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# 530 Oxford Street West, London ON Transportation Impact Assessment

Paradigm Transportation Solutions Limited

January 2024  
230258



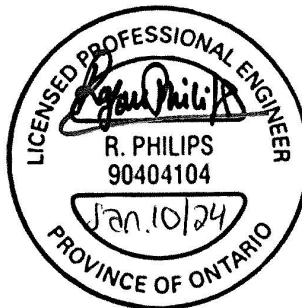
**Project Number**  
230258

## 530 Oxford Street West, London ON Transportation Impact Assessment

**Date: January 2024**  
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# Executive Summary

## Content

Paradigm Transportation Solutions Limited (Paradigm) has been retained to conduct this Transportation Impact Assessment (TIA) for a proposed mixed-use redevelopment located at 530 Oxford Street West in the City of London.

This TIA includes an analysis of existing traffic conditions, a description of the proposed development, traffic forecasts for a five-year horizon from development completion (2033), and assessment of traffic impacts with recommendations to accommodate the proposed development as appropriate.

## Proposed Redevelopment

The subject site is located on the southeast corner of Wonderland Road North and Oxford Street West. The lands are currently occupied by a commercial plaza totalling 14,091 m<sup>2</sup> Gross Floor Area (GFA) including retail, restaurants and a bank. The proposed redevelopment includes the addition of two high-rise, 32-storey, mixed use buildings accommodating a combined 408 dwelling units and 470 m<sup>2</sup> GFA street facing commercial, and 3,500 m<sup>2</sup> supermarket within the existing commercial building.

Vehicular access is proposed via the existing driveway to Oxford Street West (unsignalized) and the driveway to Wonderland Road North (signalized).

A total of 838 parking spaces will be provided on-site after the redevelopment including 402 surface spaces and 426 underground/podium spaces.

The development is anticipated to be completed by 2028.

## TIA Scope

The scope of the TIA for the proposed development includes:

- ▶ **Study Area intersections:**
  - Wonderland Road North and Oxford Street West (signalized);
  - Existing access to Wonderland Road North (signalized); and
  - Existing access to Oxford Street West (unsignalized).



- ▶ **Analysis Periods:** Weekday AM and PM, and Saturday peak hours.
- ▶ **Traffic Conditions:** Existing (2023) and five-years from development completion (2033).
- ▶ **Modal Share and Background Growth:** 10% modal share applied to development trip generation. No background road traffic reduction and/or rerouting due to BRT implementation has been considered in the analysis. Five-year background road traffic is assumed to increase at a 1.5% per annum growth rate.
- ▶ **Network Changes:** The development of the Bus Rapid Transit (BRT) system on Oxford Street West has implications for the existing site access on the south side of Oxford Street. Preliminary plans indicate that the existing access intersection will be controlled by traffic signals with a reduced westbound left-turn lane (from 105 metres to 50 metres) and storage reductions at the Wonderland Road intersection. City staff have indicated that further review of the BRT design for Oxford Street including the subject access intersection will be undertaken given the spacing between the existing traffic signals at Wonderland Road North and at Proudfoot Lane.
- ▶ **Access Review:** Based on the current information, a full-moves access under traffic signal control has been assumed for Oxford Street under future traffic conditions, in addition to the existing full-moves access under traffic signal control on Wonderland Road. In addition, a sensitivity analysis was carried out to assess the implications of Right-In Right-Out (RIRO) only access on Oxford Street.

## Conclusions

Based on the investigations carried out, it is concluded that:

- ▶ **Existing Traffic Conditions:** The study area intersections are operating with acceptable levels of service, except for the following critical movements:
  - Wonderland Road North and Oxford Street West:

The eastbound left-turn movement is operating with poor levels of service and queueing issues during the PM and Saturday peak hours;

The eastbound through movement is operating with poor levels of service during the AM peak hour; and



The westbound through and northbound left-turn movements are operating with poor levels of service during the PM peak hour.

- Oxford Street West and Site Access: The northbound left-turn movement is operating with poor levels of service during the Saturday peak hour.
- ▶ **Development Trip Generation:** The redevelopment is forecast to generate 202 AM peak hour trips, 317 PM peak hour trips, and 436 Saturday peak hour trips.
- ▶ **Background Traffic Conditions:** The study area intersections are forecast to operate with similar levels of service as under existing conditions, with the addition of the following critical movements:
  - Wonderland Road North and Oxford Street West:

The westbound left-turn movement is forecast to operate with poor levels of service during the AM and PM peak hours, and queueing issues during the PM and Saturday peak hours;

The northbound left-turn movement is forecast to operate with poor levels of service and queueing issues during the PM and Saturday peak hours;

The northbound through movement is forecast to operate with poor levels of service during the PM and Saturday peak hours;

The southbound left-turn movement is forecast to operate with poor levels of service and queueing issues during all peak hours; and

The southbound through movement is forecast to operate with poor levels of service during all peak hours.
  - Oxford Street West and Site Access: The westbound left-turn movement is forecast to operate with queueing issues during the PM and Saturday peak hours.
- ▶ **Total Traffic Conditions:** The study area intersections are forecast to operate with similar levels of service as under background traffic conditions, with the addition of the following critical movements:
  - Wonderland Road North and Oxford Street West: The westbound left-turn movement is forecast to operate with queueing issues during the AM peak hour and poor levels of service during the Saturday peak hour.



- **Oxford Street West and Site Access:** The westbound left-turn movement is forecast to operate with poor levels of service during the PM peak hour and queueing issues during the AM peak hour.
- **Wonderland Road North and Site Access:**  
 The southbound left-turn movement is forecast to operate with poor levels of service and queueing issues during the PM and Saturday peak hours; and  
 The northbound right-turn movement is forecast to operate with queueing issues during the Saturday peak hour.
- ▶ **Sensitivity Analysis:** The results of operational analysis of study area intersections assuming a restricted (RIRO) access on Oxford Street indicate additional critical movements under background and total traffic conditions. Specific to the existing signalized access on Wonderland Road, the following critical movements are noted under future total traffic conditions:
  - The southbound left-turn movement is forecast to operate with queueing issues during the AM peak hour;
  - The northbound right-turn movement is forecast to operate with queueing issues PM and Saturday peak hours; and
  - The westbound right-turn movement is forecast to operate with poor levels of service during the Saturday peak hour.
- ▶ **Oxford Street Access:** The results of the sensitivity analysis indicate that a restricted (RIRO) access on Oxford Street will create adverse effects on other intersection operations including the existing signalized access on Wonderland Road North.  
 As identified in the preliminary BRT plans, the existing Oxford Street West access should continue as a full-moves access under traffic signal control. Potential negative effects could be addressed through:
  - Operational changes involving signal optimization and phasing of all three traffic signals;
  - Geometric changes to road/intersection lane configurations including storage length increases and/or considering two-way centre-turn lanes where feasible; and
  - Appropriately accounting for changes in modal share and reduction/rerouting of background road traffic due to BRT implementation.
- ▶ **Wonderland Road North and Oxford Street West:**  
 Intersection operations are noted to deteriorate under future



traffic conditions as a result of assumed growth in background road traffic and the proposed BRT network signal timing changes. These could be addressed during the detailed design stage for BRT implementation, including new traffic signals at the existing Oxford Street West access and other modifications as noted above.

- ▶ **Parking:** The subject site is located within an area exempt from minimum parking requirements.
- ▶ **Transportation Demand Management:** The following TDM measures are identified for the development:
  - Internal walkways on-site with connections to the existing municipal network;
  - A total of 47 commercial bike parking spaces and 209 residential spaces; and
  - Frequent and convenient bus transit is provided with six routes available nearby and the future BRT network is proposed to run along the frontage of the site with a station at Wonderland Road North.

Additional TDM measures appropriate to the development include:

- Provide an additional 199 residential bicycle parking spaces;
- Unbundled parking from the sale/rent of units;
- Provide a carshare space/vehicle in a premium location on-site;
- Provide a welcome package to new residents and employees that informs them of available transit, future BRT network and active transportation infrastructure; and
- Wayfinding signage on-site to direct users of the site to available transit, future BRT network and active transportation infrastructure.

## Recommendations

Based on the findings of this study, it is recommended that the City consider:

- ▶ Implementing traffic signal control for the existing full-moves Oxford Street West access, as currently identified in the BRT implementation plan;
- ▶ Operational and geometric modifications to the three study area intersections, as noted in this study; and



- ▶ Approval of the proposed redevelopment with additional TDM measures, as noted in this study.





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# 1 Introduction

## 1.1 Overview

Paradigm Transportation Solutions Limited (Paradigm) has been retained to conduct this Transportation Impact Assessment (TIA) for a proposed mixed-use redevelopment located at 530 Oxford Street West in the City of London. **Figure 1.1** illustrates the subject development location.

The subject site is located on the southeast corner of Wonderland Road North and Oxford Street West. The lands are currently occupied by a commercial plaza totalling 14,091 m<sup>2</sup> Gross Floor Area (GFA) including retail, restaurants, and a bank. The proposed redevelopment includes the addition of two high-rise, 32-storey, mixed use buildings accommodating a combined 408 dwelling units and 470 m<sup>2</sup> GFA street facing commercial, and 3,500 m<sup>2</sup> supermarket within the existing commercial building.

Vehicular access is proposed via the existing driveway to Oxford Street West (unsignalized) and the driveway to Wonderland Road North (signalized).

A total of 838 parking spaces will be provided on-site after the redevelopment including 402 surface spaces and 426 underground/podium spaces.

The development is anticipated to be completed by 2028.

## 1.2 Purpose and Scope

The purpose of this report is to identify and assess the potential traffic impact resulting from the proposed development. The scope of the study, developed in consultation with City of London staff via e-mail in September 2023, includes:

- ▶ Assessment of the current traffic and site conditions within the study area;
- ▶ Estimates of background traffic growth for five-year horizon from development completion (2033);
- ▶ Estimates of additional traffic generated by the subject site;
- ▶ Analyses of the impact of future traffic on the surrounding road network, including the following study area intersections:
  - Wonderland Road North and Oxford Street West (signalized);



- Existing access to Wonderland Road North (signalized); and
- Existing access to Oxford Street West (unsignalized).
- ▶ Recommendations necessary to mitigate the site generated traffic in a satisfactory manner.

**Appendix A** contains the pre-study consultation material and responses from the City of London.

This study has been prepared in accordance with the requirements detailed by the City of London Transportation Impact Assessment Guidelines<sup>1</sup>.

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<sup>1</sup> City of London, *Transportation Impact Assessment Guidelines*, April 2012.





