2 | 12 | 1 | 6 | 16 | 3 | 8 | 18 | 7 | 4 | 14 |
| Adjusted Flow Rate ( *v* ), veh/h | 34 | 630 | 598 | 41 | 913 | 901 | 84 | 55 | | 51 | 93 | |
| Adjusted Saturation Flow Rate ( *s* ), veh/h/ln | 262 | 1744 | 1649 | 461 | 1730 | 1645 | 1272 | 1511 | | 1359 | 1658 | |
| Queue Service Time ( *g s* ), s | 8.3 | 14.4 | 14.4 | 3.9 | 28.4 | 30.8 | 6.3 | 3.2 | | 3.4 | 5.1 | |
| Cycle Queue Clearance Time ( *g c* ), s | 39.2 | 14.4 | 14.4 | 18.5 | 28.4 | 30.8 | 11.3 | 3.2 | | 6.6 | 5.1 | |
| Green Ratio ( *g/C* ) | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.15 | 0.15 | | 0.15 | 0.15 | |
| Capacity ( *c* ), veh/h | 187 | 1301 | 1230 | 349 | 1291 | 1227 | 204 | 232 | | 238 | 255 | |
| Volume-to-Capacity Ratio ( *X* ) | 0.181 | 0.484 | 0.486 | 0.118 | 0.707 | 0.734 | 0.410 | 0.239 | | 0.215 | 0.367 | |
| Back of Queue ( *Q* ), ft/ln ( 50 th percentile) | 14.9 | 112.3 | 104 | 10.7 | 228.5 | 230 | 51.5 | 29.7 | | 28.5 | 51.1 | |
| Back of Queue ( *Q* ), veh/ln ( 50 th percentile) | 0.6 | 4.4 | 4.2 | 0.4 | 8.8 | 9.2 | 2.0 | 1.2 | | 1.1 | 2.0 | |
| Queue Storage Ratio ( *RQ* ) ( 50 th percentile) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 | |
| Uniform Delay ( *d 1* ), s/veh | 18.2 | 5.0 | 5.1 | 8.8 | 6.8 | 7.1 | 43.0 | 37.2 | | 40.0 | 37.9 | |
| Incremental Delay ( *d 2* ), s/veh | 2.1 | 1.3 | 1.4 | 0.7 | 3.3 | 3.9 | 0.5 | 0.2 | | 0.2 | 0.3 | |
| Initial Queue Delay ( *d 3* ), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Control Delay ( *d* ), s/veh | 20.3 | 6.3 | 6.4 | 9.5 | 10.1 | 11.0 | 43.5 | 37.4 | | 40.2 | 38.3 | |
| Level of Service (LOS) | C | A | A | A | B | B | D | D | | D | D | |
| Approach Delay, s/veh / LOS | 6.8 | A | | 10.5 | B | | 41.0 | D | | 39.0 | D | |
| Intersection Delay, s/veh / LOS | 11.6 | | | | | | B | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 1.85 | B | 1.85 | B | 2.30 | B | 2.30 | B |
| Bicycle LOS Score / LOS | 1.53 | B | 2.02 | B | 0.72 | A | 0.73 | A |

# EXHIBIT 21
# 2019 PEAK PM HOUR TRAFFIC ANALYSIS – Walkley/Don Reid

## HCS7 Signalized Intersection Results Summary

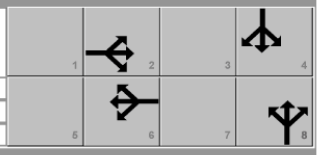
| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | | | | Duration, h | 0.25 |
| Analyst | | Analysis Date | May 17, 2018 | Area Type | Other |
| Jurisdiction | City of Ottawa | Time Period | Peak PM Hour | PHF | 0.92 |
| Urban Street | 1850 Walkley Road | Analysis Year | 2019 | Analysis Period | 1> 7:00 |
| Intersection | Walkley/Don Reid | File Name | 2019_tot_pm.xus | | |
| Project Description | Commercial Development | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( *v* ), veh/h | 29 | 1459 | 101 | 14 | 1491 | 74 | 145 | 0 | 69 | 92 | 105 | 53 |

| Signal Information | | | |
|---|---|---|---|
| Cycle, s | 110.0 | Reference Phase | 2 |
| Offset, s | 0 | Reference Point | End |
| Uncoordinated | No | Simult. Gap E/W | On |
| Force Mode | Float | Simult. Gap N/S | On |

| | | | | | | |
|---|---|---|---|---|---|---|
| Green | 72.1 | 25.9 | 0.0 | 0.0 | 0.0 | 0.0 |
| Yellow | 3.7 | 3.7 | 0.0 | 0.0 | 0.0 | 0.0 |
| Red | 2.3 | 2.3 | 0.0 | 0.0 | 0.0 | 0.0 |



| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | | 2 | | 6 | | 8 | | 4 |
| Case Number | | 6.0 | | 6.0 | | 6.0 | | 6.0 |
| Phase Duration, s | | 78.1 | | 78.1 | | 31.9 | | 31.9 |
| Change Period, ( *Y+R c* ), s | | 6.0 | | 6.0 | | 6.0 | | 6.0 |
| Max Allow Headway ( *MAH* ), s | | 0.0 | | 0.0 | | 3.3 | | 3.3 |
| Queue Clearance Time ( *g s* ), s | | | | | | 24.9 | | 13.2 |
| Green Extension Time ( *g e* ), s | | 0.0 | | 0.0 | | 1.0 | | 1.1 |
| Phase Call Probability | | | | | | 1.00 | | 1.00 |
| Max Out Probability | | | | | | 0.00 | | 0.00 |

