

To: Mike Giampa (City of Ottawa)

Date:

November 2, 2022

Project #:

60648711

From:

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Memorandum

Subject: **Traffic Impact Assessment Update: Step 2 and 3: Scoping and Forecasting for a Warehouse/
Distribution Centre Located at 2625 Sheffield Road, Ottawa, Ontario (DYT3)**

1. Introduction

AECOM was retained to undertake a traffic impact assessment (TIA) update for a warehouse / distribution centre located at 2625 Sheffield Road in Ottawa, Ontario. The purpose of this memorandum was to confirm the previously defined scope of the traffic impact assessment and identify the analysis required to offset the proposed site impacts on the adjacent network. The scoping of the TIA in this memorandum has been prepared as per the City of Ottawa TIA Guidelines, 2017, and addresses Step 2 and Step 3 of the TIA review process. This memorandum was intended to cover six modules:

1. Existing and Planned Conditions;
2. Study Area and Time Periods; and
3. Exemptions Review.
4. Development Generated Travel Demand;
5. Background Network Travel Demand; and
6. Demand Rationalization.

2. Existing and Planned Conditions

2.1 *Proposed Development*

The proposed site is located at 2625 Sheffield Road in Ottawa, Ontario. The existing site was used as a warehouse / distribution centre and has four access driveways. All four of the accesses are located to the west of site on Sheffield Road, two of which were used by trucks for loading and unloading and the other two were used by employees and visitors. It is estimated that the new site building will be occupied in 2025. There are no phasing of the development, and it is expected the site will be completed in one phase. The existing zoning is IG3 (General Industrial Subzone 3), which permits warehouse uses. The proposed site

land use is a warehouse / distribution centre and the existing/permitted land use will remain the same.

The proposed site will have four accesses. These will be the same four accesses that are currently in place for the existing site on Sheffield Road. The two most northerly access driveways will provide access to site staff (i.e., managers and associates from / to the site to Sheffield Road. The two most southerly access driveways will provide access to delivery vans from / to the site to Sheffield Road. The most southern access driveway also provides access to Trucks. All site access will be limited to right in / right out movements with free flow conditions on the major road and stop control for site traffic egressing the site. The site consists of one delivery station building.

The approximate building size is 263,500 sf and the lot size is 18.2 acres. Based on the parking requirement for this particular zoning (0.8/100 m² for first 5000 m² of GFA and 0.4/100 m² above 5000 m² GFA) the site requires 118 parking spots. The number of parking spaces that will be available on the site is 776 which is a surplus and exceeds the City of Ottawa parking by-law requirement in order to accommodate site-specific operations. **Table 1** provides design information about the site. **Table 2** provides parking review summary.

Table 1: Design Information

Type	Area
Building 1 – Delivery Station	263,543 sf
Area of Proposed Exterior Canopy	-
Area of Total Buildings	263,543 sf
Delivery Station Site Area	18.2 acres
Off-Site Parking Site Area	-
Total Site Area	18.2 acres
Distributed Site Area	TBD
Area of New or Replaced Pavement	TBD

Table 2: Parking Review Summary

Parking	Proposed On-Site	Proposed Off-Site
Associates	147	-
Manager Spaces	15	-
Van Personal Vehicles	60	-
Guest Pickup	3	-
Total Auto Spaces	225	-
Van Personal Vehicle	120	-
Van Parking	371	-
Van Loading	60	-
Total Van Spaces	551	-
Total Parking	776	

2.2 Existing Conditions

2.2.1 Road, Active Transportation and Transit Network

The study area includes the following public roadways:

Walkley Road is an east-west arterial corridor under the jurisdiction of the City of Ottawa in the vicinity of the site. Between Lancaster Road and Highway 417, it consists of two through lanes in each direction and a median two-way left-turn lane. The posted speed limit for the section of this road within the study area is 80km/h. There is currently no existing active transportation infrastructure along the corridor. Traffic signals are present along this roadway. This roadway experiences 3 collisions per year on average, based on the City of Ottawa open data.

Lancaster Road is a north-south roadway under the jurisdiction of the City of Ottawa in the vicinity of the site. North of Walkley Road, it has a two-lane cross-section with one lane in each direction. The posted speed limit for the section of this road within the study area is 50km/h. The existing active transportation infrastructure in the study area consists of continuous sidewalks and painted bike lanes on both sides of Lancaster Road. Traffic signals are present along this roadway. This roadway experiences 1 collision per year on average, based on the City of Ottawa open data.

Sheffield Road is a north-south roadway under the jurisdiction of the City of Ottawa in the vicinity of the site. North of Walkley Road, it has a two-lane cross section with one lane in each direction. The posted speed limit for the section of the road within the study area is 50km/h. There is currently no existing active transportation infrastructure along Sheffield Road. OC Transpo Route # 47 provides bus services in the northbound-southbound directions along Sheffield Road. Stop sign controlled intersections are present along this roadway. This roadway experiences 2 collisions per year on average, based on the City of Ottawa open data.

Humber Place is an east-west roadway to the south of the proposed development under the jurisdiction of the City of Ottawa. In the study area, it has a two-lane cross-section with one lane in each direction. The posted speed limit for section of the road within the study area is 50km/h. There is currently no existing active transportation infrastructure along Humber Place. Stop sign controlled intersections are present along this roadway. This roadway experiences 1 collisions per year on average, based on the City of Ottawa open data.

Highway 417 is a major north-south freeway under the jurisdiction of the Ministry of Transportation. The study area intersections incorporate ramp terminals at Walkley Road. There is currently no existing active transportation infrastructure along the ramps.

Peak hour traffic volumes for each of the above roadways can be found in Section 6.1 in this report. OC Transpo bus route # 47 provide transit services in the vicinity of the site during the AM and PM peak periods Monday to Friday. Bus Route # 47 has multiple stops including at the intersection of Sheffield Road and the north-west access driveway, Sheffield Road and Humber Place, Sheffield Road and Bantree Street, Lancaster Road and Walkley Road. Bus Route # 47 only operates in the peak direction. It brings employees from the nearest transit hub (St-Laurent Station) to the Hawthorne business/industrial area in the morning peak period and returning in the afternoon peak period. No transit service is available for shift-work employees whose work times do not correspond to the peak periods and direction. The location of the bus stops is shown in Figure 1.

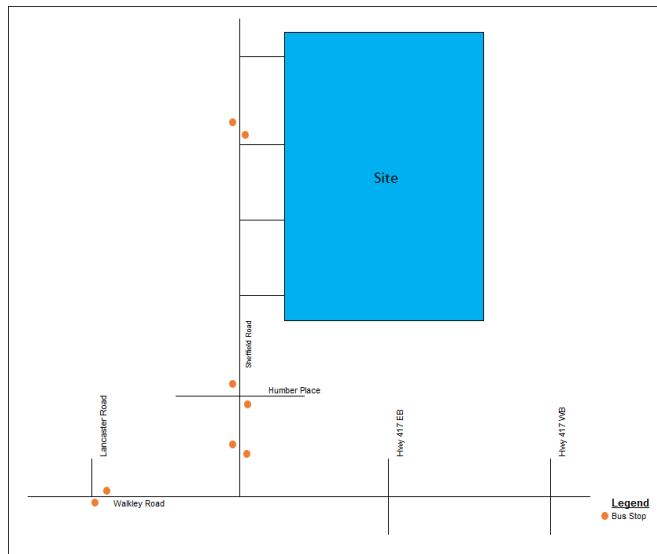


Figure 1. Bus Stops in the Vicinity of the Site

2.2.2 Intersection Lane Configurations

The existing lane configurations of the study area intersections are illustrated in **Figure 1**. The existing site has four accesses on Sheffield Road.

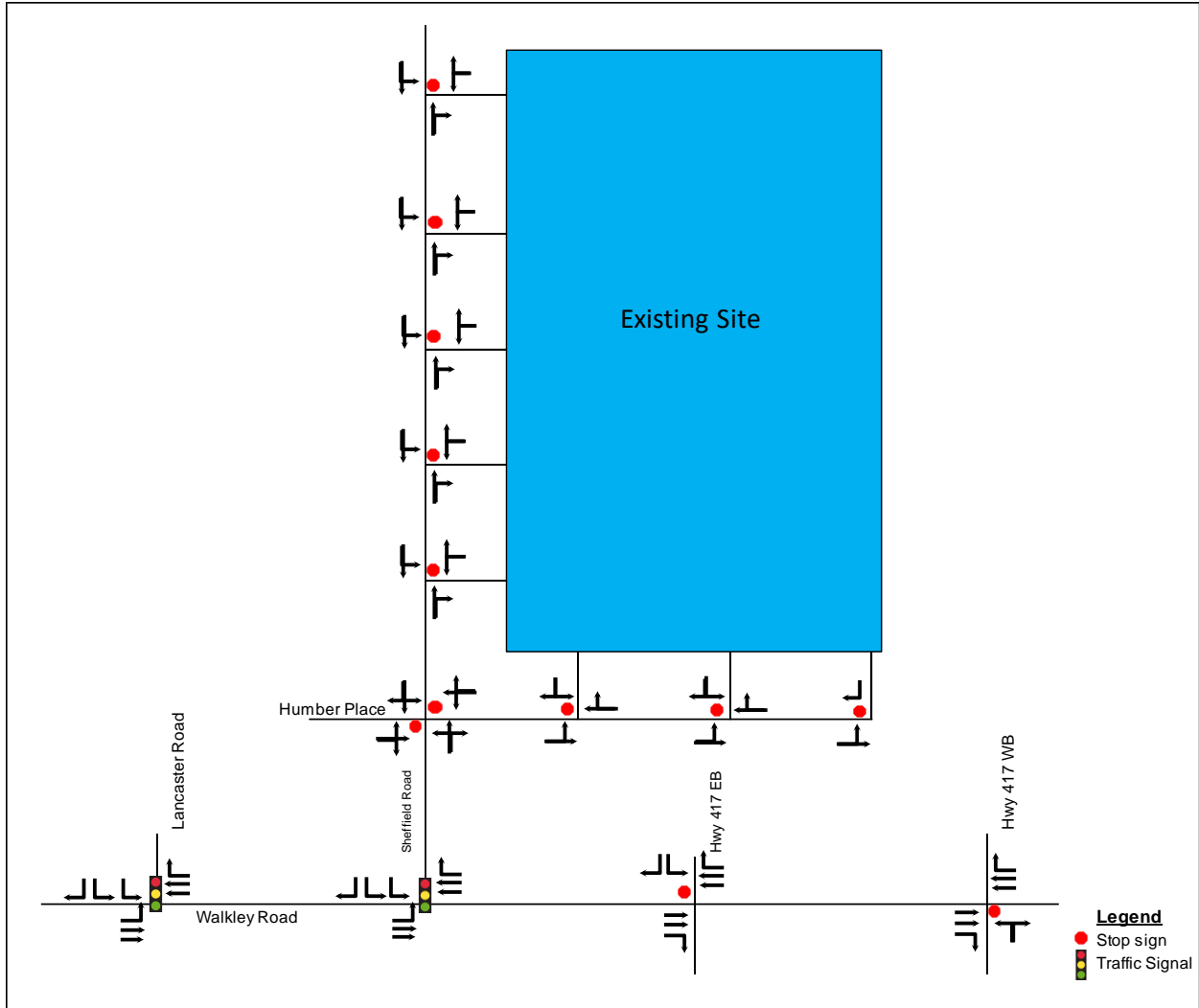


Figure 1: Existing Lane Configurations of the Study Area Intersections

2.3 ***Planned Conditions***

2.3.1 ***Changes to the study area transportation network***

As per the City of Ottawa Construction and infrastructure projects interactive search map tool¹. The following are the expected capital projects within the vicinity of the site that may affect traffic operations to the site during construction.