Image Source: Google Earth



## Location of Subject Site

530 Oxford St W, London T1A  
230258

Figure 1.1

## 2 Existing Conditions

### 2.1 Existing Roadways

The main roadways near the subject site considered in assessing the traffic impacts of the development include:

- ▶ **Wonderland Road North** is a north-south arterial road classified as a main street<sup>2</sup> with a four-lane cross section and a posted speed limit of 60 km/h. Sidewalks are provided on both sides of the roadway. On-road bike lanes are provided to the south of Oxford Street West and protected bike lanes to the north.
- ▶ **Oxford Street West** is an east-west arterial road classified as a rapid transit boulevard with a four-lane cross section and a posted speed limit of 60 km/h. Sidewalks are provided on both sides of the roadway. Protected bike lanes are provided to the west of Wonderland Road North

**Figure 2.1** illustrates the existing lane configuration and traffic control at the study area intersections.

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<sup>2</sup> City of London, *London Plan Map 3 Street Classifications*, 2023.







Image Source: Google Earth



## Existing Lane Configuration and Traffic Control

530 Oxford St W, London TIA  
230258

Figure 2.1

## 2.2 Transit Service

### 2.2.1 Existing Transit Routes

London Transit currently operates six routes within the study area. **Figure 2.2** illustrates the existing transit network in proximity to the subject site. The routes include the following:

- ▶ **Route 10 Barker at Huron – Natural Science/Masonville Place** operates along Wonderland Road with major stops at White Oaks Mall and Masonville Place. The route operates seven days a week and holidays with 15 to 30-minute headways.
- ▶ **Route 17 Byron/Riverbend – Argyle Mall** operates along Oxford Street with major stops at Fanshawe College and Argyle Mall. The route operates seven days a week and holidays with 15 to 30-minute headways.
- ▶ **Route 20 Fanshawe College – Beaverbrook** operates along Oxford Street with major stops at Fanshawe College and Downtown. The route operates seven days a week and holidays with 15 to 30-minute headways.
- ▶ **Route 27 Fanshawe College – Capulet** operates along Wonderland Road with major stops at Fanshawe College and Western University. The route operates seven days a week and holidays with 15 to 45-minute headways.
- ▶ **Route 33 Alumni Hall – Proudfoot** operates along Oxford Street and Wonderland Road with a major stop at Western University. The route operates Monday to Friday with 15-minute headways.
- ▶ **Route 91 Express Fanshawe College – Oxford at Wonderland** operates along Oxford Street with major stops in Downtown and Fanshawe College. The route operates Monday to Sunday with 15 to 30-minute headways.

Bus stops are located on Oxford Street West and Wonderland Road North fronting the subject site.

### 2.2.2 Future BRT Network

Future transit plans for the City include the implementation of a Bus Rapid Transit (BRT) system. The following three routes have been approved:



- ▶ **Downtown Loop** is currently under construction and will run along Queens Avenue, King Street, Ridout Street North and Wellington Street.
- ▶ **East London Link** is currently under construction and will run between Downtown and Fanshawe College.
- ▶ **Wellington Gateway** is currently under construction and will run along Wellington Street between Downtown and Highway 401.

The original network proposed an additional two routes to the north and to the west, with the system proposed to run along the frontage of the subject site.

**Figure 2.3** illustrates the proposed BRT network.

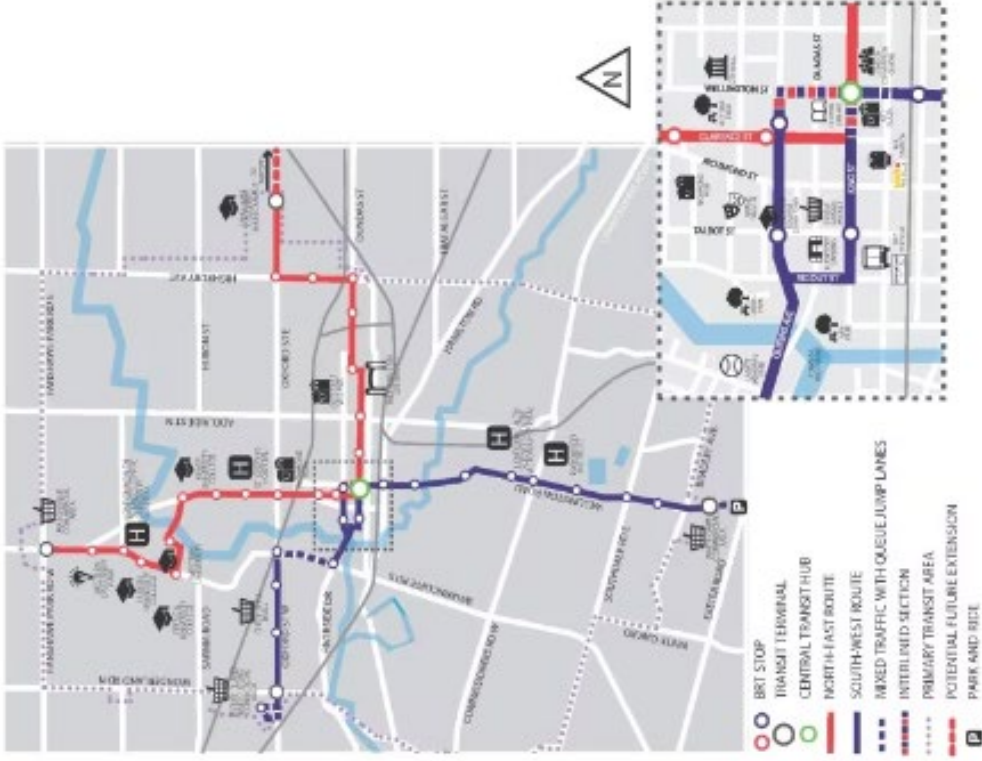




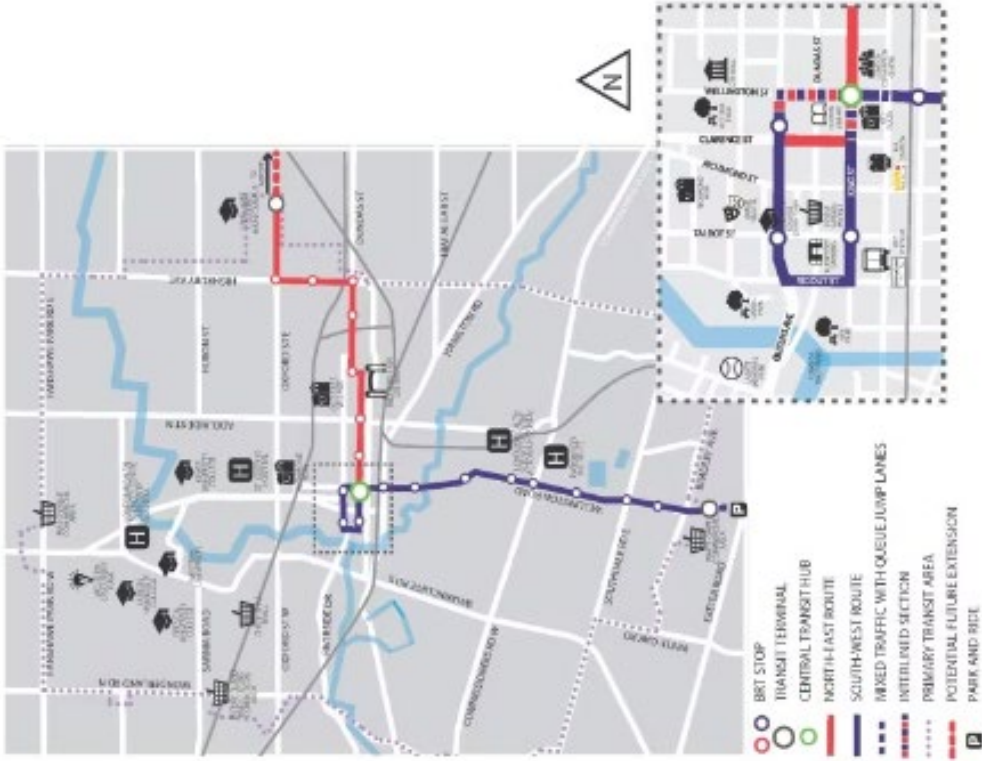
## Existing Transit Network

Figure 2.2

## Proposed Network



## Approved Network



## 2.3 Traffic Volumes

Turning movement counts were collected by Paradigm in October 2023 or obtained from the City. **Table 2.1** summarizes the traffic count date, source and peak hour start times for each intersection.

**TABLE 2.1: EXISTING TURNING MOVEMENT COUNT SUMMARY**

Intersection	Weekday				Saturday		
	Count Date	Source	AM Peak Hour	PM Peak Hour	Count Date	Source	SAT Peak Hour
Wonderland Rd N and Oxford St W	March 9 2023	City	7:45 AM	5:00 PM	October 14 2023	Paradigm	11:45 AM
Wonderland Rd N and Site Access	October 12, 2023	Paradigm	7:45 AM	4:30 PM	October 21 2023	Paradigm	12:00 PM
Oxford St W and Site Access	October 12, 2023	Paradigm	8:15 AM	3:00 PM	October 14 2023	Paradigm	1:00 PM

**Figure 2.4a** and **Figure 2.4b** illustrate the existing weekday AM and PM and Saturday peak hour traffic volumes, respectively.