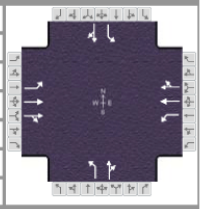
| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | 5 | 2 | 12 | 1 | 6 | 16 | 3 | 8 | 18 | 7 | 4 | 14 |
| Adjusted Flow Rate ( *v* ), veh/h | 32 | 853 | 843 | 15 | 854 | 847 | 158 | 75 | | 100 | 172 | |
| Adjusted Saturation Flow Rate ( *s* ), veh/h/ln | 293 | 1758 | 1712 | 294 | 1772 | 1738 | 1223 | 1516 | | 1329 | 1684 | |
| Queue Service Time ( *g s* ), s | 8.7 | 34.8 | 35.8 | 4.0 | 34.3 | 35.1 | 13.7 | 4.3 | | 7.1 | 9.4 | |
| Cycle Queue Clearance Time ( *g c* ), s | 44.3 | 34.8 | 35.8 | 40.3 | 34.3 | 35.1 | 22.9 | 4.3 | | 11.2 | 9.4 | |
| Green Ratio ( *g/C* ) | 0.66 | 0.66 | 0.66 | 0.66 | 0.66 | 0.66 | 0.24 | 0.24 | | 0.24 | 0.24 | |
| Capacity ( *c* ), veh/h | 165 | 1168 | 1138 | 164 | 1178 | 1155 | 262 | 371 | | 340 | 412 | |
| Volume-to-Capacity Ratio ( *X* ) | 0.191 | 0.730 | 0.741 | 0.093 | 0.725 | 0.733 | 0.602 | 0.202 | | 0.294 | 0.417 | |
| Back of Queue ( *Q* ), ft/ln ( 50 th percentile) | 17.9 | 336.2 | 330.6 | 8.2 | 331.5 | 327.9 | 104.3 | 39.7 | | 58 | 97 | |
| Back of Queue ( *Q* ), veh/ln ( 50 th percentile) | 0.7 | 13.1 | 13.2 | 0.3 | 13.0 | 13.1 | 4.1 | 1.6 | | 2.3 | 3.8 | |
| Queue Storage Ratio ( *RQ* ) ( 50 th percentile) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 | |
| Uniform Delay ( *d 1* ), s/veh | 26.8 | 12.0 | 12.2 | 25.7 | 11.9 | 12.1 | 44.5 | 33.0 | | 37.4 | 35.0 | |
| Incremental Delay ( *d 2* ), s/veh | 2.5 | 4.0 | 4.4 | 1.1 | 3.9 | 4.1 | 0.8 | 0.1 | | 0.2 | 0.3 | |
| Initial Queue Delay ( *d 3* ), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Control Delay ( *d* ), s/veh | 29.3 | 16.1 | 16.5 | 26.8 | 15.9 | 16.2 | 45.3 | 33.1 | | 37.6 | 35.2 | |
| Level of Service (LOS) | C | B | B | C | B | B | D | C | | D | D | |
| Approach Delay, s/veh / LOS | 16.5 | B | | 16.1 | B | | 41.4 | D | | 36.1 | D | |
| Intersection Delay, s/veh / LOS | 19.2 | | | | | | B | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 1.87 | B | 1.87 | B | 2.30 | B | 2.30 | B |
| Bicycle LOS Score / LOS | 1.91 | B | 1.90 | B | 0.87 | A | 0.94 | A |

# EXHIBIT 22
# 2024 PEAK AM HOUR TRAFFIC ANALYSIS – Walkley/Don Reid

## HCS7 Signalized Intersection Results Summary

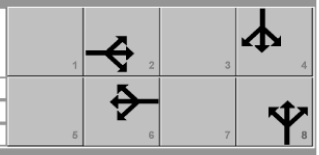
| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | | | | Duration, h | 0.25 |
| Analyst | | Analysis Date | May 17, 2018 | Area Type | Other |
| Jurisdiction | City of Ottawa | Time Period | Peak AM Hour | PHF | 0.92 |
| Urban Street | 1850 Walkley Road | Analysis Year | 2024 | Analysis Period | 1> 7:00 |
| Intersection | Walkley/Don Reid | File Name | 2024_tot_am.xus | | |
| Project Description | Commercial Development | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( *v* ), veh/h | 34 | 1079 | 169 | 42 | 1614 | 229 | 86 | 0 | 56 | 52 | 49 | 46 |

| Signal Information | | | |
|---|---|---|---|
| Cycle, s | 100.0 | Reference Phase | 2 |
| Offset, s | 0 | Reference Point | End |
| Uncoordinated | No | Simult. Gap E/W | On |
| Force Mode | Float | Simult. Gap N/S | On |

| | | | | | | |
|---|---|---|---|---|---|---|
| Green | 72.5 | 15.5 | 0.0 | 0.0 | 0.0 | 0.0 |
| Yellow | 3.7 | 3.7 | 0.0 | 0.0 | 0.0 | 0.0 |
| Red | 2.3 | 2.3 | 0.0 | 0.0 | 0.0 | 0.0 |



| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | | 2 | | 6 | | 8 | | 4 |
| Case Number | | 6.0 | | 6.0 | | 6.0 | | 6.0 |
| Phase Duration, s | | 78.5 | | 78.5 | | 21.5 | | 21.5 |
| Change Period, ( $Y+R_c$ ), s | | 6.0 | | 6.0 | | 6.0 | | 6.0 |
| Max Allow Headway ( *MAH* ), s | | 0.0 | | 0.0 | | 3.3 | | 3.3 |
| Queue Clearance Time ( $g_s$ ), s | | | | | | 14.6 | | 9.2 |
| Green Extension Time ( $g_e$ ), s | | 0.0 | | 0.0 | | 0.6 | | 0.6 |
| Phase Call Probability | | | | | | 1.00 | | 0.99 |
| Max Out Probability | | | | | | 0.00 | | 0.00 |