- New Sidewalks along Lancaster Road, north of Walkley Road;
- Guide Rail Renewal along Bantree Street, west of Sheffield Road;

2.3.2 ***Other study area developments***

As per the City of Ottawa Development Application Search Tool² there are currently no active development applications within the study area.

3. **Study Area and Time Periods**

3.1 ***Study Area***

The study area includes the following intersection:

- Walkley Road and Lancaster Road;
- Walkley Road and Sheffield Road;
- Sheffield Road and Humber Place;
- Sheffield Road and Access Driveway 1;
- Sheffield Road and Access Driveway 2;
- Sheffield Road and Access Driveway 3;
- Sheffield Road and Access Driveway 4;
- Walkley Road and Highway 417 EB ramps;
- Walkley Road and Highway 417 WB ramps;

The preliminary assessment of study area shows that no modification to the existing transit route is required. As discussed in section 2.2.1, bus route # 47 serves the site and has multiple stops along Sheffield Road close to the site. Similarly, the preliminary assessment shows no intersection design modification is required.

Figure 2 shows the boundaries of the Site and the study area intersections.

¹ <https://ottawa.ca/en/planning-development-and-construction/construction-and-infrastructure-projects#planned-construction-projects>

² <https://devapps.ottawa.ca/en/search?s=all&t=100%2520legacy%2520road&a=all&w=all&i=0&b=0,0,0,0>

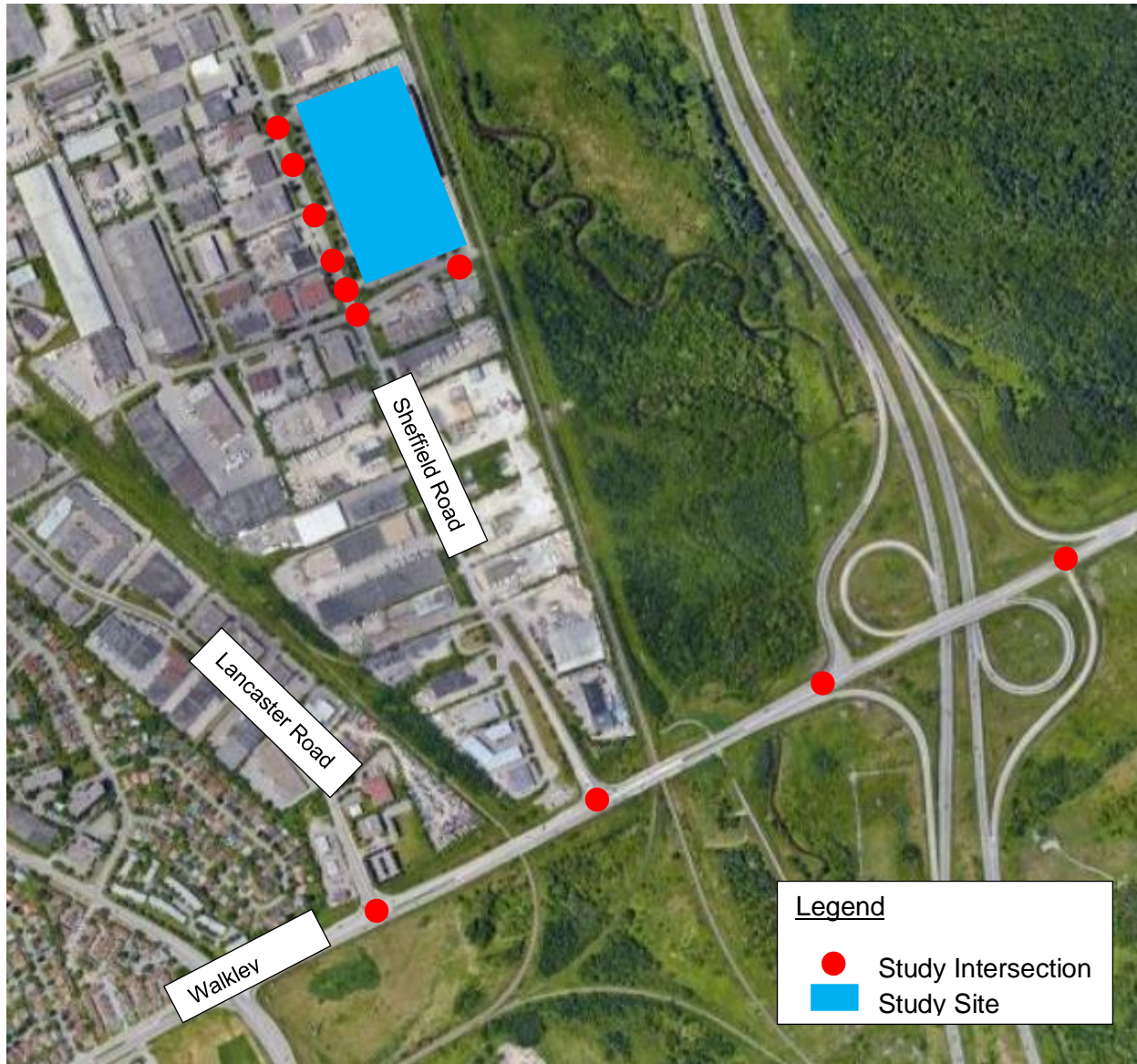


Figure 2: Study Area

3.2 Time Periods

Three peak hour periods will be considered in the preparation of the Traffic Impact Assessment. The AM and PM peak hours (if required, as per discussion further in this and the following sections), which represent the peak hours in the adjacent roadways, and the site peak hour, which occurs between 10:00AM and 11:00AM. **Figure 3** shows the expected site traffic patterns through a typical weekday, based on information provided by the Client, which in turn was derived from operational characteristics of other similar sites. **Figure 4** shows the traffic volume per 15 minutes along Sheffield Road.