**Appendix B** contains the detailed traffic counts and signal timings for the study area intersections.

## 2.4 Collision History

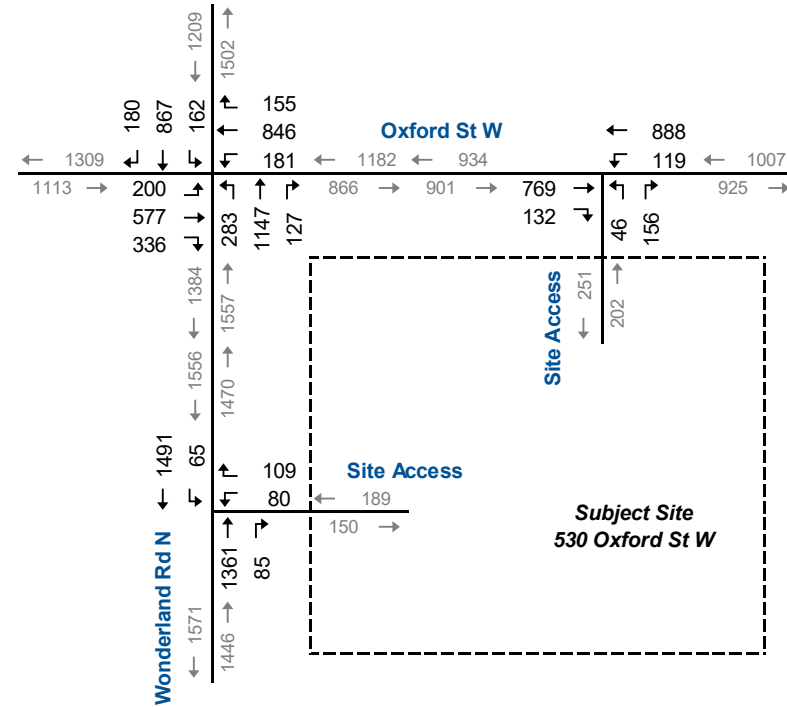
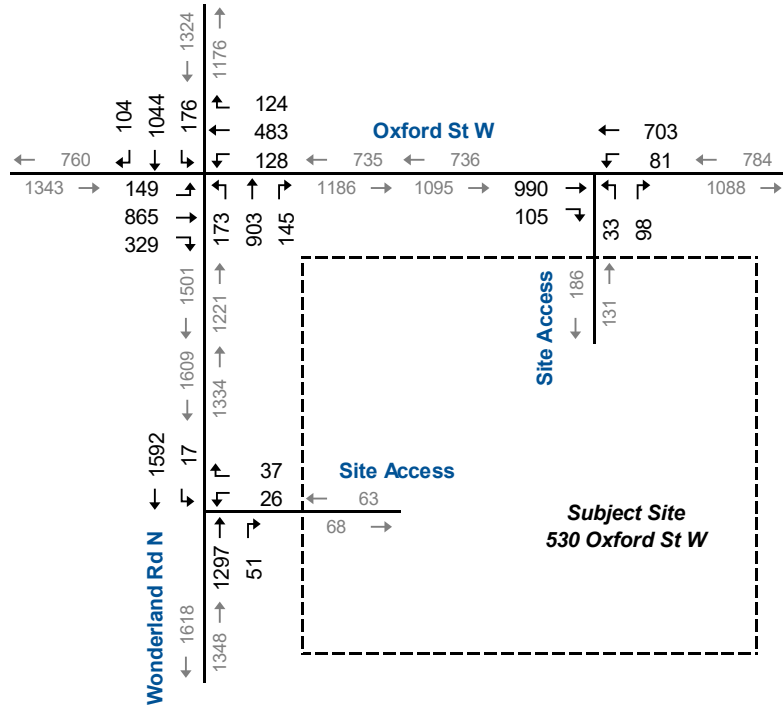
The City provided collision data for a period between January 2019 and May 2023 on Oxford Street West at the site access. A total of five collisions were recorded with three collisions (60%) being personal damage only and two collisions (40%) being non-reportable. The majority of collisions occurred at an angle or turning movement as a result of a left-turning vehicle.





### AM Peak Hour

### PM Peak Hour



NTS



## Existing Traffic Volumes AM and PM Peak Hour





## 2.5 Traffic Operations

The operations at the study area intersections have been assessed using Synchro 11. Movements are considered critical under the following conditions:

- ▶ Volume/capacity (V/C) ratios for overall intersection operations, through movements or shared through/turning movements increased to 0.90 or above and Level of Service 'E' or worse;
- ▶ V/C ratios for dedicated turning movements increased to 0.90 or above and Level of Service 'E' or worse;
- ▶ 95th percentile queue lengths for individual movements exceeds available lane storage.

Intersection level of service (LOS) is a recognized method of quantifying the average delay experienced by drivers at intersections. It is based on the delay experienced by individual vehicles executing various movements. The delay is related to the number of vehicles intending to make a particular movement, compared to the estimated capacity for that movement. The capacity is based on a number of criteria related to the opposing traffic flows and intersection geometry.

The highest possible rating is LOS A, under which the average total delay is equal to or less than 10.0 seconds per vehicle. When the average delay exceeds 80 seconds for signalized intersections, 50 seconds for unsignalized intersections or when the volume to capacity ratio is greater than 1.0, the movement is classed as LOS F and remedial measures are usually implemented if they are feasible. LOS E is usually used as a guideline for the determination of road improvement needs on through lanes, while LOS F may be acceptable for left-turn movements at peak times, depending on delays.

**Table 2.2** summarizes the results of the intersection operational analysis under existing conditions, including the weekday AM and PM and Saturday peak hour LOS, v/c ratios, and 95th percentile queues.

The results indicate that the study area intersections are operating with acceptable levels of service, except for the following critical movements:

### Wonderland Road North and Oxford Street West

- ▶ The eastbound left-turn movement is operating with LOS F, a v/c ratio greater than 0.90 and 95<sup>th</sup> percentile queues exceeding the available storage of 75 metres during the PM and Saturday peak hours;



- ▶ The eastbound through movement is operating with LOS E and a v/c ratio greater than 0.90 during the AM peak hour;
- ▶ The westbound through movement is operating with LOS E and a v/c ratio greater than 0.90 during the PM peak hour; and
- ▶ The northbound left-turn movement is operating with LOS E and a v/c ratio greater than 0.90 during the PM peak hour.

### **Oxford Street West and Site Access**

- ▶ The northbound left-turn movement is operating with LOS F and a v/c ratio greater than 0.90 during the Saturday peak hour.

**Appendix C** contains the detailed Synchro 11 reports.



**TABLE 2.2: EXISTING TRAFFIC OPERATIONS**

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Wonderland Rd N & Oxford St W	TCS	LOS Delay V/C Q Stor. Avail.	C 0.49 44 75 31	E 66 174 -	C 0.55 86 -	D 52	D 43 44 -	D 44 85 -	A 8 18 110 92	D 38	E 58 73 135 62	D 39 156 -	A 7 25 45 20	D 38	C 32 48 75 27	D 45 180 -	A 6 14 50 36	D 40	D 43
	Site Access & Wonderland Rd N	TCS	LOS Delay V/C Q Stor. Avail.					E 63 0.25 18 -		C 23 0.30 12 -	D 39		A 3 0.48 55 -	A 1 0.04 3 15 12	A 3	A 2 0.06 1 25 24	A 4 -		A 4	A 4
	Site Access & Oxford St W	TWSC	LOS Delay V/C Q Stor. Avail.		A 0 0.00 0 -	> > > > >	A 0	B 12 0.15 4 105 101	A 0 0.00 0 -		A 1	F 106 0.53 16 -		C 16 0.24 7 -	E 39					
PM Peak Hour	Wonderland Rd N & Oxford St W	TCS	LOS Delay V/C Q Stor. Avail.	F 1.04 99 75 -24	D 48 103 -	C 25 86 -	D 51	D 38 0.67 53 -	E 63 0.93 166 -	B 15 0.27 32 110 78	D 53	E 67 0.95 115 135 20	D 46 0.92 224 -	A 5 0.18 11 45 34	D 47	D 48 0.76 54 75 21	D 43 0.76 145 -	B 14 0.27 36 50 14	D 39	D 47
	Site Access & Wonderland Rd N	TCS	LOS Delay V/C Q Stor. Avail.					E 68 0.54 39 -		D 44 0.61 36 -	D 54	A 5 0.51 82 -	A 2 0.07 7 15 8	A 5	A 6 0.31 6 25 19	A 5 -	A 5 68 -		A 5	A 8
	Site Access & Oxford St W	TWSC	LOS Delay V/C Q Stor. Avail.		A 0 0.00 0 -	> > > > >	A 0	B 12 0.20 5 105 100	A 0 0.00 0 -		A 1	F 152 0.76 26 -		C 16 0.35 11 -	E 47					
Saturday Peak Hour	Wonderland Rd N & Oxford St W	TCS	LOS Delay V/C Q Stor. Avail.	F 0.98 97 75 -22	E 0.77 92 -	C 0.51 73 -	D 53	D 42 0.70 53 -	E 56 0.78 93 -	B 19 0.34 40 110 70	D 46	D 53 0.82 110 135 25	D 36 0.77 188 -	A 5 0.19 12 45 33	D 35	D 38 0.73 64 75 11	D 44 0.82 179 -	B 12 0.23 32 50 18	D 39	D 42
	Site Access & Wonderland Rd N	TCS	LOS Delay V/C Q Stor. Avail.					E 66 0.55 43 -		D 46 0.69 44 -	D 54	A 5 0.48 81 -	A 2 0.09 9 15 6	A 5	A 7 0.40 9 25 16	A 4 -	A 4 52 -		A 4	A 8
	Site Access & Oxford St W	TWSC	LOS Delay V/C Q Stor. Avail.		A 0 0.00 0 -	> > > > >	A 0	B 12 0.29 9 105 96	A 0 0.00 0 -		A 2	F 430 1.52 58 -		C 20 0.52 22 -	F 119					

MOE - Measure of Effectiveness  
 LOS - Level of Service  
 Delay - Average Delay per Vehicle in Seconds  
 V/C - Volume to Capacity Ratio  
 Q - 95th Percentile Queue Length (m)  
 Stor. - Existing Storage (m)  
 Avail. - Available Storage (m)  
 TCS - Traffic Control Signal  
 TWSC - Two-Way Stop Control  
 </> - Shared with through movement

## 3 Development Concept

### 3.1 Development Description

The subject site is located on the southeast corner of Wonderland Road North and Oxford Street West. The lands are currently occupied by a commercial plaza totalling 14,091 m<sup>2</sup> Gross Floor Area (GFA) including retail, restaurants and a bank. The proposed redevelopment includes the addition of two high-rise, 32-storey, mixed use buildings accommodating a combined 408 dwelling units and 470 m<sup>2</sup> GFA street facing commercial, and 3,500 m<sup>2</sup> supermarket within the existing commercial building.