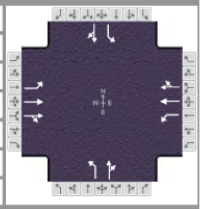
| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | 5 | 2 | 12 | 1 | 6 | 16 | 3 | 8 | 18 | 7 | 4 | 14 |
| Adjusted Flow Rate ( *v* ), veh/h | 37 | 694 | 662 | 46 | 1002 | 1002 | 93 | 61 | | 57 | 103 | |
| Adjusted Saturation Flow Rate ( *s* ), veh/h/ln | 218 | 1744 | 1649 | 408 | 1730 | 1645 | 1260 | 1512 | | 1353 | 1656 | |
| Queue Service Time ( $g_s$ ), s | 14.0 | 17.6 | 17.9 | 5.6 | 36.6 | 41.4 | 7.1 | 3.5 | | 3.8 | 5.5 | |
| Cycle Queue Clearance Time ( $g_c$ ), s | 55.7 | 17.6 | 17.9 | 23.7 | 36.6 | 41.4 | 12.6 | 3.5 | | 7.2 | 5.5 | |
| Green Ratio ( *g/C* ) | 0.73 | 0.73 | 0.73 | 0.73 | 0.73 | 0.73 | 0.17 | 0.17 | | 0.17 | 0.17 | |
| Capacity ( *c* ), veh/h | 141 | 1280 | 1210 | 298 | 1270 | 1207 | 213 | 251 | | 251 | 275 | |
| Volume-to-Capacity Ratio ( *X* ) | 0.262 | 0.543 | 0.547 | 0.153 | 0.789 | 0.830 | 0.440 | 0.242 | | 0.226 | 0.376 | |
| Back of Queue ( *Q* ), ft/ln ( 50 th percentile) | 22 | 143.1 | 134.1 | 14.2 | 312.4 | 331.4 | 57.5 | 32.1 | | 31.2 | 55.8 | |
| Back of Queue ( *Q* ), veh/ln ( 50 th percentile) | 0.9 | 5.5 | 5.4 | 0.6 | 12.0 | 13.3 | 2.2 | 1.3 | | 1.2 | 2.2 | |
| Queue Storage Ratio ( *RQ* ) ( 50 th percentile) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 | |
| Uniform Delay ( $d_1$ ), s/veh | 28.1 | 5.9 | 5.9 | 11.2 | 8.4 | 9.1 | 42.6 | 36.2 | | 39.3 | 37.1 | |
| Incremental Delay ( $d_2$ ), s/veh | 4.5 | 1.7 | 1.8 | 1.1 | 5.0 | 6.7 | 0.5 | 0.2 | | 0.2 | 0.3 | |
| Initial Queue Delay ( $d_3$ ), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Control Delay ( *d* ), s/veh | 32.6 | 7.5 | 7.7 | 12.3 | 13.4 | 15.7 | 43.2 | 36.4 | | 39.5 | 37.4 | |
| Level of Service (LOS) | C | A | A | B | B | B | D | D | | D | D | |
| Approach Delay, s/veh / LOS | 8.3 | A | | 14.5 | B | | 40.5 | D | | 38.1 | D | |
| Intersection Delay, s/veh / LOS | 14.3 | | | | | | B | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 1.85 | B | 1.85 | B | 2.30 | B | 2.30 | B |
| Bicycle LOS Score / LOS | 1.64 | B | 2.18 | B | 0.74 | A | 0.75 | A |

## EXHIBIT 23
## 2024 PEAK PM HOUR TRAFFIC ANALYSIS – Walkley/Don Reid

### HCS7 Signalized Intersection Results Summary

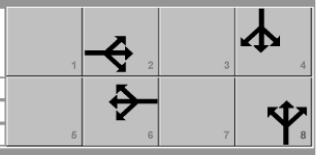
| General Information | | | | Intersection Information | |
|---|---|---|---|---|---|
| Agency | | | | Duration, h | 0.25 |
| Analyst | | Analysis Date | May 17, 2018 | Area Type | Other |
| Jurisdiction | City of Ottawa | Time Period | Peak PM Hour | PHF | 0.92 |
| Urban Street | 1850 Walkley Road | Analysis Year | 2024 | Analysis Period | 1> 7:00 |
| Intersection | Walkley/Don Reid | File Name | 2024_tot_pm.xus | | |
| Project Description | Commercial Development | | | | |



| Demand Information | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Demand ( *v* ), veh/h | 32 | 1610 | 111 | 15 | 1647 | 82 | 161 | 0 | 76 | 102 | 116 | 59 |

| Signal Information | | | |
|---|---|---|---|
| Cycle, s | 110.0 | Reference Phase | 2 |
| Offset, s | 0 | Reference Point | End |
| Uncoordinated | No | Simult. Gap E/W | On |
| Force Mode | Float | Simult. Gap N/S | On |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Green | 69.4 | 28.6 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | |
| Yellow | 3.7 | 3.7 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | |
| Red | 2.3 | 2.3 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | |



| Timer Results | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Assigned Phase | | 2 | | 6 | | 8 | | 4 |
| Case Number | | 6.0 | | 6.0 | | 6.0 | | 6.0 |
| Phase Duration, s | | 75.4 | | 75.4 | | 34.6 | | 34.6 |
| Change Period, ( *Y+R c* ), s | | 6.0 | | 6.0 | | 6.0 | | 6.0 |
| Max Allow Headway ( *MAH* ), s | | 0.0 | | 0.0 | | 3.3 | | 3.3 |
| Queue Clearance Time ( *g s* ), s | | | | | | 27.5 | | 14.3 |
| Green Extension Time ( *g e* ), s | | 0.0 | | 0.0 | | 1.1 | | 1.2 |
| Phase Call Probability | | | | | | 1.00 | | 1.00 |
| Max Out Probability | | | | | | 0.00 | | 0.00 |