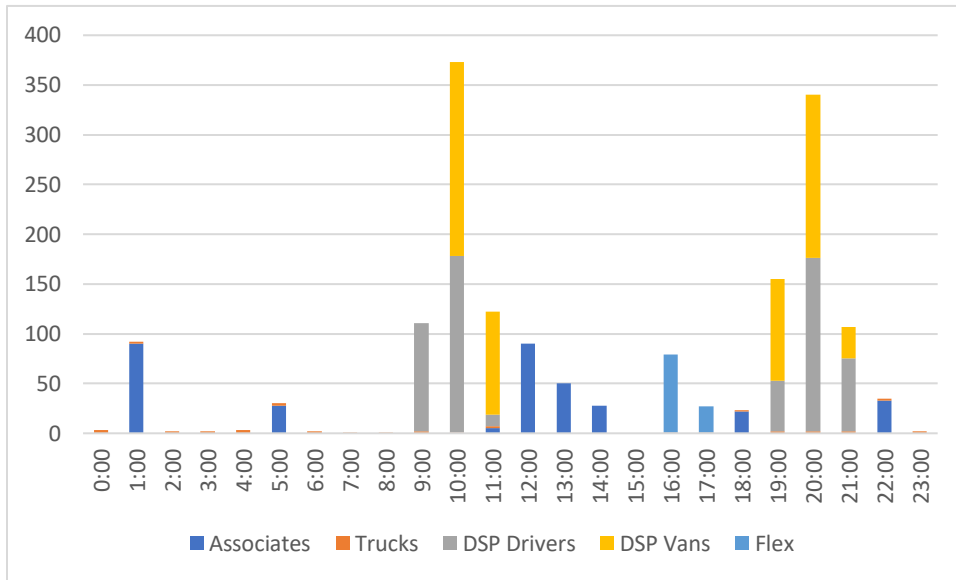


Figure 3: Estimated Site Generated Hourly Trips through a Weekday

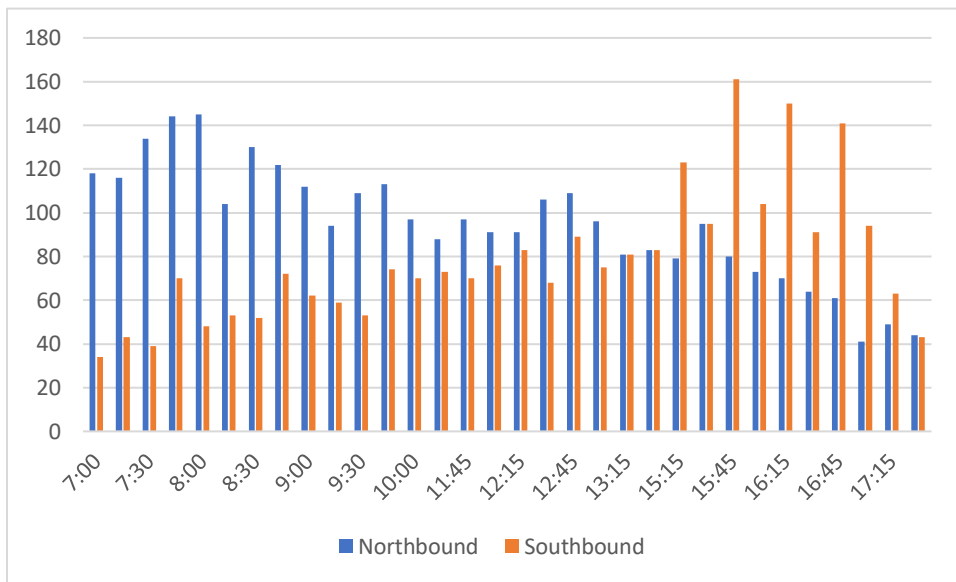


Figure 4: Vehicular Traffic on Sheffield Road per 15 Minute Intervals

As can be seen from the graphs, site peak hours do not coincide with the peak periods on adjacent roadways. In fact, little to no site generated traffic is expected to enter or exit the site during peak hours on the adjacent roadways. As a result, site peak hour(s) could be assessed instead, incorporating traffic volumes from the side roads corresponding the identified site peak hours. However, traffic data obtained from the most recent turning movement counts does not extend to capture the peak hours identified for the subject site. As a result, factors could be applied to peak hour volumes at the adjacent roadways to scale them down to represent background traffic during site peak hours. The morning peak period for the adjacent roadways is typically between 7:00AM and 10:00AM, while the site traffic is expected to peak between 10:00AM and 11:00AM. The mid-day peak period for the adjacent roadways is identified between 11:30AM and 1:30PM. Therefore, we propose to review available traffic data collected from 9:00AM to 10:00AM and between 11:30AM and 12:30PM, average them out assuming that this would represent the hour between 10:00AM and 11:00AM in order to match the site peak hour in the morning. It should be noted that undertaking traffic surveys at this time to fill in the gaps in available traffic data could result in significantly skewed traffic information due to the on-going pandemic. The following traffic data have been gathered from the City of Ottawa and will be used in the subsequent analysis.

Table 3: Available Turning Movement Counts

Intersection	Date of Counts	Time of Counts
Sheffield Road and Humber Place	October 8, 2019	7:00 AM to 10:00 AM 11:30 AM to 1:30 PM 3:00 PM to 6:00 PM
Sheffield Road and Walkley Road	January 30, 2019	7:00 AM to 10:00 AM 11:30 AM to 1:30 PM 3:00 PM to 6:00 PM
Lancaster Road and Walkley Road	February 22, 2018	7:00 AM to 10:00 AM 11:30 AM to 1:30 PM 3:00 PM to 6:00 PM
Walkley Road and Hwy 417 EB Ramps	August 6, 2019	7:00 AM to 10:00 AM 11:30 AM to 1:30 PM 3:00 PM to 6:00 PM
Walkley Road and Hwy 417 WB Ramps	August 6, 2019	7:00 AM to 10:00 AM 11:30 AM to 1:30 PM 3:00 PM to 6:00 PM

3.3 *Horizon years*

As per the TIA guidelines, the following two horizon years will be considered:

- Horizon year 2025: The expected year of site build-out; and
- Horizon year 2030: Five year after development build-out.

3.4 *Exemptions Review*

Following a review of the City of Ottawa TIA guidelines, some of elements are expected to be exempted from the TIA. **Table 4** provides a complete list of all the TIA elements as well as considerations for exemption.

Table 4: Traffic Impact Assessment Exemptions³

Module	Element	Exemption Considerations	Applicable
Design Review Component			
Development Design	Circulation and Access	Only required for site plans	Included
	New Street Networks	Only required for plans of subdivision	Excluded. No new street network is considered
Parking	Parking Supply	Only required for site plans	Included
	Spillover Parking	Only required for site plans where parking supply is 15% below unconstrained demand	Excluded. Parking supply is above the unconstrained demand
Network Impact Component			
Transportation Demand Management	All elements	Not required for site plans expected to have fewer than 60 employees and/or students on location at any given time	Included
Neighbourhood Traffic Management	Adjacent Neighbourhoods	Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds	Excluded
Network Concept		Only required when proposed development generates more than 200 person-trips during the peak hour in excess of the equivalent volume permitted by established zoning	Excluded

As noted earlier, undertaking analysis of the adjacent street peak hours may be irrelevant since the subject site is not expected to generate any trips during these periods. As such, it is suggested that site peak hour(s) are also used instead with the assumptions listed earlier applied in the process.

³ The City of Ottawa TIA Guidelines, 2017, page 22-23,

4 Development Generated Travel Demand

4.1 Trip Generation and Mode Shares

Trip generation information was provided by the client, which was estimated based on the expected operations at the proposed site. Delivery stations operate 24/7 to support delivery of packages to customer locations between 11:00AM and 9:00PM.

Delivery stations operate 24/7 to support delivery of packages to at customer locations between 11:00AM and 9:00PM. The proposed site anticipates approximately 18 line-haul trucks delivering packages to the delivery station each day, primarily between the hours of 10:00PM to 8:00AM. The customer packages are sorted, picked to the delivery routes, placed onto movable racks and staged for dispatch. Associates and managers support this operation, and the shift structure is designed between 2:00AM and 12:30 PM that mitigates traffic impact during rush hour periods. Additionally, there will be managers and dispatchers supervising the delivery operations, arriving at 6:00AM and departing at 2:30 PM followed by another shift of dispatchers arriving at 1:30PM and departing at 10:00PM.

At the proposed site, the delivery associates arrive at a delivery station at 9:20AM. Depending on the parking lot design of the delivery station, the drivers either park their personal vehicles onsite and pick up their delivery vans or park their personal vehicles offsite, pick up their delivery vans and drive to the delivery station. Starting at 9:50AM and ending at 11:10AM, 298 delivery vans will load and depart from the delivery station at a rate of 60 vans every 20 minutes to facilitate a regulated traffic flow into the surrounding area. The 1st wave of delivery vans leave at 10:10AM. The departure window is designed to mitigate impact on rush hour periods. Approximately 8-10 hours after dispatch, delivery routes are completed, and the vans return to the station between 7:10PM and 9:10 PM. The drivers park the delivery van either onsite or at the offsite location and leave using a personal vehicle or public transport.

The client will also use Flex service to deliver packages from this location. The Flex service works in concert with an advanced logistics systems and technology that the client has been building since day one. The client anticipates approximately 52 traditional passenger vehicles entering the facility staggered between 4:00PM and 5:30PM. Flex vehicles will load and depart every 15 minutes.

Associates will work in the delivery station between 1:00PM and 10:15PM to support the Flex and van drivers as they return to the station. After the check out and release of all delivery vehicles by 10:00PM, delivery station associates prepare the delivery station for the next day's packages.

Table 5 illustrates the anticipated site operations and associated trip generation during the adjacent roadways' peak hours and during the site peak hours.

Table 5: Estimated Site Trip Generation

Trip Type	Daily			AM Peak Hour (7:00 AM-8:00 AM)			PM Peak Hour (4:00 PM-5:00 PM)			AM Site Peak Hour (10:00 AM-11:00 AM)			PM Site Peak Hour (8:00 PM-9:00 PM)		
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
Associates	158	158	316	-	-	0	-	-	0	-	-	0	-	-	0
Managers/ Dispatch	15	15	30	-	-	0	-	-	0	-	-	0	-	-	0
Trucks	18	18	36	-	1	1	1	-	1	-	1	1	1	1	2
Delivery Service Partners Drivers	298	298	596	-	-	0	-	-	0	177	-	177	-	174	174
Delivery Service Partners Vans	298	298	596	-	-	0	-	-	0	-	195	195	164	-	164
Flex	52	52	104			0	30	16	46	-	-	0	-	-	0
Total	839	839	1678	0	1	1	31	16	47	177	196	373	165	175	340

4.2 Trip Distribution

The estimated number of trips generated by the site will be distributed among the access driveways based on their use and the anticipated travel pattern. There are four access driveways to / from the site on Sheffield Road. The two most northern access driveways are 100% designated to the site staff (i.e., managers and associates). Site staff are anticipated to enter the site using the access slightly further to the south, and exit the site using the most northern access. The second most southern access is 100% designated to delivery service partner drivers and vans, and to flex vehicles. The most southern access is designated to delivery service partner drivers and vans, flex vehicles, and to trucks. Therefore, 100% of trucks enter and exit the site using this south access.

4.3 Trip Assignment

Trips were assigned manually to the network based on the information provided by the client and based on the study area. It is estimated that 100% of trucks will travel to / from the site through the southernmost access. These trucks will enter / exit Highway 417 through Walkley Road. The shortest route from Walkley Road to / from the proposed site is through the intersection of Sheffield Road and Humber Place.

For the delivery service partner drivers and vans, and flex vehicles, the majority of associated traffic, approximately 80%, will travel south to / from Walkley Road. The remaining 20% will travel north to / from Innes Road. No site staff trips are expected during the AM, PM peaks on adjacent roadways and during site peak hours. **Figure 5** illustrates the trip assignments during the AM and PM peak hours. **Figure 6** illustrates the trip assignments during the site peak hours.