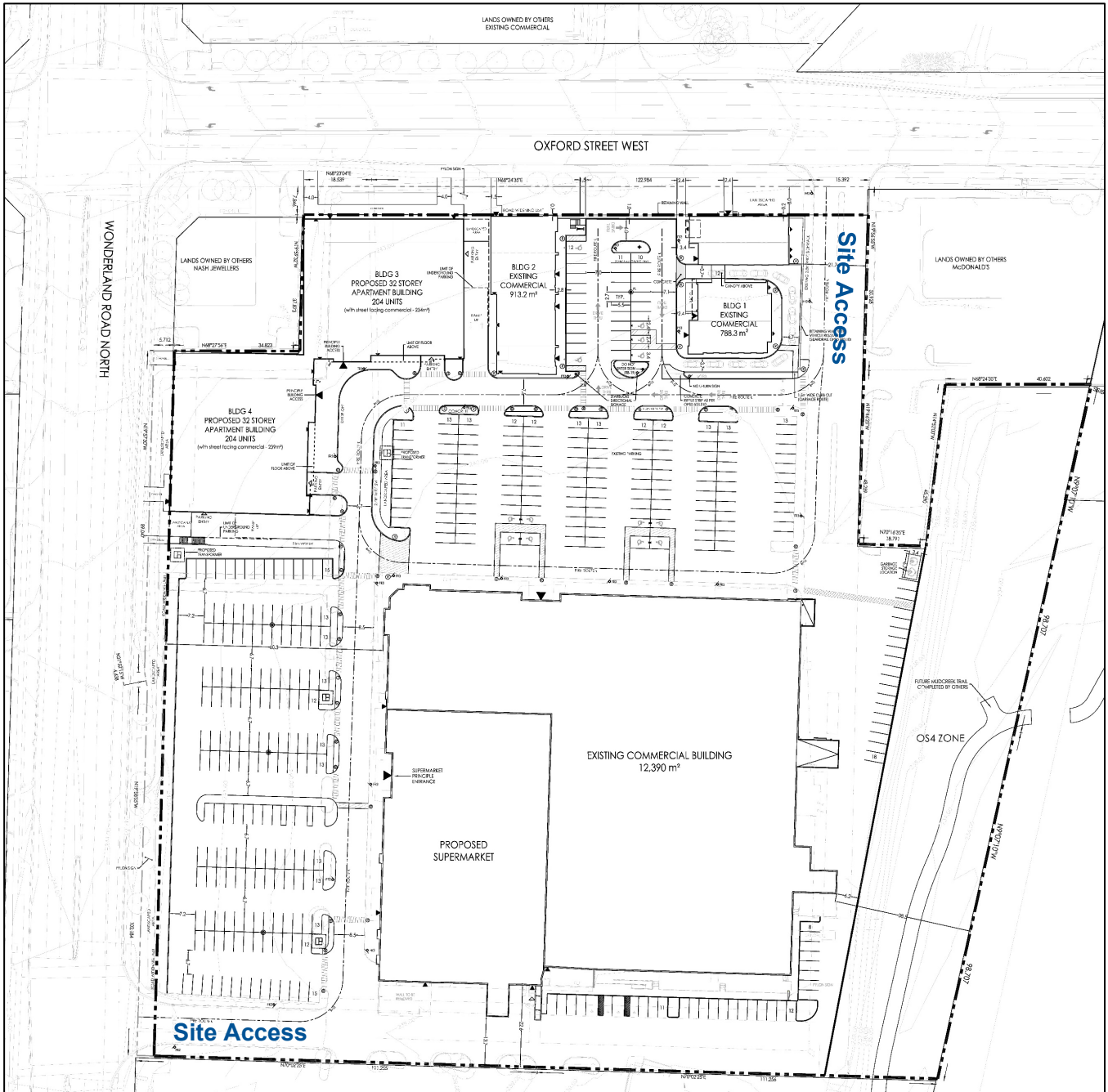
Vehicular access is proposed via the existing driveway to Oxford Street West (unsignalized) and the driveway to Wonderland Road North (signalized).

A total of 838 parking spaces will be provided on-site after the redevelopment including 402 surface spaces and 426 underground/podium spaces.

The development is anticipated to be completed by 2028.

**Figure 3.1** shows the development concept.





# Site Plan

## Figure 3.1

## 3.2 Development Trip Generation

The Institute of Transportation Engineers (ITE) Trip Generation Manual<sup>3</sup> provides rates and equations used to estimate the peak hour traffic volumes generated by the Land Use Codes (LUC) of this development:

- ▶ LUC 222 (Multifamily Housing, High Rise);
- ▶ LUC 822 (Strip Retail Plaza); and
- ▶ LUC 850 (Supermarket).

The mixed-use nature of the proposed development will encourage shared trips by different land uses. Internal capture has only been estimated for new trips generated by the redevelopment; however, it is anticipated that synergy will occur between the new and existing uses. The potential internal capture has been estimated using the NCHRP 8-51 Internal Trip Capture Estimation Tool. **Appendix D** contains the data sheets. It is noted that internal capture estimates are only available for weekday AM and PM peak hour time periods and not for Saturday mid-day. The ITE Trip Generation Handbook<sup>4</sup> indicates that AM and PM peak hour rates can not be used for any other time period. To remain conservative, no internal capture reductions have been applied during the Saturday peak hour.

The proximity to transit services including future BRT, and pedestrian/cycling facilities, will also encourage alternative mode usage involving walking, cycling, and transit. During pre-study consultation, the City identified a mode share of 10%. The modal share reduction has been applied after the internal capture reduction.

The ITE provides information on average pass-by rates for land use codes. Pass-by rates for LUC 822 are not available; therefore, rates for LUC 821 were applied to the trips generated by the proposed retail uses within the subject redevelopment. Pass-by trips were applied to both site access connections equally and were assigned to these intersections based on existing eastbound/westbound volumes along Oxford Street West and northbound/southbound volumes along Wonderland Road North. The pass-by rates were applied after all other reductions including internal capture and modal share.

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<sup>3</sup> Institute of Transportation Engineers, *Trip Generation Manual*, 11th ed., (Washington, DC: ITE, 2021).

<sup>4</sup> Institute of Transportation Engineers, *Trip Generation Handbook*, 3rd ed., (Washington, DC: ITE, 2017).



**Table 3.1** summarizes the forecast number of net new trips generated by the proposed development.

**TABLE 3.1: TRIP GENERATION**

Land Use	Number of Units	Trip Type	AM Peak Hour			PM Peak Hour			Saturday Peak Hour					
			Rate	In	Out	Total	Rate	In	Out	Total	Rate	In	Out	Total
LUC 222 - Multifamily Housing (High-Rise)	408	Total	Eq	28	81	109	Eq	80	49	129	Eq	87	66	153
		Internal	2%	1	1	2	41%	37	16	53	-	-	-	-
		Mode Share	10%	3	8	11	10%	4	3	7	10%	9	7	16
LUC 822 - Strip Retail Plaza (1,000 ft <sup>2</sup> )	5.05	Total	2.36	7	5	12	6.59	17	16	33	6.57	17	16	33
		Internal	0%	0	0	0	12%	2	2	4	-	-	-	-
		Mode Share	10%	1	1	2	10%	2	1	3	10%	2	2	4
LUC 850 - Supermarket (1,000 ft <sup>2</sup> )	37.67	Total	2.86	64	44	108	8.95	169	168	337	10.10	190	190	380
		Internal	2%	1	1	2	16%	16	37	53	-	-	-	-
		Mode Share	10%	6	4	10	10%	15	13	28	10%	19	19	38
		Pass-by	0%	0	0	0	24%	14	14	28	19%	32	32	64
<b>Total Trip Generation</b>				<b>99</b>	<b>130</b>	<b>229</b>		<b>266</b>	<b>233</b>	<b>499</b>		<b>294</b>	<b>272</b>	<b>566</b>
Total Internal Capture				2	2	4		55	55	110		-	-	-
Total Mode Share				10	13	23		21	17	38		30	28	58
Total Pass-by				0	0	0		17	17	34		36	36	72
<b>Net Trip Generation</b>				<b>87</b>	<b>115</b>	<b>202</b>		<b>173</b>	<b>144</b>	<b>317</b>		<b>228</b>	<b>208</b>	<b>436</b>

LUC 222 - AM: T = 0.22(X)+18.85 | PM: T = 0.26(X)+23.12 | SAT: T = 0.30(X)+30.34

### 3.3 Development Trip Distribution and Assignment

The trip distribution was determined based on existing travel patterns within the study area and traffic volumes at the site access points. **Table 3.2** displays the breakdown of trip distributions used in this study.

**TABLE 3.2: ESTIMATED TRIP DISTRIBUTION**

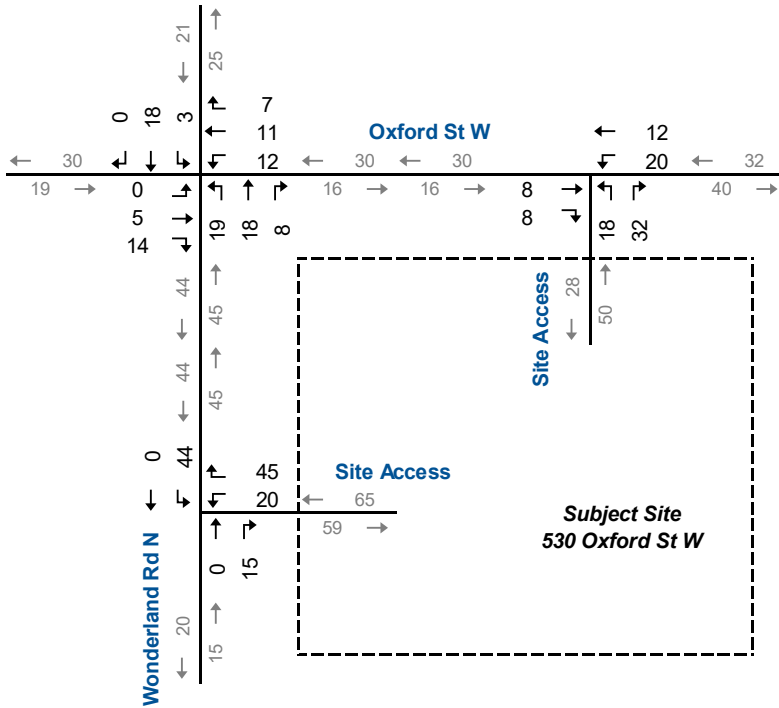
Origin/Destination	Residential	Commercial
North via Wonderland Rd N	20%	25%
South via Wonderland Rd N	20%	15%
East via Oxford St W	30%	40%
West via Oxford St W	30%	20%
<b>Total</b>	<b>100%</b>	<b>100%</b>

**Figure 3.2a** and **Figure 3.2b** illustrate the site-generated traffic volumes for the weekday AM and PM and Saturday peak hours, respectively.