| Movement Group Results | EB | | | WB | | | NB | | | SB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach Movement | L | T | R | L | T | R | L | T | R | L | T | R |
| Assigned Movement | 5 | 2 | 12 | 1 | 6 | 16 | 3 | 8 | 18 | 7 | 4 | 14 |
| Adjusted Flow Rate ( *v* ), veh/h | 35 | 937 | 933 | 16 | 941 | 938 | 175 | 83 | | 111 | 190 | |
| Adjusted Saturation Flow Rate ( *s* ), veh/h/ln | 246 | 1758 | 1712 | 248 | 1772 | 1738 | 1202 | 1517 | | 1321 | 1684 | |
| Queue Service Time ( *g s* ), s | 14.2 | 45.2 | 47.4 | 6.1 | 44.8 | 46.4 | 15.4 | 4.6 | | 7.8 | 10.2 | |
| Cycle Queue Clearance Time ( *g c* ), s | 61.1 | 45.2 | 47.4 | 54.0 | 44.8 | 46.4 | 25.5 | 4.6 | | 12.3 | 10.2 | |
| Green Ratio ( *g/C* ) | 0.64 | 0.64 | 0.64 | 0.64 | 0.64 | 0.64 | 0.27 | 0.27 | | 0.27 | 0.27 | |
| Capacity ( *c* ), veh/h | 118 | 1126 | 1097 | 116 | 1135 | 1113 | 278 | 407 | | 366 | 452 | |
| Volume-to-Capacity Ratio ( *X* ) | 0.294 | 0.832 | 0.851 | 0.140 | 0.829 | 0.843 | 0.629 | 0.203 | | 0.303 | 0.421 | |
| Back of Queue ( *Q* ), ft/ln ( 50 th percentile) | 26.3 | 463.2 | 468.1 | 11.3 | 458 | 462.6 | 115.5 | 42.2 | | 62.9 | 104.7 | |
| Back of Queue ( *Q* ), veh/ln ( 50 th percentile) | 1.1 | 18.1 | 18.7 | 0.5 | 18.0 | 18.5 | 4.6 | 1.7 | | 2.5 | 4.2 | |
| Queue Storage Ratio ( *RQ* ) ( 50 th percentile) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 | |
| Uniform Delay ( *d 1* ), s/veh | 39.6 | 15.2 | 15.6 | 37.2 | 15.2 | 15.5 | 43.6 | 31.1 | | 35.8 | 33.2 | |
| Incremental Delay ( *d 2* ), s/veh | 6.2 | 7.2 | 8.4 | 2.5 | 7.0 | 7.8 | 0.9 | 0.1 | | 0.2 | 0.2 | |
| Initial Queue Delay ( *d 3* ), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Control Delay ( *d* ), s/veh | 45.8 | 22.5 | 24.0 | 39.7 | 22.2 | 23.3 | 44.5 | 31.2 | | 36.0 | 33.4 | |
| Level of Service (LOS) | D | C | C | D | C | C | D | C | | D | C | |
| Approach Delay, s/veh / LOS | 23.6 | C | | 22.9 | C | | 40.2 | D | | 34.3 | C | |
| Intersection Delay, s/veh / LOS | 25.0 | | | | | | C | | | | | |

| Multimodal Results | EB | | WB | | NB | | SB | |
|---|---|---|---|---|---|---|---|---|
| Pedestrian LOS Score / LOS | 1.88 | B | 1.88 | B | 2.29 | B | 2.29 | B |
| Bicycle LOS Score / LOS | 2.06 | B | 2.05 | B | 0.91 | A | 0.98 | A |

**EXHIBIT 24**
**WALKLEY ROAD – PLOS Segment Evaluation**

| | |
|---|---|
| STREET | Walkley Road |
| FROM | Heron Road |
| TO | Don Reid Drive |
| YEAR | 2024 |
| DIRECTION | Eastbound–Westbound |
| MMLOS MODE | PLOS |

SEGMENT SCORE **E**

| Sidewalk Width (m) | Boulevard Width (m) | Motor Vehicle Traffic Volume (AADT) | Presence of On-street Parking | Segment PLOS | | | |
|---|---|---|---|---|---|---|---|
| | | | | Operating Speed (km/h) | | | |
| | | | | ≤30 | >30 or 50 | >50 or 60 | >60 [1] |
| 2.0 or more | > 2 | ≤ 3000 | N/A | A | A | A | B |
| | | > 3000 | Yes | A | B | B | N/A |
| | | | No | A | B | C | D |
| | 0.5 to 2 | ≤ 3000 | N/A | A | A | A | B |
| | | > 3000 | Yes | A | B | C | N/A |
| | | | No | A | C | D | E |
| | 0 | ≤ 3000 | NA | A | B | C | D |
| | | > 3000 | Yes | B | B | D | N/A |
| | | | No | B | C | E | F |
| 1.8 | > 2 | ≤ 3000 | N/A | A | A | A | B |
| | | > 3000 | Yes | A | B | C | N/A |
| | | | No | A | C | D | E |
| | 0.5 to 2 | ≤ 3000 | N/A | A | B | B | D |
| | | > 3000 | Yes | A | C | C | N/A |
| | | | No | B | C | E | E |
| | 0 | ≤ 3000 | N/A | A | B | C | D |
| | | > 3000 | Yes | B | C | D | N/A |
| | | | No | C | D | F | F |
| 1.5 | > 2 | ≤ 3000 | N/A | C | C | C | C |
| | | > 3000 | Yes | C | C | D | N/A |
| | | | No | C | D | E | E |
| | 0.5 to 2 | ≤ 3000 | N/A | C | C | C | D |
| | | > 3000 | Yes | C | C | D | N/A |
| | | | No | D | E | E | E |
| | 0 | N/A | | D | E | F [2] | F [2] |
| <1.5 | N/A | | | F [3] | F [3] | F [3] | F [3] |
| No sidewalk | N/A | | | C [4] | F [3] | F [3] | F [3] |

**EXHIBIT 25**
**WALKLEY/HERON – PLOS Signalized Intersection Evaluation**

| | |
|---|---|
| MAIN STREET | Walkley Road |
| MINOR STREET | Heron Road |
| APPROACHES | All |
| YEAR | 2024 |
| DIRECTION | All |
| MMLOS MODE | PLOS |