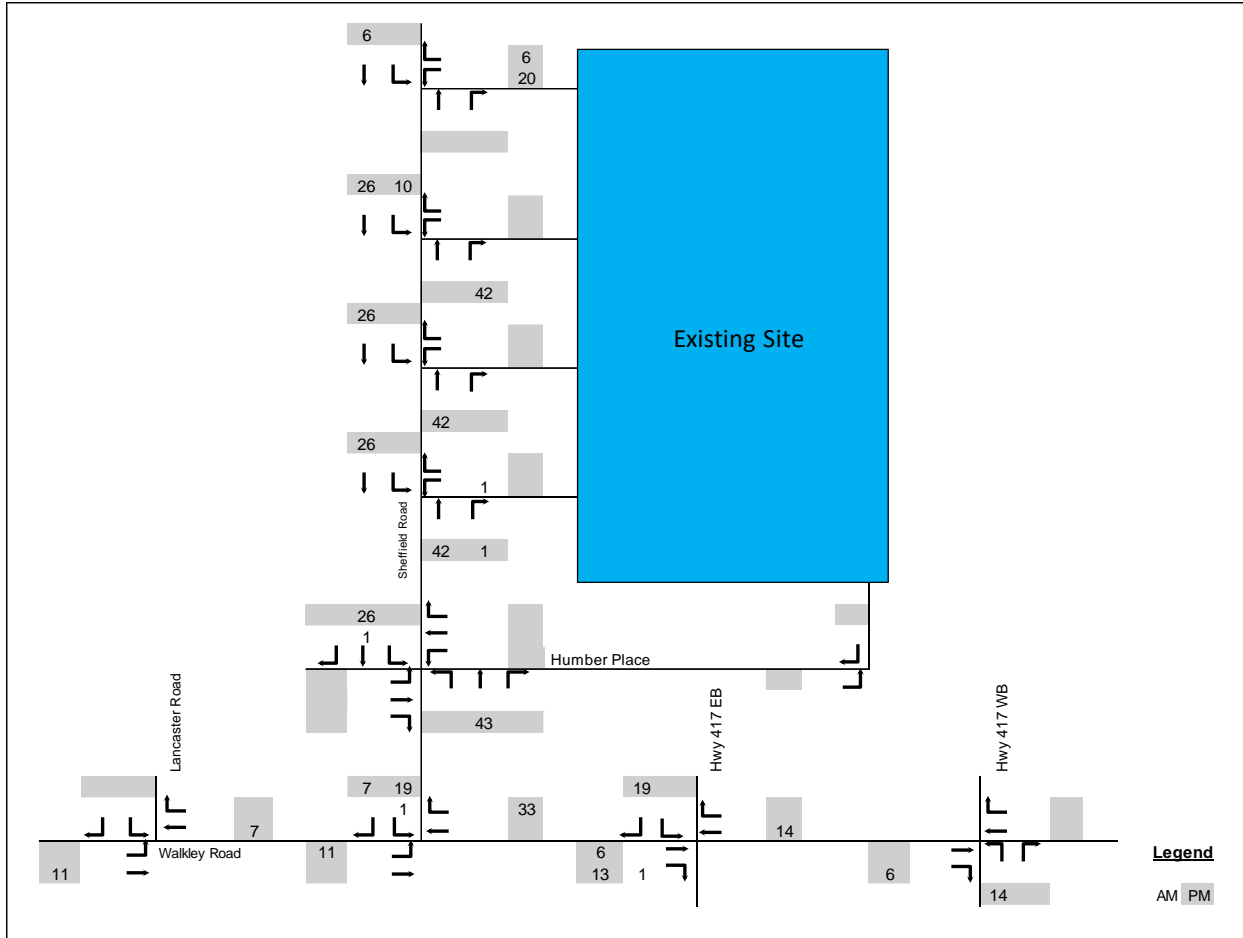


Figure 5: Weekday AM and PM Peak Hours (Adjacent Roads) Existing Site Trip Assignment

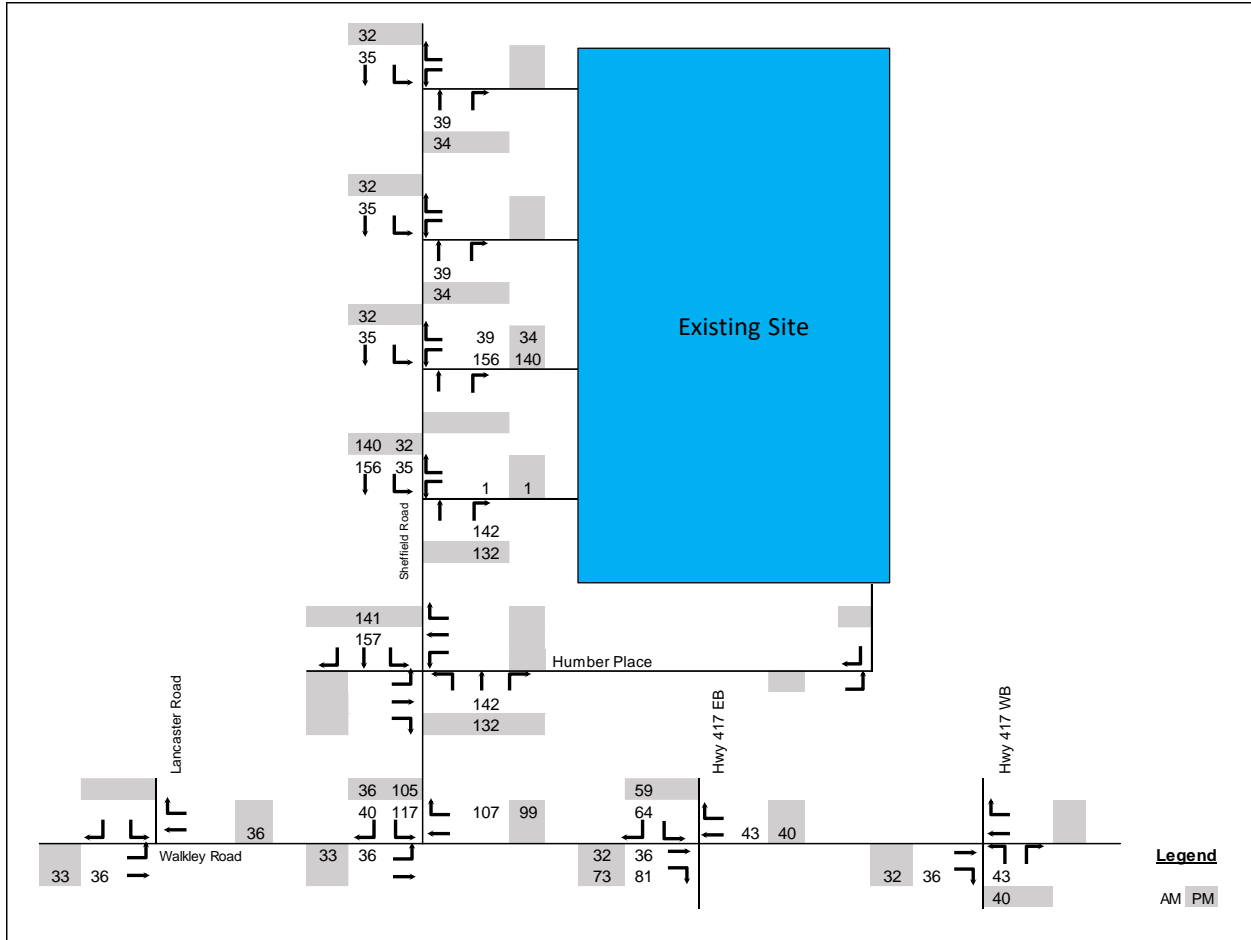


Figure 6: Site Peak Hours Trip Assignment (10:00 AM to 11:00 AM and 8:00 PM-9:00 PM)

5 Background Network Travel Demands

5.1 *Transportation Network Plans*

As per the City of Ottawa Construction and infrastructure projects interactive search map tool⁴, the following are the expected capital projects within the vicinity of the site that may impact traffic operations to the site during construction.

- New Sidewalks along Lancaster Road, north of Walkley Road ;
- Guide Rail Renewal along Bantree Street, west of Sheffield Road;

5.2 *Background Growth*

To account for any potential future increase in ambient traffic demand, a conservative assumption of 1.5% growth rate was applied to all study intersections movements to bring existing peak hour traffic volumes to the 5-year horizon year. This growth rate was determined by consulting the City of Ottawa Transportation Master Plan. Total trips are estimated to increase by 32% between the years 2011 and 2031. Thus an annual growth rate of 1.5% was chosen for the purpose of this analysis.

5.3 *Other Developments*

As per the City of Ottawa Development Application Search Tool ² there are currently no active development applications within the study area.

⁴ <https://ottawa.ca/en/planning-development-and-construction/construction-and-infrastructure-projects#planned-construction-projects>

6 Demand Rationalization

The purpose of this section is to rationalize future travel demands within the study area to account for potential capacity limitations in the transportation network and the ability to accommodate additional traffic generated by the proposed site

6.1 Traffic Volume Summary

6.1.1 Existing Conditions

Traffic data from the most recent turning movement counts was obtained from the City of Ottawa for the Studied intersections. The following provides a summary of AM and PM peak hours at each of the study area intersection.

- Sheffield Road and Walkley Road (7:00 AM – 8:00 AM, 3:45 PM – 4:45 PM);
- Lancaster Road and Walkley Road (7:15 AM – 8:15 AM, 3:45 PM – 4:45 PM);
- Sheffield Road and Humber Place (7:45 AM – 8:45 AM, 3:15 PM – 4:15 PM);
- Walkley Road and Highway 417 EB Ramps (7:00 AM – 8:00 AM, 4:00 PM – 5:00 PM).
- Walkley Road and Highway 417 WB Ramps (7:00 AM – 8:00 AM, 4:00 PM – 5:00 PM).

Unlike the noted intersections, no recent turning movement count data were available for the existing access driveways from/to the existing Site (i.e., the Site accesses). Due to the COVID 19 pandemic, undertaking turning movement counts at this time would likely result in skewed traffic demand. Therefore, the turning movement volumes at the site accesses in the Existing Conditions were estimated by taking the following steps:

- The number of trips generated by the existing land uses at the Site (i.e., the existing building) were estimated based on their existing land use types and their available statistics (e.g., size, number of floors, etc.) and as per the trip generation rates available in the 10th Edition of ITE Trip Generation Manual. The trips generated by the site was later converted to person trips by multiplying by 1.28 as per City of Ottawa TIA Guidelines.
- The ITE Manual information on “Warehouse” with land use code (LUC) of 150 and the current gross-floor area (GFA) calculated at 275,977 square-foot, was used to estimate the number of trips generated by the Site in the existing conditions.
- The heavy vehicle percentages assigned to the estimated traffic was obtained from the City of Ottawa Online Transportation Intersection Volumes 2019. The heavy vehicle percentage at the intersection of Sheffield Road and Walkley Road is 8.5% of the estimated traffic, which was assigned to the appropriate accesses. The remaining of the estimated traffic (passenger vehicles) was assigned to the other access driveway.
- The information available from the ITE Manual for the noted land-use types were also used to estimate the number of trips entering and exiting the existing Site from / to Sheffield Road during the typical weekday AM and PM peak hours. As there are four access driveways, passenger vehicles would only use the two most northern accesses. Commercial vehicles such as tractor-trailers would enter the Site through the most southern access and exit the Site through the second most southern access. **Table 6** shows the estimated number of trips estimated for the existing Site, as well as the number of trips in and out via the north access driveways and the south access driveways under Existing Conditions.