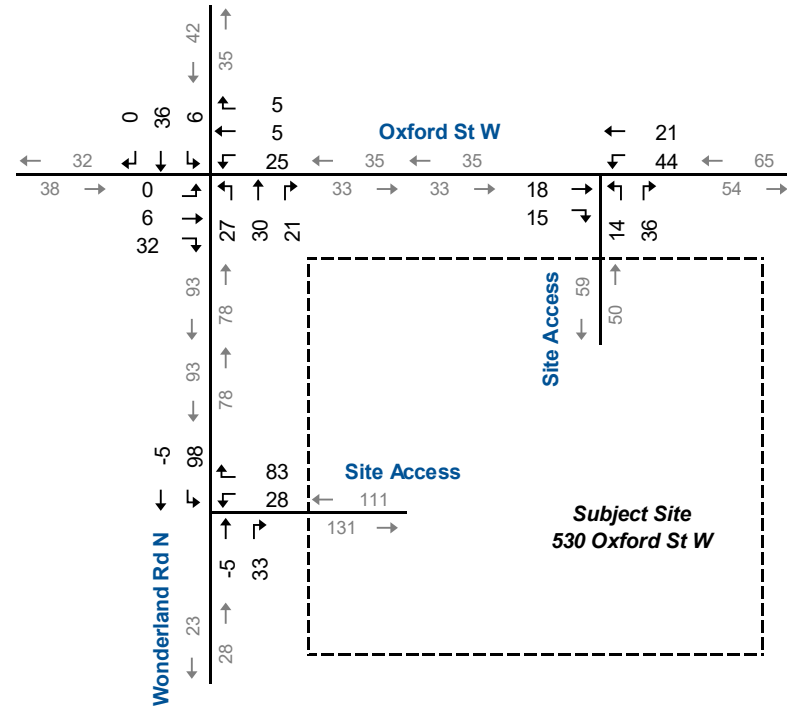




### AM Peak Hour



### PM Peak Hour

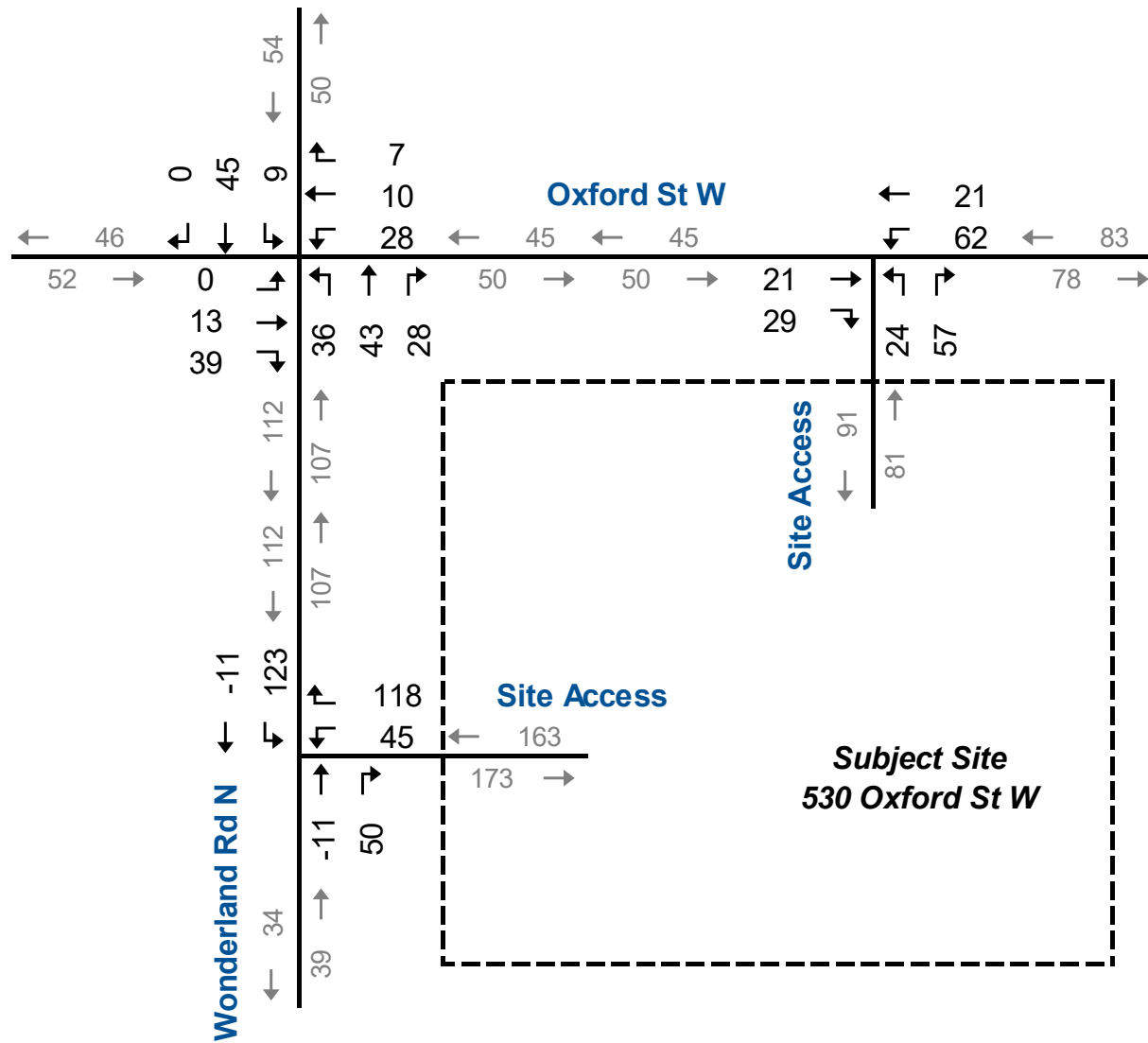


NTS



## Site Generated Traffic Volumes AM and PM Peak Hour





NTS



## Site Generated Traffic Volumes Saturday Peak Hour

## 4 Evaluation of Future Traffic Conditions

The assessment of future traffic conditions in this section includes estimates of future background and total traffic volumes, and the analyses for the 2033 horizon.

### 4.1 Network Improvements

The future Bus Rapid Transit (BRT) system will travel along Oxford Street West across the frontage of the subject site with a station at Wonderland Road North to the west of the subject site. Through this section of Oxford Street West, the BRT will be centre running with travel lanes on either side.

No changes to the intersection lane configuration at Wonderland Road North and Oxford Street West are proposed; however, the following revisions to the existing storage lengths are noted:

- ▶ **Eastbound Left-Turn Lane:** Increase from 75 metres of storage within a two-way centre left-turn lane under existing conditions to 100 metres of storage in an exclusive left-turn lane.
- ▶ **Westbound Left-Turn Lane:** A left-turn lane terminating at the site access on Oxford Street West under existing conditions to 100 metres of storage.
- ▶ **Westbound Right-Turn Lane:** Decrease from 110 metres of storage under existing conditions to 60 metres of storage.

Additionally, preliminary design plans indicate that the site access intersection on Oxford Street West will operate under traffic signal control with a reduced westbound left-turn lane (105 metres to 50 metres). **Section 4** reviews the traffic impact of the study area intersections with the site access on Oxford Street West operating as full-moves under traffic signal control.

**Appendix E** contains the preliminary BRT plans.

The City has indicated that further review of the corridor will have to be completed at the BRT design stage given the short distance to each of the existing signalized intersections at Wonderland Road North and at Proudfoot Lane. **Section 5** reviews the traffic impact of the study area intersections with the site access on Oxford Street West operating as Right-In Right-Out (RIRO).



## 4.2 Background Traffic Forecasts

To derive the 2033 generalized background traffic volumes, a growth rate of 1.5% compounded per annum was applied to the existing roadway traffic volumes. This growth rate was confirmed with City staff during the pre-study consultation.

## 4.3 2033 Background Traffic

**Figure 4.1a** and **Figure 4.1b** illustrate the 2033 background traffic volumes, including road traffic growth.

The 2033 background traffic volumes have been analyzed using the same methodology as under existing traffic conditions, with changes to the intersection geometry as discussed above. Given that the BRT is centre running along Oxford Street West, westbound and eastbound left-turn advance phases at Wonderland Road North and the westbound left-turn advance phase at the site access are protected.

**Table 4.1** summarizes the results of the 2033 background traffic operations. The results indicate that the study area intersections are forecast to operate with similar levels of service as under existing traffic conditions, with the addition of the following critical movements:

### Wonderland Road North and Oxford Street West

- ▶ The westbound left-turn movement is forecast to operate with LOS F and a v/c ratio greater than 0.90 during the AM and PM peak hours, and 95<sup>th</sup> percentile queues exceeding the available storage of 100 metres during the PM and Saturday peak hours;
- ▶ The northbound left-turn movement is forecast to operate with LOS F and a v/c ratio greater than 0.90 during the AM and Saturday peak hours, and 95<sup>th</sup> percentile queues exceeding the available storage of 135 metres during the PM and Saturday peak hours;
- ▶ The northbound through movement is forecast to operate with LOS E and a v/c ratio greater than 0.90 during the PM and Saturday peak hours;
- ▶ The southbound left-turn movement is forecast to operate with LOS F, a v/c ratio greater than 0.90 and 95<sup>th</sup> percentile queues exceeding the available storage of 75 metres during the AM, PM and Saturday peak hours; and
- ▶ The southbound through movement is forecast to operate with LOS E or F and a v/c ratio greater than 0.90 during the AM, PM and Saturday peak hours.



## **Oxford Street West and Site Access**

- ▶ The westbound left-turn movement is forecast to operate with 95<sup>th</sup> percentile queues exceeding the available storage of 50 metres during the PM and Saturday peak hours.

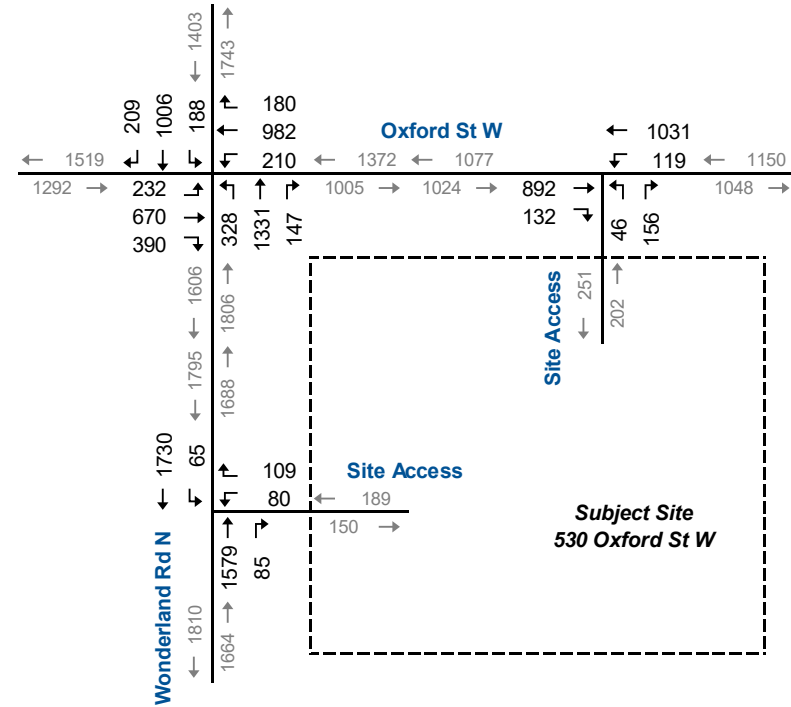
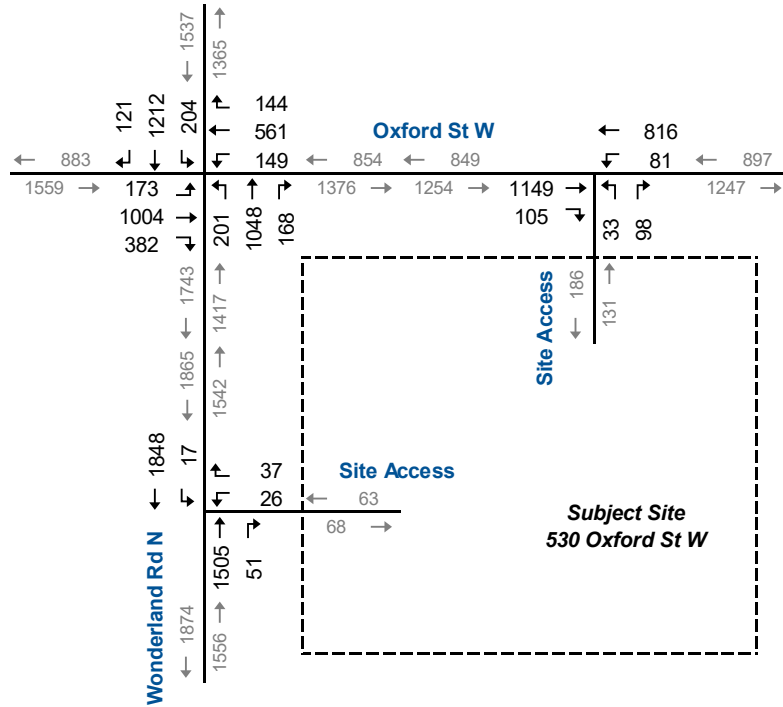
**Appendix F** contains the supporting detailed Synchro 11 reports.