West Approach

| | Comment | Points |
|---|---|---|
| 5.1 Crossing Distance & Conditions | | |
| Median? | Yes | |
| Total Travel Lanes Crossed | 6 | 60 |
| Island Refuge | Yes | −4 |
| 5.2 Signal Phasing & Timing Features | | |
| Left Turn Conflict | No Left Turn | 0 |
| Right Turn Conflict | No Right Turn | 0 |
| Right Turns on Red | RTOR Prohibited | 0 |
| Leading Ped Interval | No | −2 |
| 5.3 Corner Radius | | |
| Radius | | |
| Right Turn | No Right Turn | 0 |
| 5.4 Crosswalk Treatment | Standard Transverse Markings | −7 |
| TOTAL PETSI SCORE | | 47 |
| DELAY SCORE | | 36 |
| From Signal Timing Plan | | |
| PETSI SCORE | | **D** |
| DELAY SCORE | | **D** |
| OVERALL APPROACH SCORE | | **D** |

OVERALL INTERSECTION SCORE **D**

**EXHIBIT 26**
**WALKLEY/DON REID – PLOS Signalized Intersection Evaluation**

| | |
|---|---|
| MAIN STREET | Walkley Road |
| MINOR STREET | Don Reid Drive (Ryder Street) |
| APPROACHES | All |
| YEAR | 2024 |
| DIRECTION | All |
| MMLOS MODE | PLOS |

| | North Approach | | South Approach | | East Approach | | West Approach | |
|---|---|---|---|---|---|---|---|---|
| | Comment | Points | Comment | Points | Comment | Points | Comment | Points |
| 5.1 Crossing Distance & Conditions | | | | | | | | |
| Median? | No | | No | | Yes | | Yes | |
| Total Travel Lanes Crossed | 3 | 105 | 3 | 105 | 5 | 75 | 6 | 60 |
| Island Refuge | No | −4 | No | −4 | No | −4 | No | −4 |
| 5.2 Signal Phasing & Timing Features | | | | | | | | |
| Left Turn Conflict | Permissive | −8 | Permissive | −8 | Permissive | −8 | Permissive | −8 |
| Right Turn Conflict | Permissive/ or Yield Control | −5 | Permissive/ or Yield Control | −5 | Permissive/ or Yield Control | −5 | Permissive/ or Yield Control | −5 |
| Right Turns on Red | RTOR Allowed | −3 | RTOR Allowed | −3 | RTOR Allowed | −3 | RTOR Allowed | −3 |
| Leading Ped Interval | No | −2 | No | −2 | No | −2 | No | −2 |
| 5.3 Corner Radius | | | | | | | | |
| Radius | > 10m to 15m | −6 | > 15m to 25m | −8 | > 15m to 25m | −8 | > 15m to 25m | −8 |
| Right Turn | No Channelization | 0 | No Channelization | 0 | No Channelization | 0 | No Channelization | 0 |
| 5.4 Crosswalk Treatment | Standard Transverse Markings | −7 | Standard Transverse Markings | −7 | Standard Transverse Markings | −7 | Standard Transverse Markings | −7 |
| TOTAL PETSI SCORE | | 70 | | 46 | | 68 | | 68 |
| DELAY SCORE | | 39 | | 39 | | 36 | | 36 |
| From Signal Timing Plan | | | | | | | | |
| PETSI SCORE | | **C** | | **C** | | **E** | | **E** |
| DELAY SCORE | | **D** | | **D** | | **D** | | **D** |
| OVERALL APPROACH SCORE | | **D** | | **D** | | **E** | | **E** |

OVERALL INTERSECTION SCORE **E**

## EXHIBIT 27
## WALKLEY ROAD – BLOS Segment Evaluation

| | |
|---|---|
| STREET | Walkley Road |
| FROM | Heron Road |
| TO | Don Reid Drive (Ryder Street) |
| YEAR | 2024 |
| DIRECTION | Eastbound–Westbound |
| MMLOS MODE | BLOS |

SEGMENT SCORE **E**

| Type of Bikeway | | LOS |
|---|---|---|
| **Physically Separated Bikeway** (cycle tracks, protected bike lanes and multi-use paths). Physical separation refers to, but is not limited to, curbs, raised medians, bollards and parking lanes (adjacent to the bike lane along the travelled way i.e. not curbside). | | A |
| **Bike Lanes Not Adjacent Parking Lane - Select Worst Scoring Criteria** | | |
| No. of Travel Lanes | 1 travel lane in each direction | A |
| | 2 travel lanes in each direction separated by a raised median | B |
| | 2 travel lanes in each direction without a separating median | C |
| | More than 2 travel lanes in each direction | D |
| Bike Lane Width | ≥ 1.8 m wide bike lane (includes marked buffer and paved gutter width) | A |
| | ≥1.5 m to <1.8 m wide bike lane (includes marked buffer and paved gutter width) | B |
| | ≥1.2 m to <1.5 m wide bike lane (includes marked buffer and paved gutter width) | C |
| Operating Speed | ≤ 50 km/h operating speed | A |
| | 60 km/h operating speed | C |
| | ≥ 70 km/h operating speed | E |
| Bike lane blockage (commercial areas) | Rare | A |
| | Frequent | C |
| **Bike Lanes Adjacent to curbside Parking Lane - Select Worst Scoring Criteria** | | |
| No. of Travel Lanes | 1 travel lane in each direction | A |
| | 2 or more travel lanes in each direction | C |
| Bike Lane and Parking Lane Width | 4.5 m wide bike lane plus parking lane (includes marked buffer and paved gutter width) | A |
| | 4.25 m wide bike lane plus parking lane (includes marked buffer and paved gutter width) | B |
| | ≤ 4.0 m wide bike lane plus parking lane (includes marked buffer and paved gutter width) | C |
| Operating Speed | < 40 km/h operating speed | A |
| | 50 km/h operating speed | B |
| | 60 km/h operating speed | D |
| | ≥ 70 km/h operating speed | F |
| Bike lane blockage (commercial areas) | Rare | A |
| | Frequent | C |
| **Mixed Traffic** | | |
| No. of Travel Lanes and Operating Speed | 2 travel lanes; ≤ 40 km/h; no marked centerline or classified as residential | A |
| | 2 to 3 travel lanes; ≤ 40 km/h | B |
| | 2 travel lanes; 50 km/h; no marked centerline or classified as residential | B |
| | 2 to 3 travel lanes; 50 km/h | D |
| | 4 to 5 travel lanes; ≤ 40 km/h | D |
| | 4 to 5 travel lanes; ≥ 50 km/h | E |
| | 6 or more travel lanes; ≤ 40 km/h | E |
| | ≥ 60 km/h | F |
| **Unsignalized Crossing along Route: no median refuge** | | |
| No. of Travel Lanes on Side Street and Operating Speed | 3 or less lanes being crossed; ≤ 40 km/h | A |
| | 4 to 5 lanes being crossed; ≤ 40 km/h | B |
| | 3 or less lanes being crossed; 50 km/h | B |
| | 4 to 5 lanes being crossed; 50 km/h | C |
| | 3 or less lanes being crossed; 60 km/h | C |
| | 4 to 5 lanes being crossed; 60 km/h | D |
| | 6 or more lanes being crossed; ≤ 40 km/h | E |
| | 3 or less lanes being crossed; ≥ 65 km/h | E |
| | 6 or more lanes being crossed; ≥ 50 km/h | F |
| | 4 to 5 lanes being crossed; ≥ 65 km/h | F |
| **Unsignalized Crossing along Route: with median refuge (≥ 1.8 m wide)** | | |
| No. of Travel Lanes on Side Street and Operating Speed | 5 or less lanes being crossed; ≤ 40 km/h | A |
| | 3 or less lanes being crossed; 50 km/h | A |
| | 6 or more lanes being crossed; ≤ 40 km/h | B |
| | 4 to 5 lanes being crossed; 50 km/h | B |
| | 3 or less lanes being crossed; 60 km/h | B |
| | 6 or more lanes being crossed; 50 km/h | C |
| | 4 to 5 lanes being crossed; 60 km/h | C |
| | 3 or less lanes being crossed; ≥ 65 km/h | D |
| | 6 or more lanes being crossed; 60 km/h | E |
| | 4 to 5 lanes being crossed; ≥ 65 km/h | E |
| | 6 or more lanes being crossed; ≥ 65 km/h | F |