Table 6: Estimated Number of Trips Generated by Site in the Existing Conditions

Land Use Description		Warehouse				
ITE Manual Code		150				
GFA in square-feet		275,977				
ITE Trip Generation Rates and Directional Distribution	Rate in AM Peak Hour	0.17	Total Number of Trips Generated by Existing Site	Total Number of Person-Trips Generated by Existing Site	Total Number of Person-Trips to / from North of the site	Total Number of Person-Trips to / from South of the site.
	Rate in PM Peak Hour	0.19				
	% Entering in AM Peak Hour	77%				
	% Exiting in AM Peak Hour	23%				
	% Entering in PM Peak Hour	27%				
	% Exiting in PM Peak Hour	73%				
Number of Trips Generated	Total in AM Peak Hour	47	47	59	12	47
	Total in PM Peak Hour	52	52	65	13	52
	Entering in AM Peak Hour	36	36	45	9	36
	Exiting in AM Peak Hour	11	11	14	3	11
	Entering in PM Peak Hour	12	12	15	3	12
	Exiting in PM Peak Hour	40	40	50	10	40

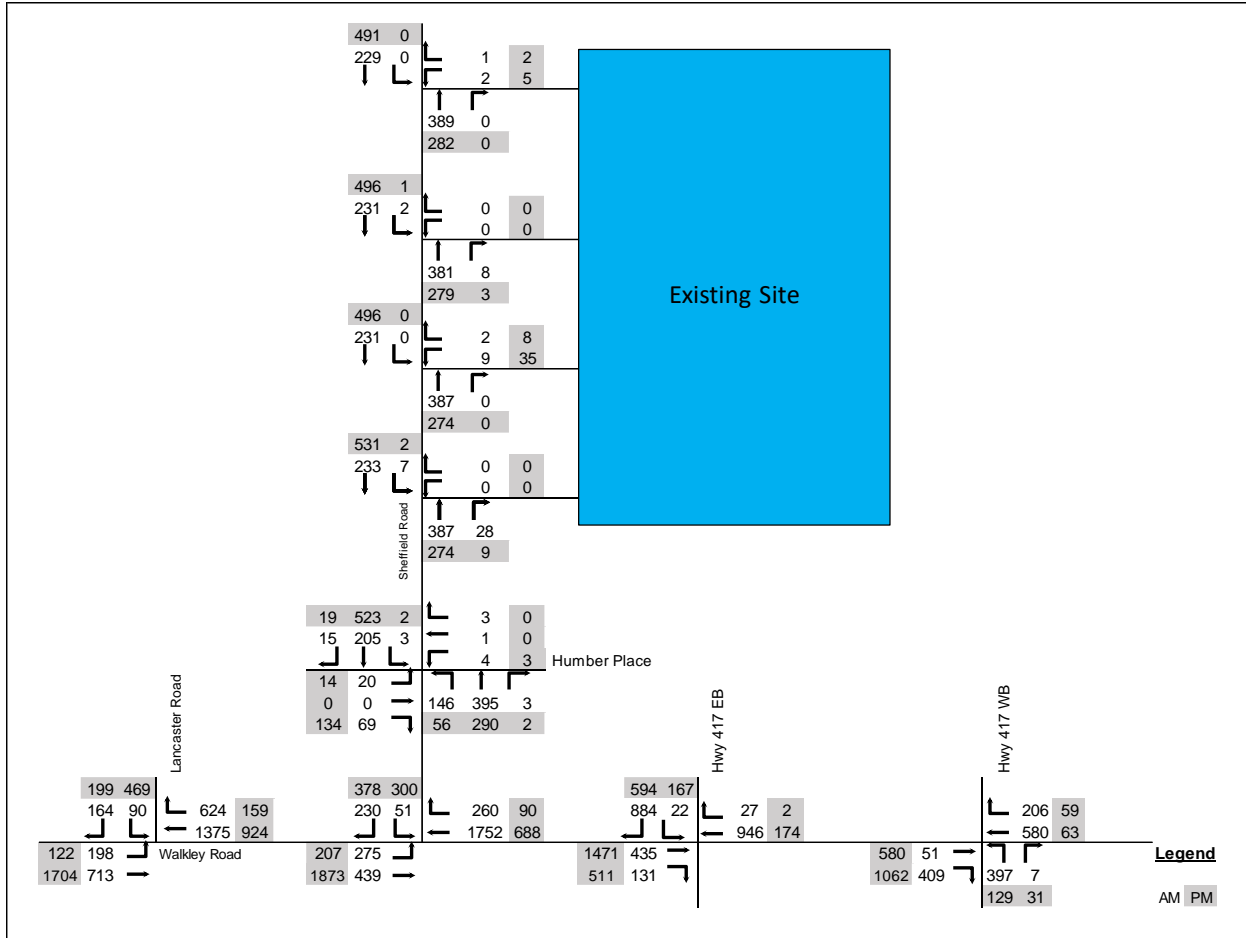


Figure 7: Turning Movement Volumes Under Existing (2022) Conditions

6.1.2 Future Background Scenarios

The Future Background scenario is intended to assess traffic conditions at the study area intersections in the absence of additional traffic volumes associated with the proposed changes to the existing Site. As stated earlier and through consultation with the City of Ottawa Development Application Search Tool, there are currently no active applications within the study area.

To estimate the turning movement volumes under the Future Background scenarios in 2025 and 2030, the annual growth rate of 1.5% was applied to the existing year (2022) turning movement volumes, as shown in **Figure 7**. Traffic volumes under the future background AM and PM scenario in years 2025 and 2030 are shown in **Figure 8** and **Figure 9**, respectively.

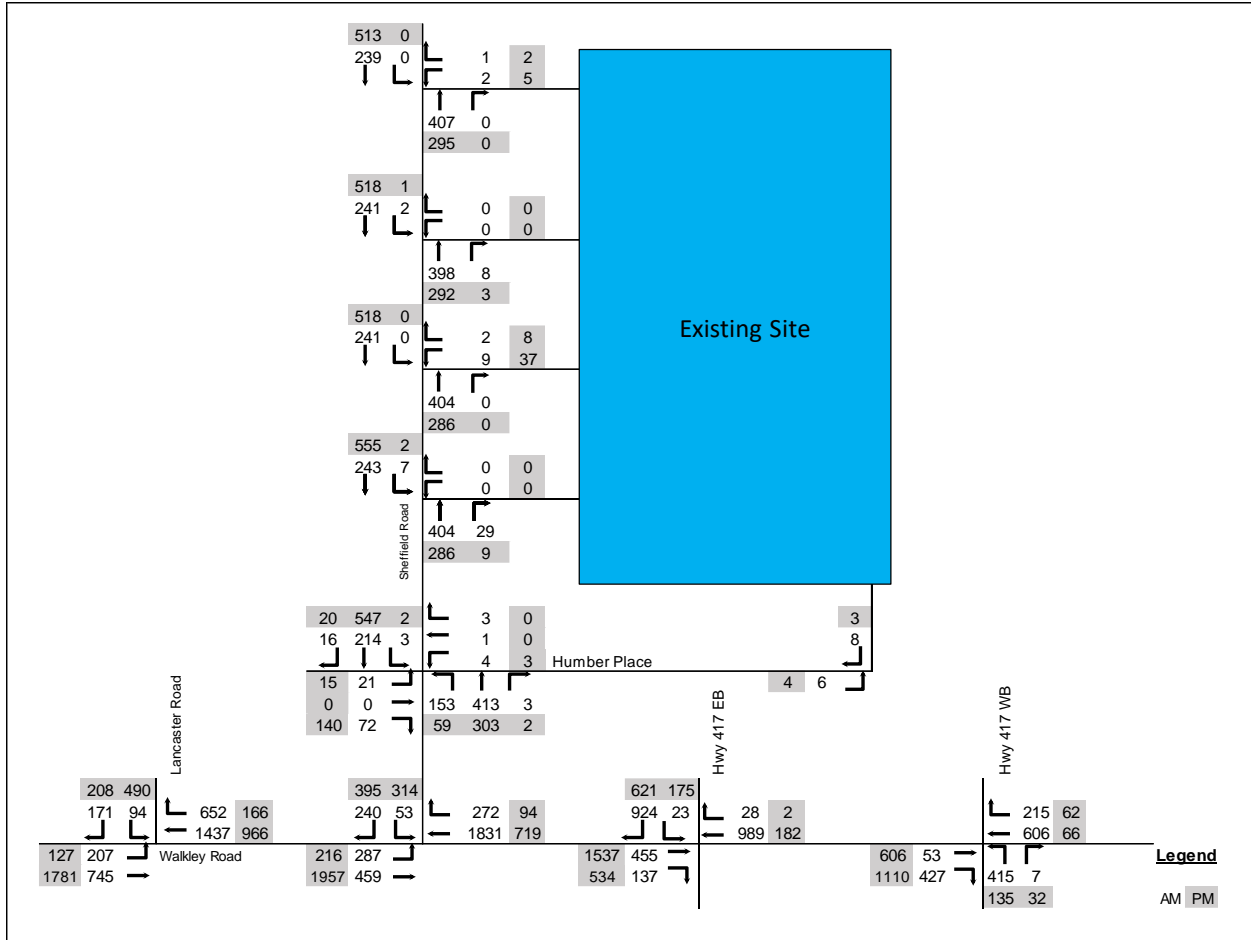


Figure 8: Turning Movement Volumes under the Future Background Scenario During the Adjacent Road Peak in the Interim Horizon Year of 2025