### AM Peak Hour

### PM Peak Hour



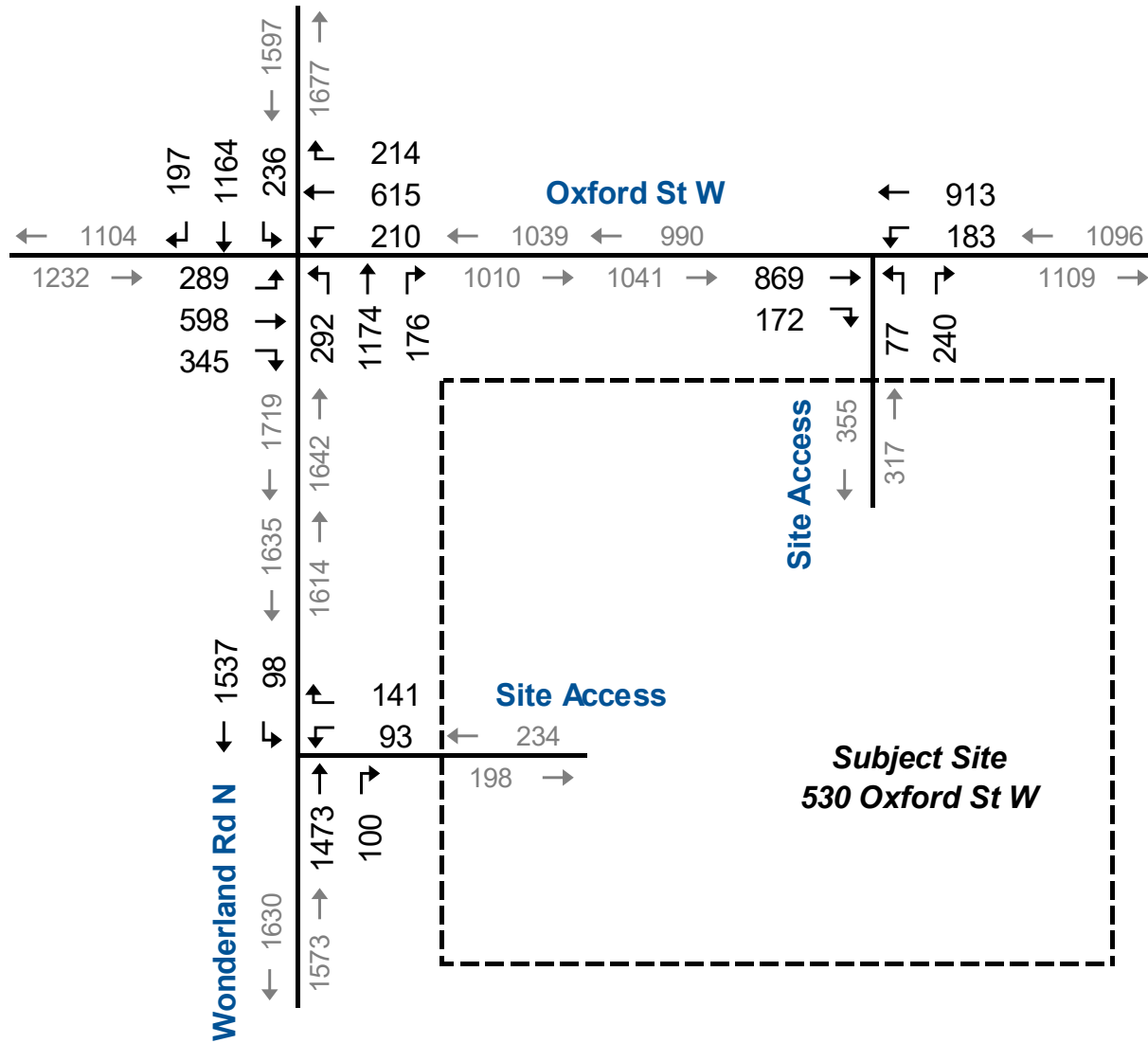
NTS



## Background Traffic Volumes AM and PM Peak Hour

530 Oxford St W, London TIA  
230258

Figure 4.1a



NTS



## Background Traffic Volumes Saturday Peak Hour

**TABLE 4.1: BACKGROUND TRAFFIC OPERATIONS**

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Wonderland Rd N & Oxford St W	TCS	LOS Delay V/C Q Stor. Avail.	F 0.87 92 100 8	F 84 211 -	C 0.62 104 -	E 71 -	F 165 97 100 3	D 49 101 -	B 12 26 60 34	E 63 -	F 88 95 135 40	D 44 184 -	A 6 23 45 22	D 46 -	F 109 105 101 75 -26	E 71 1.02 242 -	A 8 19 50 31	E 71 -	E 63 -
	Site Access & Wonderland Rd N	TCS	LOS Delay V/C Q Stor. Avail.					E 63 0.25 18 -		C 23 0.30 12 -	D 39 -		A 4 0.56 72 -	A 1 0.04 4 15 11	A 4 -	A 2 0.08 1 25 24	A 8 -		A 8 -	A 6 -
	Site Access & Oxford St W	TCS	LOS Delay V/C Q Stor. Avail.		C 24 0.84 122 -	> > > > >	C 24 -	E 65 0.66 43 50 7	A 10 0.44 49 -		B 15 -	C 29 0.09 14 -		A 8 0.23 14 -	B 13 -					
PM Peak Hour	Wonderland Rd N & Oxford St W	TCS	LOS Delay V/C Q Stor. Avail.	F 123 1.04 128 100 -28	D 54 0.81 122 -	C 28 0.63 107 -	E 58 -	F 100 0.94 113 100 -13	F 128 1.16 223 -	B 16 0.34 37 60 23	F 109 -	F 150 1.20 160 135 -25	E 77 1.06 272 -	A 5 0.19 5 45 40	F 85 -	F 159 1.19 101 75 -26	E 67 0.98 202 -	B 12 0.29 35 50 15	E 71 -	F 81 -
	Site Access & Wonderland Rd N	TCS	LOS Delay V/C Q Stor. Avail.					E 65 0.51 39 -		E 56 0.65 42 -	E 60 -	A 6 0.59 114 -	A 2 0.07 8 15 7	A 6 -	A 9 0.43 5 25 20	A 5 0.66 68 -			A 6 -	A 8 -
	Site Access & Oxford St W	TCS	LOS Delay V/C Q Stor. Avail.		C 26 0.82 103 -	> > > > >	C 26 -	E 64 0.74 56 50 -6	B 13 0.59 75 -		B 18 -	C 25 0.10 17 -		A 6 0.30 16 -	B 11 -					
Saturday Peak Hour	Wonderland Rd N & Oxford St W	TCS	LOS Delay V/C Q Stor. Avail.	F 148 1.15 158 100 -58	E 56 0.81 108 -	C 28 0.58 94 -	E 70 -	F 85 0.87 104 100 -4	E 59 0.84 111 -	C 23 0.39 54 60 6	E 56 -	F 87 1.01 143 135 -8	E 67 1.02 238 -	A 7 0.23 11 45 34	E 64 -	F 88 0.99 124 75 -49	F 103 1.11 249 -	B 13 0.27 36 50 14	F 90 -	E 71 -
	Site Access & Wonderland Rd N	TCS	LOS Delay V/C Q Stor. Avail.					E 61 0.50 42 -		E 57 0.71 50 -	E 58 -	A 6 0.56 112 -	A 3 0.09 10 15 5	A 6 -	B 13 0.55 6 25 19	A 4 0.59 45 -			A 5 -	A 9 -
	Site Access & Oxford St W	TCS	LOS Delay V/C Q Stor. Avail.		C 29 0.83 120 -	> > > > >	C 29 -	D 51 0.71 68 50 -18	B 10 0.47 59 -		B 17 -	C 31 0.19 28 -		A 7 0.45 20 -	B 13 -					

MOE - Measure of Effectiveness      Q - 95th Percentile Queue Length (m)      </> - Shared with through movement  
 LOS - Level of Service      Stor. - Existing Storage (m)  
 Delay - Average Delay per Vehicle in Seconds      Avail. - Available Storage (m)  
 V/C - Volume to Capacity Ratio      TCS - Traffic Control Signal



## 4.4 2033 Total Traffic

**Figure 4.2a** and **Figure 4.3b** illustrate the 2033 total traffic volumes, including trips generated by the proposed development.

The 2033 total traffic volumes have been analyzed using the same methodology as under background traffic conditions.

**Table 4.2** summarizes the results of the 2033 total traffic operations. The results indicate that the study area intersections are forecast to operate with similar levels of service as under background traffic conditions, with the addition of the following critical movements:

### Wonderland Road North and Oxford Street West

- ▶ The westbound left-turn movement is forecast to operate with 95<sup>th</sup> percentile queues exceeding the available storage of 100 metres during the AM peak hour, and LOS F and a v/c ratio greater than 0.90 during the Saturday peak hour.