NOT APPLICABLE

NOT APPLICABLE

NOT APPLICABLE

NOT APPLICABLE

**EXHIBIT 28**
**WALKLEY/HERON – BLOS Signalized Intersection Evaluation**

| | |
|---|---|
| MAIN STREET | Walkley Road |
| MINOR STREET | Heron Road |
| APPROACHES | Southbound |
| YEAR | 2024 |
| DIRECTION | North/South |
| MMLOS MODE | BLOS |

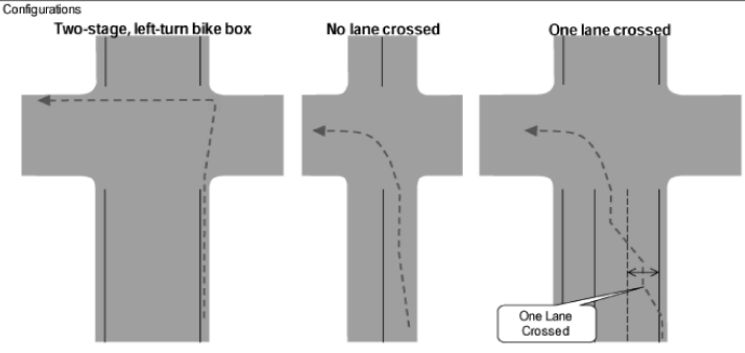
INTERSECTION SCORE **B**

| Bikeway and Intersection Type | | LOS |
|---|---|---|
| **Bike Lanes or higher order facility on a Signalized Intersection Approach** | | |
| Right-turn Lane and Turning Speed of Motorists | No impact on LTS (as long as cycling facility remains to the right of any turn lane - otherwise see pocket bike lanes below) | |
| Cyclist Making a Left-turn and Operating Speed of Motorists (refer to figure) | Two-stage, left-turn bike box; ≤ 50 km/h | A |
| | No lane crossed, ≤ 50 km/h | B |
| | 1 lane crossed, ≤ 40 km/h | B |
| | No lane crossed, ≥ 60 km/h | C |
| | 1 lane crossed, 50 km/h | C |
| | 2 or more lanes crossed, ≤ 40 km/h | D |
| | 1 lane crossed, ≥ 60 km/h | E |
| | 2 or more lanes crossed, ≥ 50 km/h | F |
| | All other single left-turn lane configurations | F |
| | Dual left-turn lanes (shared or exclusive) | F |
| **Pocket Bike Lanes on a Signalized Intersection Approach** | | |
| Right-turn Lane and Turning Speed of Motorists | Right-turn lane introduced to the right of the bike lane and ≤ 50 m long, turning speed ≤ 25 km/h (based on curb radii and angle of intersection) | B |
| | Right-turn lane introduced to the right of the bike lane and > 50 m long, turning speed ≤ 30 km/h (based on curb radii and angle of intersection) | D |
| | Bike lane shifts to the left of the right-turn lane, turning speed ≤ 25 km/h (based on curb radii and angle of intersection) | D |
| | Right-turn lane with any other configurations | F |
| | Dual right-turn lanes (shared or exclusive) | F |
| Cyclist Making a Left-turn and Operating Speed of Motorists (refer to figure) | Two-stage, left-turn bike box; ≤ 50 km/h | A |
| | No lane crossed, ≤ 50 km/h | B |
| | 1 lane crossed, ≤ 40 km/h | B |
| | No lane crossed, ≥ 60 km/h | C |
| | 1 lane crossed, 50 km/h | C |
| | 2 or more lanes crossed, ≤ 40 km/h | D |
| | 1 lane crossed, ≥ 60 km/h | E |
| | 2 or more lanes crossed, ≥ 50 km/h | F |
| | All other single left-turn lane configurations | F |
| | Dual left-turn lanes (shared or exclusive) | F |
| **Mixed Traffic on a Signalized Intersection Approach** | | |
| Right-turn Lane and Turning Speed of Motorists | Right-turn lane 25 to 50 m long, turning speed ≤ 25 km/h (based on curb radii and angle of intersection) | D |
| | Right-turn lane 25 to 50 m long, turning speed > 25 km/h (based on curb radii and angle of intersection) | E |
| | Right-turn lane longer than 50 m | F |
| | Dual right-turn lanes (shared or exclusive) | F |
| Cyclist Making a Left-turn and Operating Speed of Motorists (refer to figure) | Two-stage, left-turn bike box; ≤ 50 km/h | A |
| | No lane crossed, ≤ 50 km/h | B |
| | 1 lane crossed, ≤ 40 km/h | B |
| | No lane crossed, ≥ 60 km/h | D |
| | 1 lane crossed, 50 km/h | D |
| | 2 or more lanes crossed, ≤ 40 km/h | D |
| | 1 lane crossed, ≥ 60 km/h | F |
| | 2 or more lanes crossed, ≥ 50 km/h | F |
| | All other single left-turn lane configurations | F |
| | Dual left-turn lanes (shared or exclusive) | F |