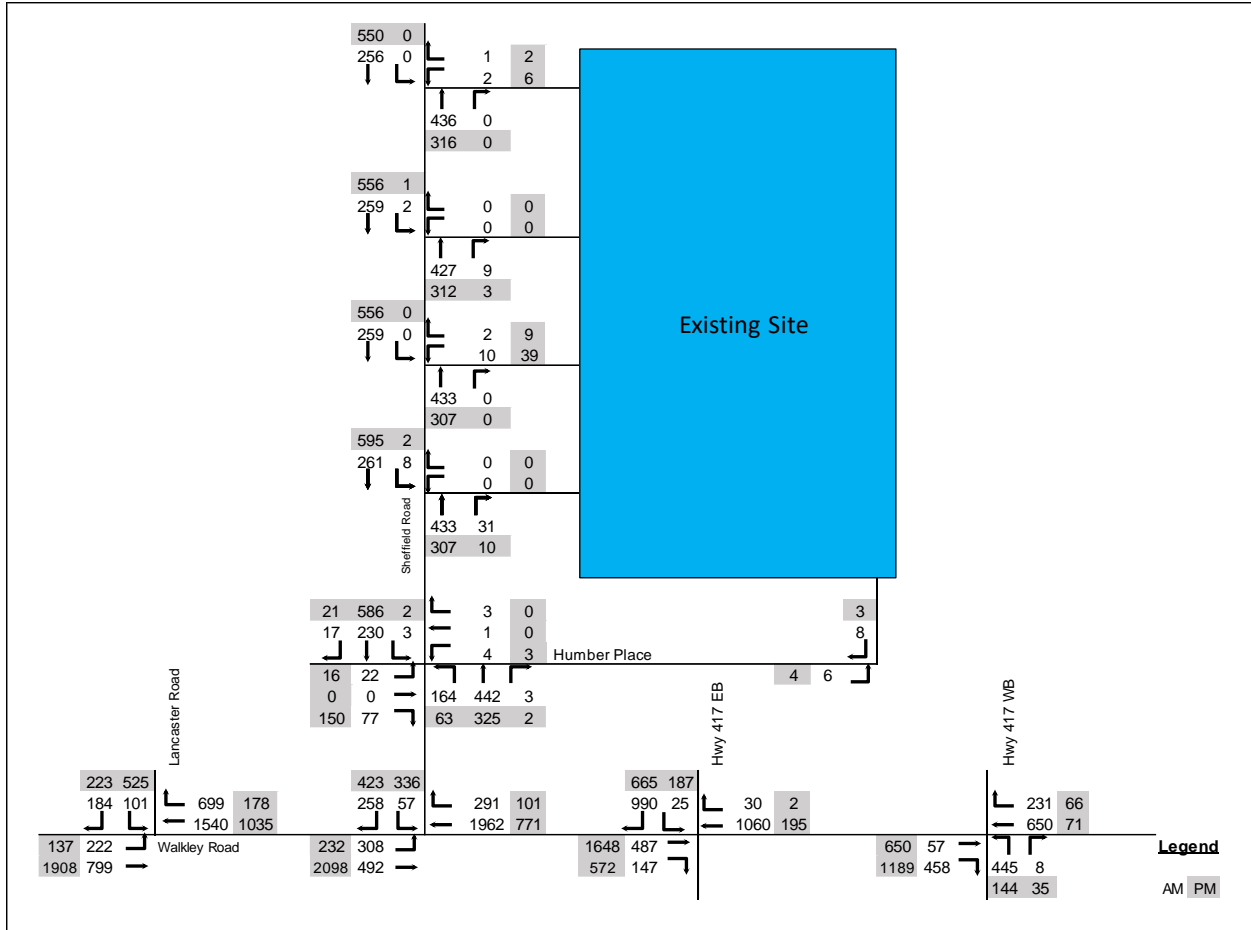


Figure 9: Turning Movement Volumes under the Future Background Scenario During the Adjacent Road Peak in the Horizon Year of 2030

Future Background under proposed site peak hours was also assessed. Traffic data obtained from the most recent turning movement counts does not extend to the peak hours identified for the subject site. As a result, factors were applied to available peak hour volumes at the adjacent roadways to estimate background traffic during site peak hours. The morning peak period for the adjacent roadways is typically between 7:00AM and 10:00AM, while the site traffic is expected to peak between 10:00AM and 11:00AM. The mid-day peak period for the adjacent roadways is identified between 11:30AM and 1:30PM. Therefore, to calculate the AM scaling factor, we reviewed available traffic data collected from 9:00AM to 10:00AM and between 11:30AM and 12:30PM, averaged them out assuming that this would represent the hour between 10:00AM and 11:00AM in order to match the site peak hour in the morning. The AM reduction factor of 2.9% was calculated. This means that traffic volumes between 10:00AM and 11:00AM are in general 2.9% lower than the AM peak hour volumes.

In the PM, available traffic data from the traffic surveys typically extends up to 6:00PM. However, the site peak hour occurs between 8:00PM and 9:00PM. A reduction factor was calculated based on a review of available traffic data for the last hour on a 15minute interval basis. The PM reduction factor was calculated at 26.3%. This means that traffic volumes between 8:00PM and 9:00PM are estimated to be 26.3% lower than the PM peak volume, in general.

The methodology of using volume data between 5:00PM and 6:00PM to estimate background volumes between 8:00PM and 9:00PM is likely very conservative. The methodology to calculate the morning peak reduction factor is likely conservative, as well.

Traffic volumes under the future background site AM and PM scenario in years 2025 and 2030 are shown in **Figure 10** and **Figure 11**, respectively.

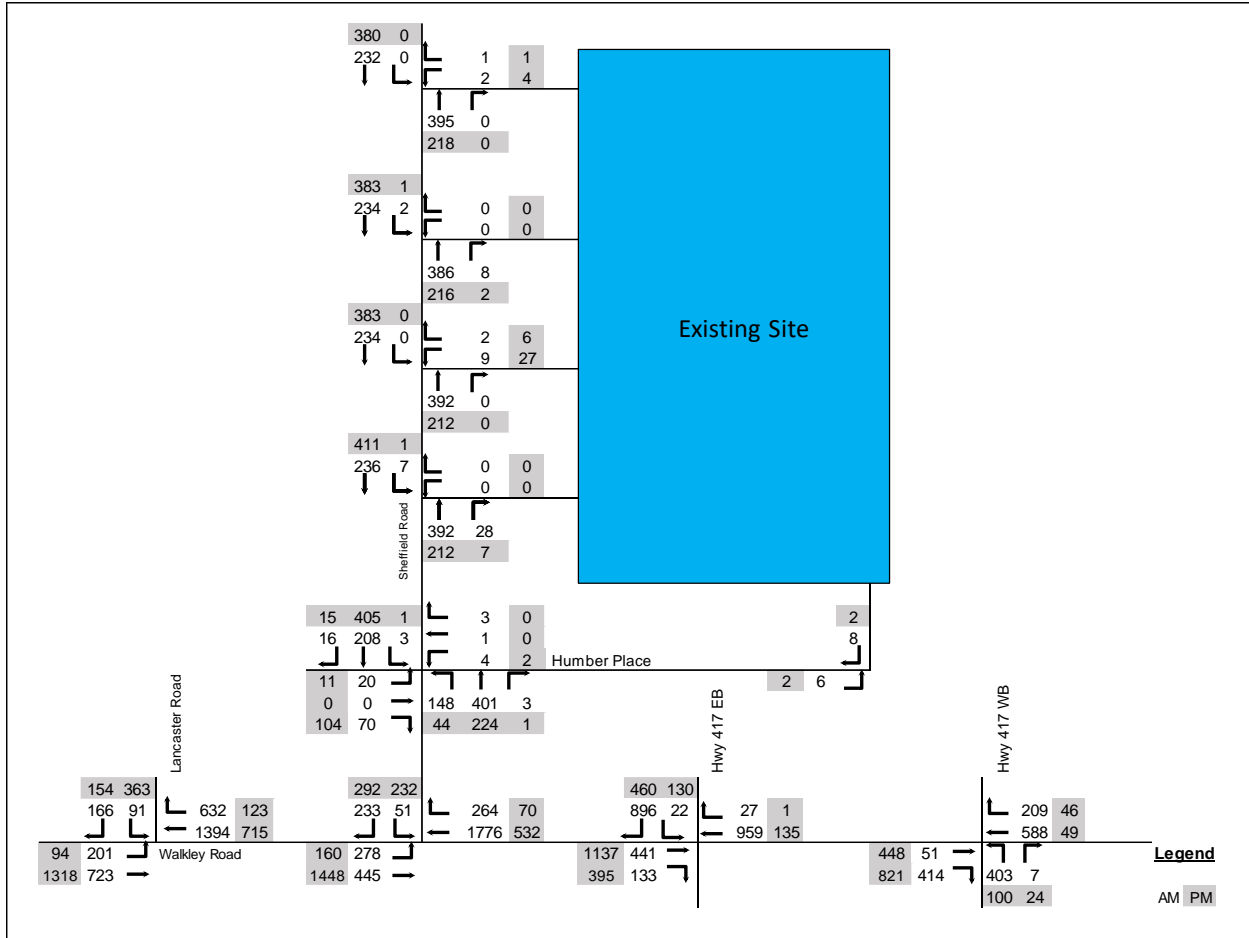


Figure 10: Turning Movement Volumes under the Future Background Scenario During the Proposed Site Peak Hours in the Interim Horizon Year of 2025