### Oxford Street West and Site Access

- ▶ The westbound left-turn movement is forecast to operate with LOS F and a v/c ratio greater than 0.90 during the PM peak hour, and 95<sup>th</sup> percentile queues exceeding the available storage of 50 metres during the AM peak hour.

### Wonderland Road North and Site Access

- ▶ The southbound left-turn movement is forecast to operate with LOS F, a v/c ratio greater than 0.90 and 95<sup>th</sup> percentile queues exceeding the available storage of 25 metres during the PM and Saturday peak hours; and
- ▶ The northbound right-turn movement is forecast to operate with 95<sup>th</sup> percentile queues exceeding the available storage of 15 metres during the Saturday peak hour.

**Appendix G** contains the supporting detailed Synchro 11 reports.

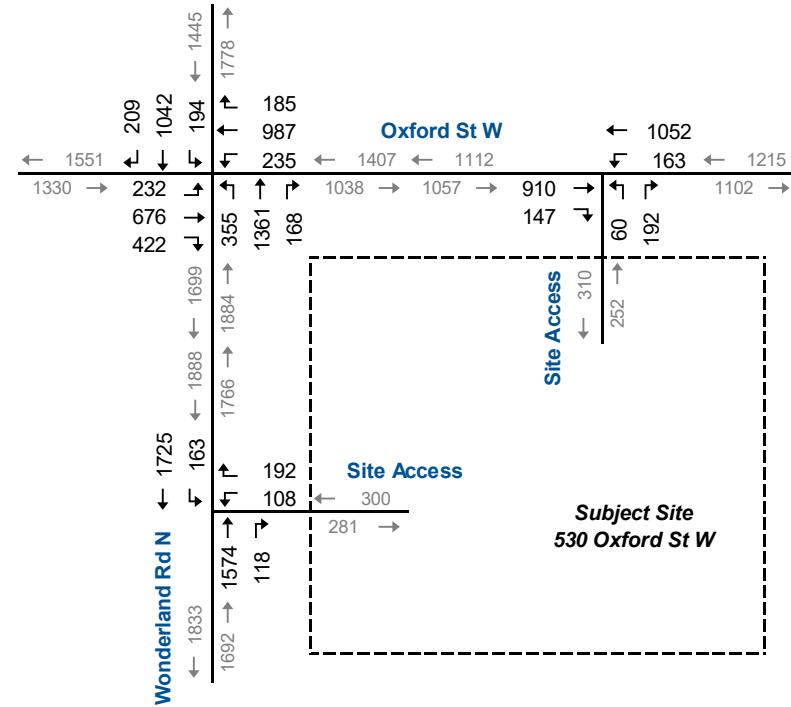
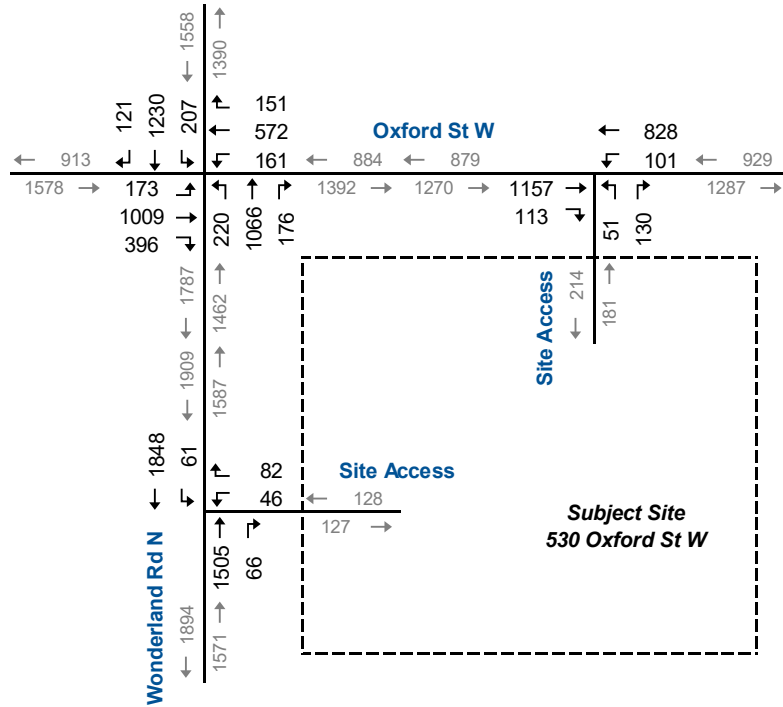






### AM Peak Hour

### PM Peak Hour



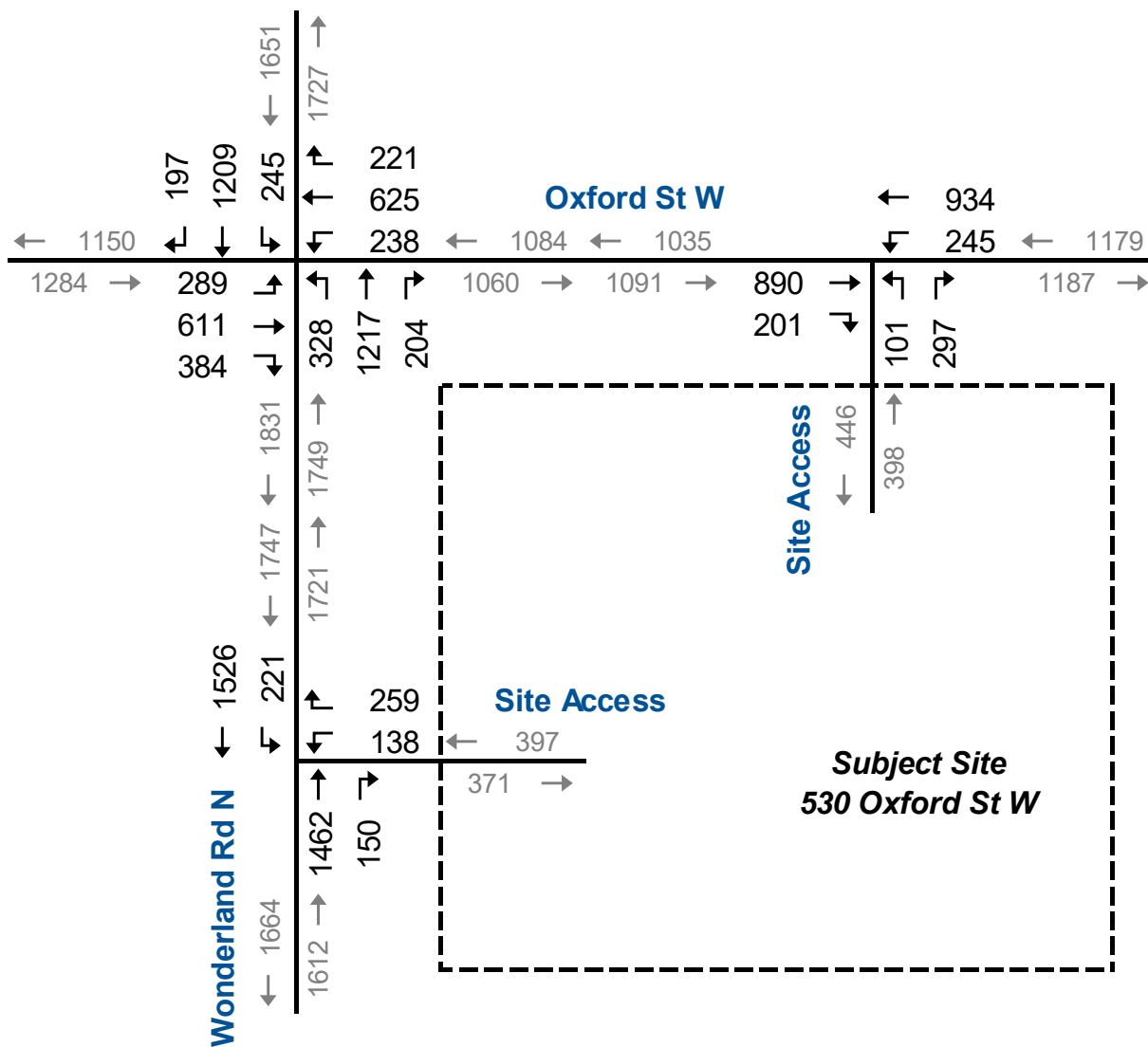
NTS



## Total Traffic Volumes AM and PM Peak Hour

530 Oxford St W, London TIA  
230258

Figure 4.2a



NTS



## Total Traffic Volumes Saturday Peak Hour

**TABLE 4.2: TOTAL TRAFFIC OPERATIONS**

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Wonderland Rd N & Oxford St W	TCS	LOS Delay V/C Q Stor. Avail.	F 0.87 92 100 8	F 1.05 213 -	C 0.64 110 -	E 72	F 1.22 106 100 -6	D 0.71 103 -	B 0.28 28 60 32	E 70	F 1.14 109 135 26	D 0.90 197 -	A 0.25 20 45 25	D 51	F 1.13 107 103 75 -28	E 0.17 1.03 248 -	A 0.08 19 50 31	E 75	E 67
	Site Access & Wonderland Rd N	TCS	LOS Delay V/C Q Stor. Avail.					E 0.36 26 -		D 0.56 30 -	D 52		A 0.59 94 -	A 0.06 6 15 9	A 5	A 0.33 3 25 22	A 0.74 60 -		A 9	A 9
	Site Access & Oxford St W	TCS	LOS Delay V/C Q Stor. Avail.		C 24 0.84 125 -	> > > > >	C 24	F 0.88 0.84 57 50 -7	A 1.10 0.44 50 -		B 18	C 0.14 20 -		A 0.29 16 -	B 14					
PM Peak Hour	Wonderland Rd N & Oxford St W	TCS	LOS Delay V/C Q Stor. Avail.	F 1.04 128 100 -28	D 0.82 123 -	C 0.69 120 -	E 59	F 1.05 130 100 -30	F 1.17 225 -	B 0.35 39 60 21	F 115	F 1.30 182 135 -47	F 1.09 278 -	A 0.22 10 45 35	F 97	F 1.23 105 75 -30	E 1.02 214 -	B 0.29 35 50 15	E 80	F 88
	Site Access & Wonderland Rd N	TCS	LOS Delay V/C Q Stor. Avail.					D 0.43 45 -	E 0.78 70 -	E 59		A 0.64 158 -	A 0.11 15 0	A 10	F 1.28 78 25 -53	A 0.71 79 -			C 22	B 19
	Site Access & Oxford St W	TCS	LOS Delay V/C Q Stor. Avail.		C 0.82 108 -	> > > >	C 26	F 1.03 82 50 -32	B 0.59 77 -		C 27	C 0.14 21 -		A 0.36 18 -	B 11					
Saturday Peak Hour	Wonderland Rd N & Oxford St W	TCS	LOS Delay V/C Q Stor. Avail.	F 1.15 158 100 -58	E 0.85 111 -	C 0.66 109 -	E 71	F 0.95 124 100 -24	E 0.85 113 -	C 0.41 56 60 4	E 60	F 1.14 177 135 -42	E 1.06 247 -	A 0.27 14 45 31	E 77	F 1.03 129 75 -54	F 1.15 264 -	B 0.27 36 50 14	F 104	F 80
	Site Access & Wonderland Rd N	TCS	LOS Delay V/C Q Stor. Avail.					D 0.44 54 -	E 0.85 92 -	E 59		B 0.62 148 -	A 0.14 19 15 -4	B 11	F 1.54 96 25 -71	A 0.65 57 -			D 40	C 29
	Site Access & Oxford St W	TCS	LOS Delay V/C Q Stor. Avail.		C 0.85 128 -	> > > >	C 31	E 0.86 102 50 -52	A 0.46 61 -		C 22	C 0.27 35 -		A 0.52 23 -	B 14					