NOT APPLICABLE

NOT APPLICABLE

Left-turn Configurations




*Notes:*
*1. Pocket bike lanes are defined as bike lanes that develop near intersections between vehicular right turn lanes on the right side and vehicular through or left lanes on the left side. All other configurations of bike lanes or separated facility that remain against the edge of the curb/parking lane and require right turning vehicles to yield to through cyclists will not impact the level of traffic stress (i.e. are considered to be LOS A).*

**EXHIBIT 29**
**WALKLEY/DON REID – BLOS Signalized Intersection Evaluation**

| | |
|---|---|
| MAIN STREET | Walkley Road |
| MINOR STREET | Don Reid Drive |
| APPROACHES | Eastbound–Westbound |
| YEAR | 2024 |
| DIRECTION | East/West |
| MMLOS MODE | BLOS |

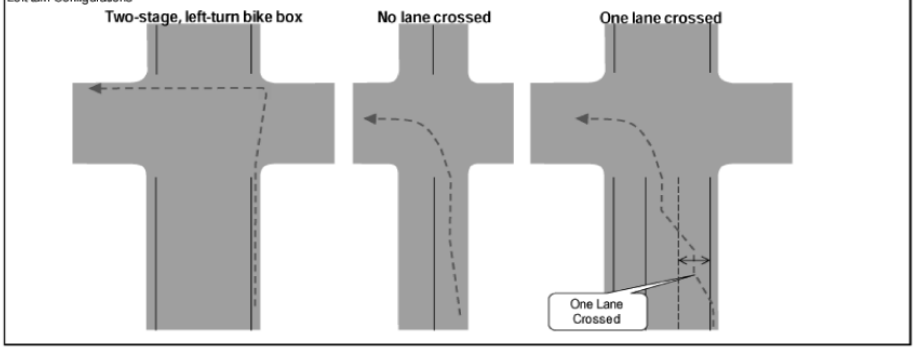
INTERSECTION SCORE **F**

| Bikeway and Intersection Type | | LOS |
|---|---|---|
| **Bike Lanes or higher order facility on a Signalized Intersection Approach** | | |
| Right-turn Lane and Turning Speed of Motorists | No impact on LTS (as long as cycling facility remains to the right of any turn lane - otherwise see pocket bike lanes below) | |
| Cyclist Making a Left-turn and Operating Speed of Motorists (refer to figure) | Two-stage, left-turn bike box; ≤ 50 km/h | A |
| | No lane crossed, ≤ 50 km/h | B |
| | 1 lane crossed, ≤ 40 km/h | B |
| | No lane crossed, ≥ 60 km/h | C |
| | 1 lane crossed, 50 km/h | C |
| | 2 or more lanes crossed, ≤ 40 km/h | D |
| | 1 lane crossed, ≥ 60 km/h | E |
| | 2 or more lanes crossed, ≥ 50 km/h | F |
| | All other single left-turn lane configurations | F |
| | Dual left-turn lanes (shared or exclusive) | F |
| **Pocket Bike Lanes on a Signalized Intersection Approach** | | |
| Right-turn Lane and Turning Speed of Motorists | Right-turn lane introduced to the right of the bike lane and ≤ 50 m long, turning speed ≤ 25 km/h (based on curb radii and angle of intersection) | B |
| | Right-turn lane introduced to the right of the bike lane and > 50 m long, turning speed ≤ 30 km/h (based on curb radii and angle of intersection) | D |
| | Bike lane shifts to the left of the right-turn lane, turning speed ≤ 25 km/h (based on curb radii and angle of intersection) | D |
| | Right-turn lane with any other configurations | F |
| | Dual right-turn lanes (shared or exclusive) | F |
| Cyclist Making a Left-turn and Operating Speed of Motorists (refer to figure) | Two-stage, left-turn bike box; ≤ 50 km/h | A |
| | No lane crossed, ≤ 50 km/h | B |
| | 1 lane crossed, ≤ 40 km/h | B |
| | No lane crossed, ≥ 60 km/h | C |
| | 1 lane crossed, 50 km/h | C |
| | 2 or more lanes crossed, ≤ 40 km/h | D |
| | 1 lane crossed, ≥ 60 km/h | E |
| | 2 or more lanes crossed, ≥ 50 km/h | F |
| | All other single left-turn lane configurations | F |
| | Dual left-turn lanes (shared or exclusive) | F |
| **Mixed Traffic on a Signalized Intersection Approach** | | |
| Right-turn Lane and Turning Speed of Motorists | Right-turn lane 25 to 50 m long, turning speed ≤ 25 km/h (based on curb radii and angle of intersection) | D |
| | Right-turn lane 25 to 50 m long, turning speed > 25 km/h (based on curb radii and angle of intersection) | E |
| | Right-turn lane longer than 50 m | F |
| | Dual right-turn lanes (shared or exclusive) | F |
| Cyclist Making a Left-turn and Operating Speed of Motorists (refer to figure) | Two-stage, left-turn bike box; ≤ 50 km/h | A |
| | No lane crossed, ≤ 50 km/h | B |
| | 1 lane crossed, ≤ 40 km/h | B |
| | No lane crossed, ≥ 60 km/h | D |
| | 1 lane crossed, 50 km/h | D |
| | 2 or more lanes crossed, ≤ 40 km/h | D |
| | 1 lane crossed, ≥ 60 km/h | F |
| | 2 or more lanes crossed, ≥ 50 km/h | F |
| | All other single left-turn lane configurations | F |
| | Dual left-turn lanes (shared or exclusive) | F |