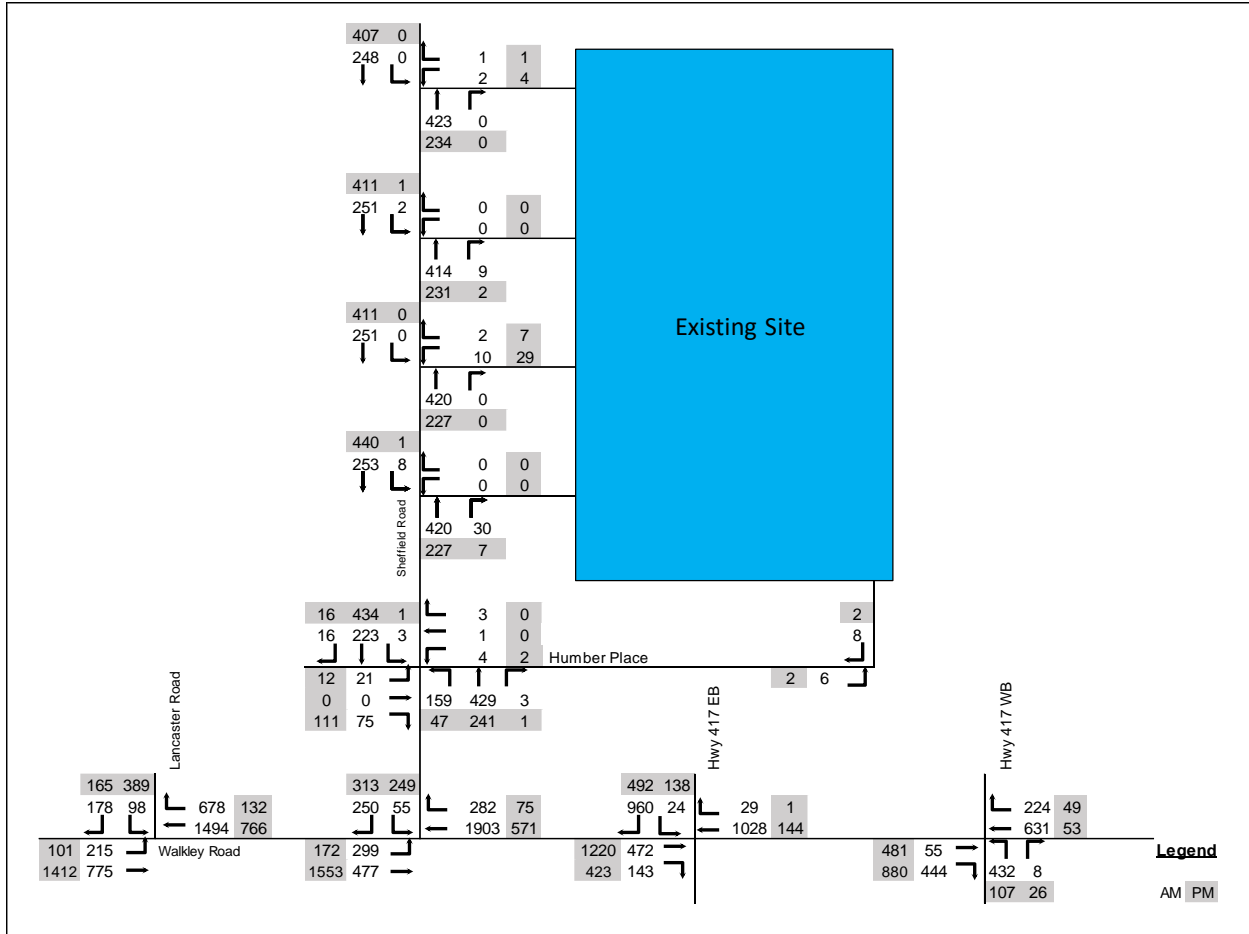


Figure 11: Turning Movement Volumes under the Future Background Scenario During the Proposed Site Peak Hours in the Horizon Year of 2030

6.1.3 Future Total Scenarios

The turning movement volumes under the Future Total Traffic conditions for the Future Site scenario were estimated by subtracting traffic volumes generated by the existing Site and replacing them with site traffic volumes associated with the future distribution centre / warehouse, as shown in **Figure 5** and **Figure 6**. The Future Total Traffic volumes under the Future Site scenario in the year 2025 and 2030 are shown in **Figure 12** and **Figure 13**, respectively. The Future Total Traffic volumes under the Future Site scenario during the site peak hour in the year 2025 and 2030 are shown in **Figure 14** and **Figure 15**, respectively.

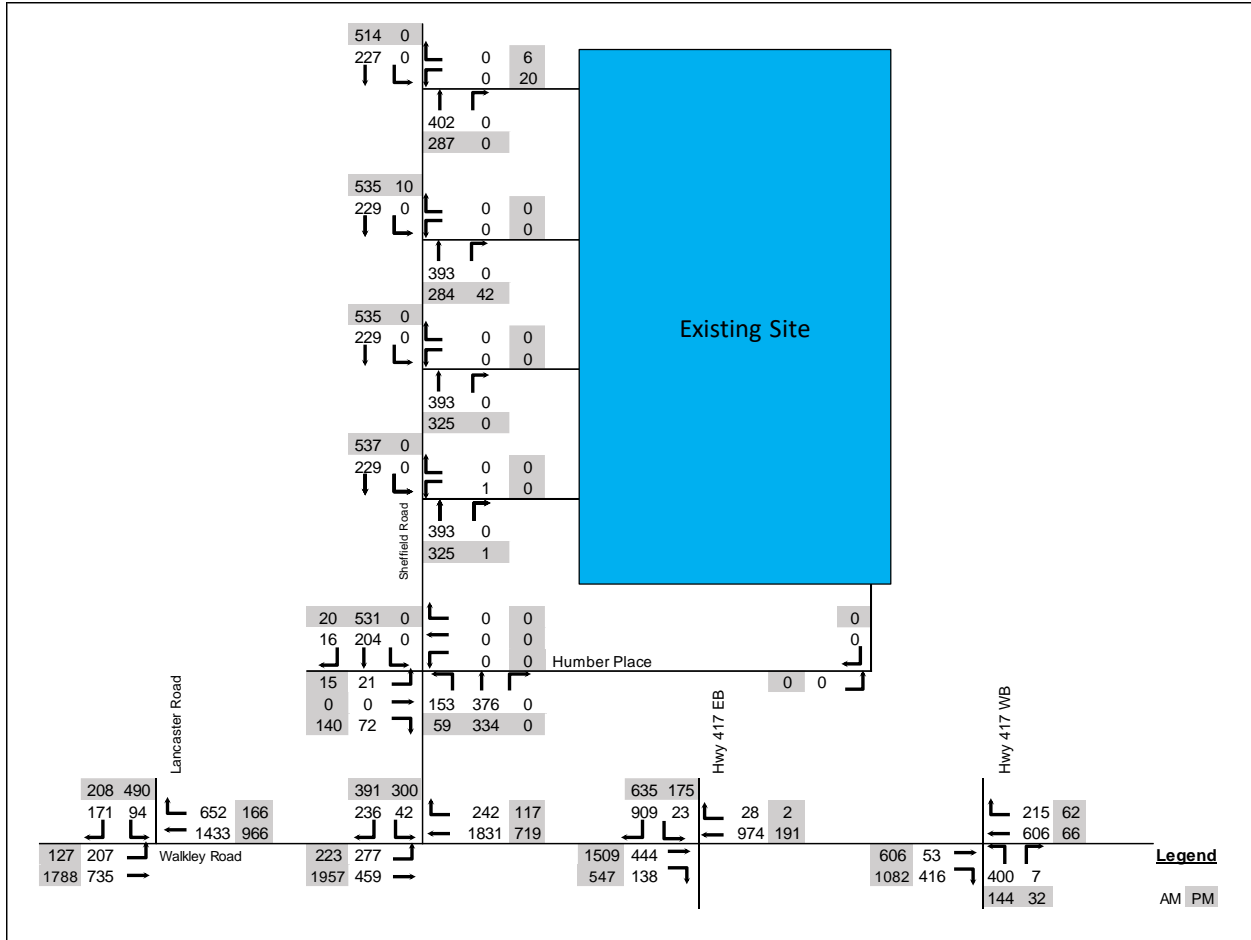


Figure 12: Turning Movement Volumes under the Future Total Scenario during Adjacent Roads Peak in the Opening Year 2025

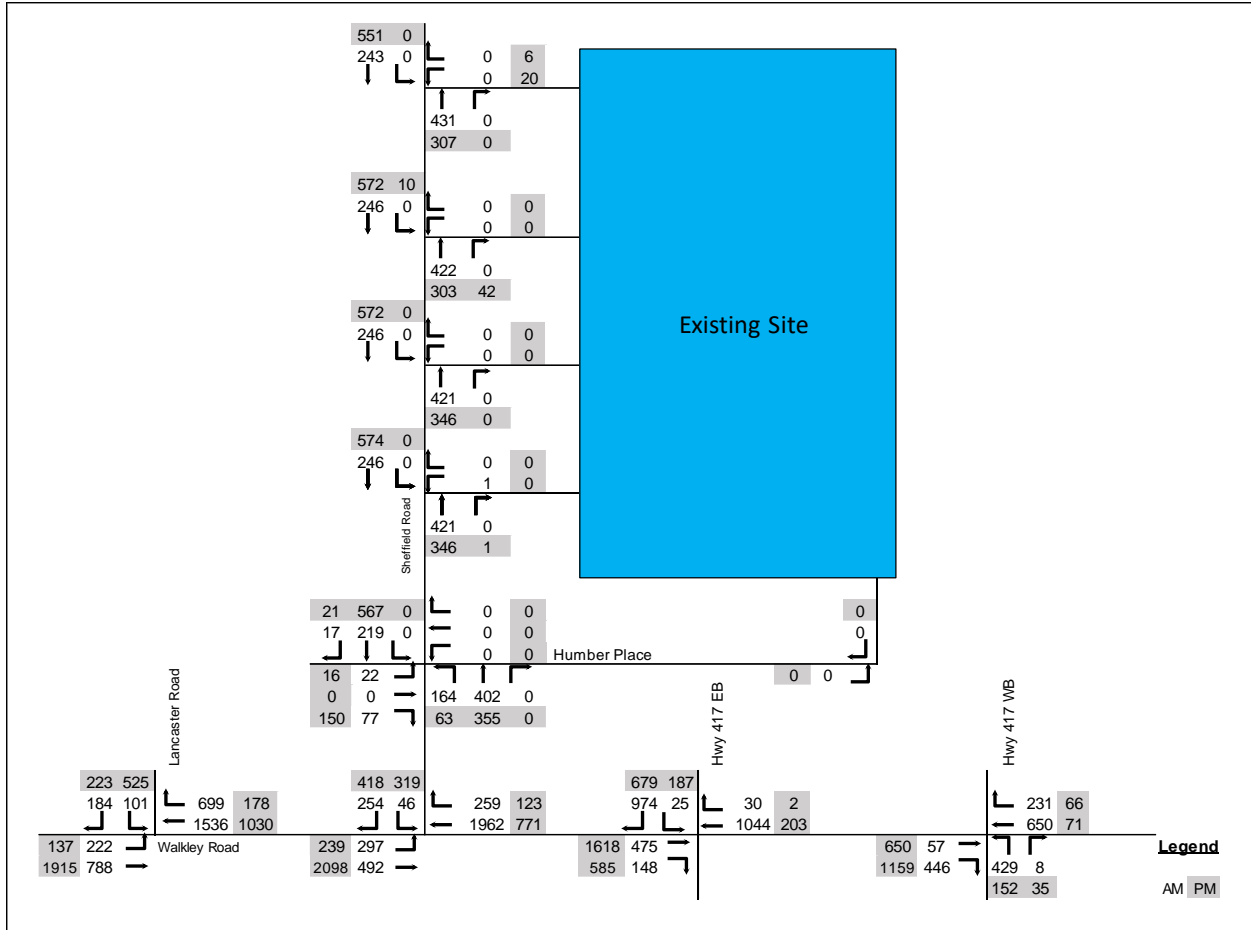


Figure 13: Turning Movement Volumes under the Future Total Scenario during Adjacent Roads Peak in the Opening Year 2030

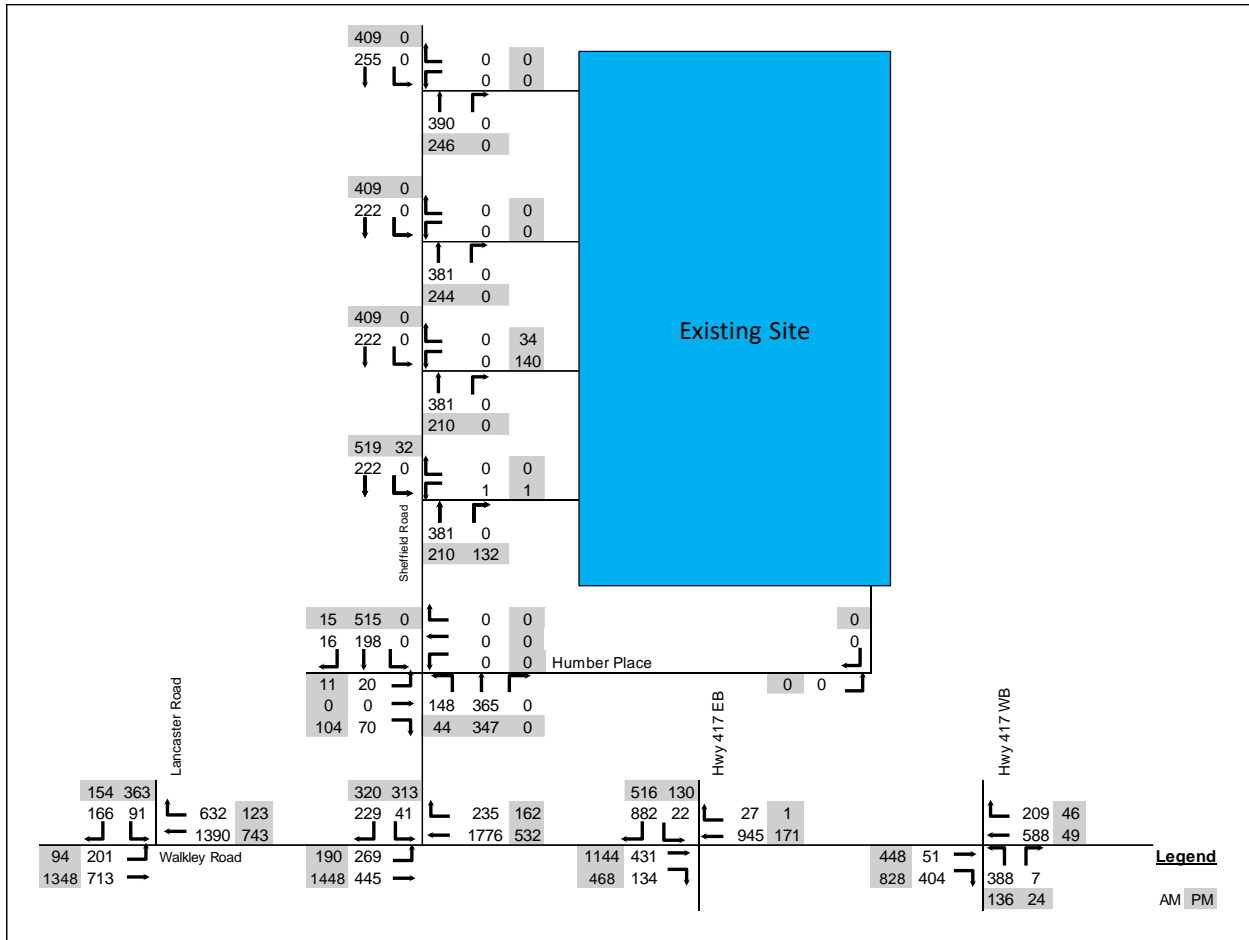


Figure 14: Turning Movement Volumes under the Future Total Scenario During the Proposed Site Peak Hour in the Opening Year 2025

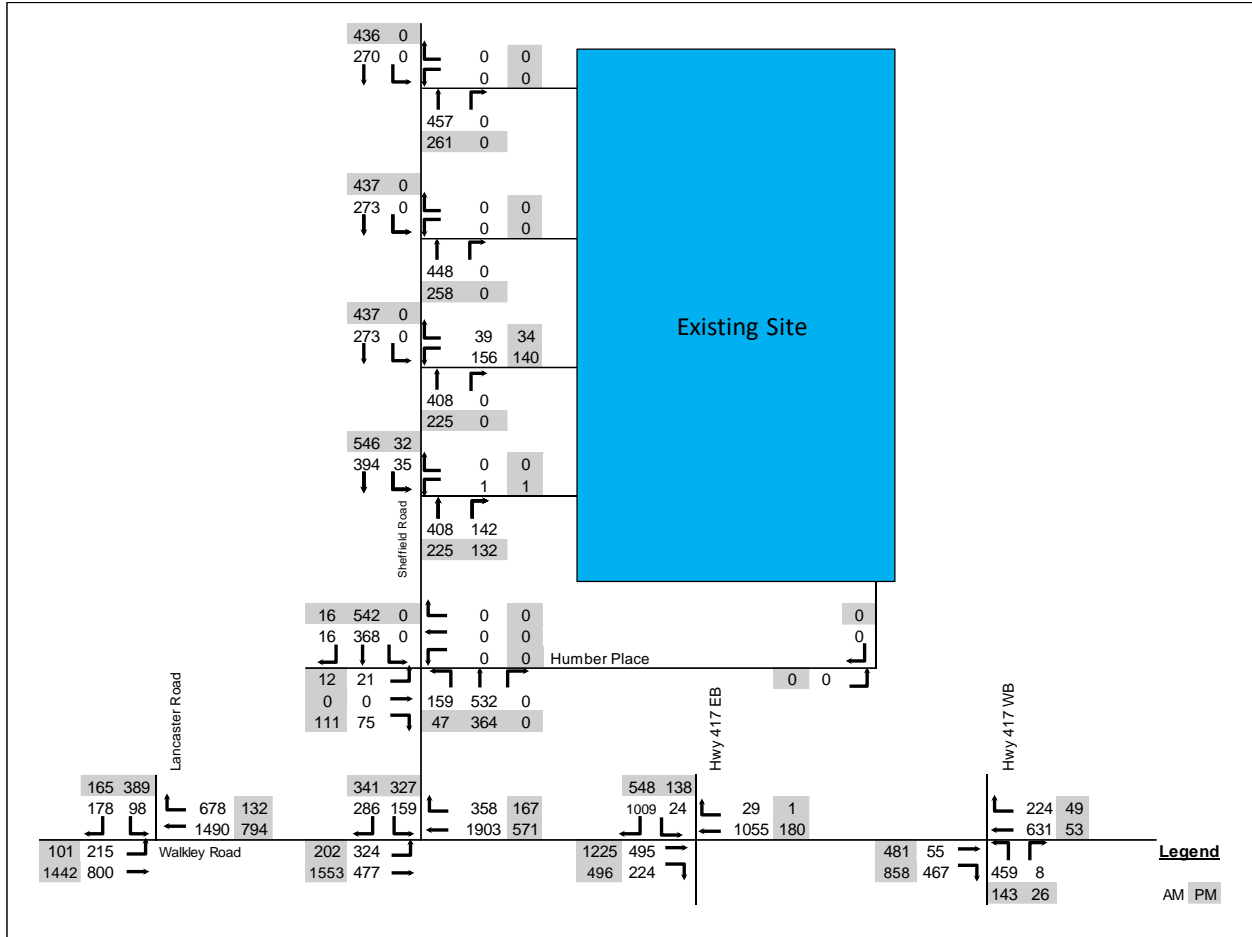


Figure 15: Turning Movement Volumes under the Future Total Scenario During the Proposed Site Peak Hour in the Horizon Year 2030

6.2 Description of Capacity Issues

Following a review of existing conditions operations, future background AM and PM peak hour scenario operations, and future total AM and PM peak hour scenario at the study intersections, it is noted that all study intersection operate at an acceptable level of service with excess capacity available in both the AM and PM peak hours for all movements. The only critical movements noted are the southbound left turn at the intersection of Walkley Road and Lancaster Road in the PM peak hour and both westbound through and eastbound left turns at the AM peak hour at the intersection of Walkley Road and Sheffield Road, which were found to operate at LOS E but with excess capacity available during the alternate peak hour in all scenarios noted above.

During the site AM and PM peak hours in the future background and future total scenarios, all intersections operate at an acceptable level of service with excess capacity available in both the AM and PM peak hours for all movements. The only critical movements noted are the eastbound left and westbound left turns with V/C ratio of 0.86 up to 1.00 at the intersection of Walkley Road and Sheffield Road which were found to operate at LOS E and F in the AM peak hour with excess capacity available during the PM peak hour. Another significant critical movement noted is the northbound right and left turns for the Walkley Road and Highway 417 NB ramp terminal (unsignalized intersection), which was found to operate at LOS E and F in all future scenarios in the AM peak hour. Traffic volumes at this intersection were found to warrant traffic signals under the existing conditions scenario. As a sensitivity analysis, this intersection was assessed under the 2030 AM Peak Hour future total scenario (worst case scenario) with traffic signal control using a simple signal timing plan. As a result, this intersection was found to operate at significantly improved levels of service. It should be noted that traffic signals at this location are warranted under existing conditions and not as a result of traffic associated with the subject site. In addition, site traffic volumes do not peak at the same time as traffic along the adjacent roadways.

6.3 Adjustment to Development Generated Demands

All intersections movements during the AM and PM peak hours operate with excess capacity and no adjustment to the development generated demand is required.

6.4 Adjustments to Background Network Demands

All intersections movements during the AM and PM peak hours operate with excess capacity and no adjustment to the background network demand is required.