NOT APPLICABLE

NOT APPLICABLE

Left-turn Configurations




*Notes:*
*1. Pocket bike lanes are defined as bike lanes that develop near intersections between vehicular right turn lanes on the right side and vehicular through or left lanes on the left side. All other configurations of bike lanes or separated facility that remain against the edge of the curb/parking lane and require right turning vehicles to yield to through cyclists will not impact the level of traffic stress (i.e. are considered to be LOS A).*

**EXHIBIT 30**
**WALKLEY ROAD – TLOS Segment Evaluation**

| | |
|---|---|
| STREET | Walkley Road |
| FROM | Heron Road |
| TO | Don Reid Drive |
| YEAR | 2024 |
| DIRECTION | Eastbound–Westbound |
| MMLOS MODE | TLOS |

SEGMENT SCORE **D**

| Facility Type | | Level/exposure to congestion delay, friction and incidents | | | Quantitative Measurement | LOS |
|---|---|---|---|---|---|---|
| | | Congestion | Friction | Incident Potential | | |
| Segregated ROW | | No | No | No | N/A | A |
| Bus lane | No/limited parking/driveway friction | No | Low | Low | $C_f \leq 60$ | B |
| | Frequent parking/driveway friction | No | Medium | Medium | $C_f > 60$ | C |
| Mixed Traffic | Limited parking/driveway friction | Yes | Low | Medium | $Vt/Vp \geq 0.8$ | D |
| | Moderate parking/driveway friction | Yes | Medium | Medium | $Vt/Vp \leq 0.6$ | E |
| | Frequent parking/driveway friction | Yes | High | High | $Vt/Vp < 0.4$ | F |

Notes:

Cf, Conflict Factor = = (Number of driveways x crossing volume) / 1 km

Vt/Vp is the ratio of average transit travel speed to posted speed limit

**EXHIBIT 31**
**WALKLEY/HERON – TLOS Signalized Intersection Evaluation**

| | |
|---|---|
| MAIN STREET | Walkley Road |
| MINOR STREET | Heron Road |
| APPROACHES | Eastbound–Westbound |
| YEAR | 2024 |
| DIRECTION | East/West |
| MMLOS MODE | TLOS |

INTERSECTION SCORE **C**

Exhibit 16 – TLOS Signalized Intersection Evaluation Table

| Delay | Typical Location | LOS |
|---|---|---|
| 0 | Grade Separation | A |
| ≤10 sec | High Level TSP | B |
| ≤20 sec | | C |
| ≤30 sec | | D |
| ≤40 sec | TSP & long cycle length | E |
| >40 sec | No TSP & long cycle length | F |

Note: Delay includes travel time from end of queue to entering the intersection

**EXHIBIT 32**
**WALKLEY/DON REID – TLOS Signalized Intersection Evaluation**

| | |
|---|---|
| MAIN STREET | Walkley Road |
| MINOR STREET | Don Reid (Ryder Street) |
| APPROACHES | Eastbound–Westbound |
| YEAR | 2024 |
| DIRECTION | East/West |
| MMLOS MODE | TLOS |

INTERSECTION SCORE **C**

Exhibit 16 – TLOS Signalized Intersection Evaluation Table

| Delay | Typical Location | LOS |
|---|---|---|
| 0 | Grade Separation | A |
| ≤10 sec | High Level TSP | B |
| ≤20 sec | | C |
| ≤30 sec | | D |
| ≤40 sec | TSP & long cycle length | E |
| >40 sec | No TSP & long cycle length | F |

Note: Delay includes travel time from end of queue to entering the intersection

**EXHIBIT 33**
**WALKLEY ROAD – TkLOS Segment Evaluation**

| | | | |
|---|---|---|---|
| STREET | Walkley Road | | |
| FROM | Heron Road | | |
| TO | Don Reid Drive (Ryder Street) | SEGMENT SCORE | **A** |
| YEAR | 2024 | | |
| DIRECTION | Eastbound–Westbound | | |
| MMLOS MODE | TkLOS | | |

Exhibit 20 – TkLOS Segment Evaluation Table

| Curb Lane Width (m) | Only two travel lanes (one in each direction) | More than two travel lanes |
|---|---|---|
| >3.7 | B | A |
| ≤3.5 | C | A |
| ≤3.3 | D | C |
| ≤3.2 | E | D |
| ≤3 | F | E |

**EXHIBIT 34**
**WALKLEY/HERON – TkLOS Signalized Intersection Evaluation**

| | |
|---|---|
| MAIN STREET | Walkley Road |
| MINOR STREET | Heron Road |
| APPROACHES | Northbound–Southbound |
| YEAR | 2024 |
| MMLOS MODE | TkLOS |

INTERSECTION SCORE **A**

Exhibit 21 – TkLOS Signalized Intersection Evaluation Table

| Effective Corner Radius | One receiving lane on departure from intersection | More than one receiving lane on departure from intersection |
|---|---|---|
| < 10m | F | D |
| 10 to 15m | E | B |
| > 15m | C | A |

**EXHIBIT 35**
**WALKLEY/DON REID – TkLOS Signalized Intersection Evaluation**

| | |
|---|---|
| MAIN STREET | Walkley Road |
| MINOR STREET | Don Reid Drive (Ryder Street) |
| APPROACHES | Eastbound–Westbound |
| YEAR | 2024 |
| MMLOS MODE | TkLOS |

INTERSECTION SCORE **C**

Exhibit 21 – TkLOS Signalized Intersection Evaluation Table

| Effective Corner Radius | One receiving lane on departure from intersection | More than one receiving lane on departure from intersection |
|---|---|---|
| < 10m | F | D |
| 10 to 15m | E | B |
| > 15m | C | A |