MOE - Measure of Effectiveness      Q - 95th Percentile Queue Length (m)      </> - Shared with through movement  
 LOS - Level of Service      Stor. - Existing Storage (m)  
 Delay - Average Delay per Vehicle in Seconds      Avail. - Available Storage (m)  
 V/C - Volume to Capacity Ratio      TCS - Traffic Control Signal

## 4.5 Remedial Measures

### 4.5.1 Signal Warrants

The site access on Oxford Street West has been assessed using the Ontario Traffic Manual (OTM) signal warrant guidelines<sup>5</sup> to determine if traffic signal control is warranted.

Based on the warrant analysis, traffic control signals are not warranted under the forecast total traffic conditions.

**Appendix H** contains the warrant analysis worksheets.

### 4.5.2 Site Access

As identified in **Section 4.4**, the southbound left-turn movement at the Wonderland Road North Site Access and westbound left-turn movement at the Oxford Street West Site Access are forecast to operate with poor levels of service and queueing issues under total traffic conditions. Signal timing optimization at both intersections and a southbound left-turn advance phase at the Wonderland Road North Site Access would provide additional capacity for the critical movements. **Table 4.3** summarizes the intersection operations with the above signal timings changes. Based on operational results with the above signal timing changes, the following turn lane storage lengths would need to be extended:

- ▶ The westbound left-turn lane at the Oxford Street West Site Access be extended from 50 metres to 100 metres. It is noted that the existing storage length is 105 metres;
- ▶ The northbound right-turn lane at the Wonderland Road North Site Access be extended from 15 metres to 35 metres; and
- ▶ The southbound left-turn lane at the Wonderland Road North Site Access be extended from 25 metres to 45 metres.

**Appendix I** contains the supporting detailed Synchro 11 reports.

The site access points have a clear throat length of 50 and 47 metres, respectively, at Wonderland Road North and Oxford Street West. The 95<sup>th</sup> percentile queues are forecast to exceed the available throat length only during the Saturday peak hour at the Wonderland Road North access.

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<sup>5</sup> Ontario Traffic Manual Book 12 – Traffic Signals



### **4.5.3 Wonderland Road North and Oxford Street West**

Generally, all left-turn and through movements at the intersection of Wonderland Road North and Oxford Street West are forecast to operate with poor levels of service, limited capacity and queueing issues, primarily as a result of the BRT network signal timing changes and background growth. The City should review operations at the BRT design stage to identify potential improvements to increase capacity.



**TABLE 4.3: TOTAL TRAFFIC OPERATIONS WITH IMPROVEMENTS**

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Site Access & Wonderland Rd N	TCS	LOS Delay V/C Q Stor. Avail.					E 66 0.39 26 -		B 19 0.46 17 -		<b>D 36</b>		A 9 0.64 137 -	A 4 0.06 8 15 7	<b>A 9</b>	A 3 0.26 2 25 -	A 7 0.73 40 -	<b>A 7</b>	<b>A 9</b>
	Site Access & Oxford St W	TCS	LOS Delay V/C Q Stor. Avail.	C 24 0.84 125 -	>	>	<b>C 24</b>	F 88 0.84 57 50 -7	A 10 0.44 50 -		<b>B 18</b>	C 30 0.14 20 -		A 8 0.29 16 -	<b>B 14</b>					<b>C 21</b>
PM Peak Hour	Site Access & Wonderland Rd N	TCS	LOS Delay V/C Q Stor. Avail.					E 69 0.62 50 -		B 17 0.62 28 -		<b>D 36</b>	B 18 0.72 228 -	A 8 0.12 22 15 -7	<b>B 18</b>	C 26 0.64 32 25 -7	A 8 0.66 87 -		<b>A 9</b>	<b>B 15</b>
	Site Access & Oxford St W	TCS	LOS Delay V/C Q Stor. Avail.	C 27 0.83 112 -	>	>	<b>C 27</b>	E 56 0.74 70 50 -20	B 11 0.55 71 -		<b>B 17</b>	C 30 0.15 22 -		A 7 0.39 19 -	<b>B 12</b>					<b>C 21</b>
Saturday Peak Hour	Site Access & Wonderland Rd N	TCS	LOS Delay V/C Q Stor. Avail.					E 69 0.67 60 -		C 21 0.71 41 -		<b>D 38</b>	C 22 0.72 227 -	B 11 0.17 32 15 -17	<b>C 21</b>	C 21 0.69 45 25 -20	B 14 0.59 115 -		<b>B 14</b>	<b>B 20</b>
	Site Access & Oxford St W	TCS	LOS Delay V/C Q Stor. Avail.	D 37 0.86 166 -	>	>	<b>D 37</b>	E 61 0.78 99 50 -49	B 11 0.46 71 -		<b>C 22</b>	D 40 0.25 43 -		A 8 0.51 26 -	<b>B 16</b>					<b>C 27</b>

MOE - Measure of Effectiveness      Q - 95th Percentile Queue Length (m)      </> - Shared with through movement  
 LOS - Level of Service      Stor. - Existing Storage (m)  
 Delay - Average Delay per Vehicle in Seconds      Avail. - Available Storage (m)  
 V/C - Volume to Capacity Ratio      TCS - Traffic Control Signal



## 5 Sensitivity Analysis

As noted in **Section 4.1**, preliminary design plans indicate that the site access intersection on Oxford Street West will operate under traffic signal control, as reviewed in **Section 4**. However, the City has indicated that further review of the corridor will have to be completed at the BRT design stage given the short distance to each of the existing signalized intersections at Wonderland Road North and at Proudfoot Lane.

This section reviews the traffic impact on the study area intersections with the site access on Oxford Street West operating as unsignalized RIRO.

### 5.1 Site Generated Traffic

Left-turn movements at the site access on Oxford Street West included in **Section 3.3** have been re-assigned to the signalized access on Wonderland Road North.

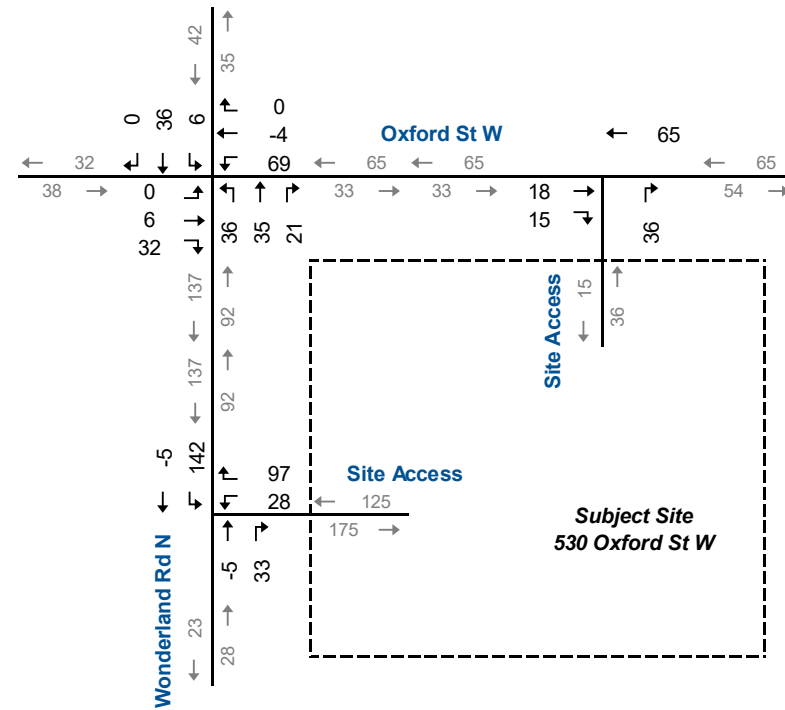
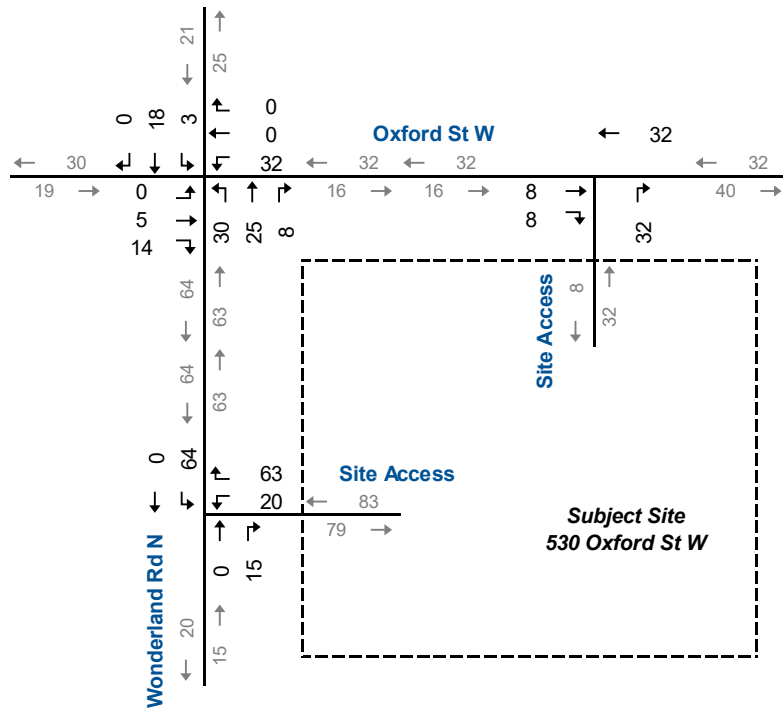
**Figure 5.1a** and **Figure 5.1b** illustrate the site-generated traffic volumes with the site access on Oxford Street West operating as RIRO.





### AM Peak Hour

### PM Peak Hour



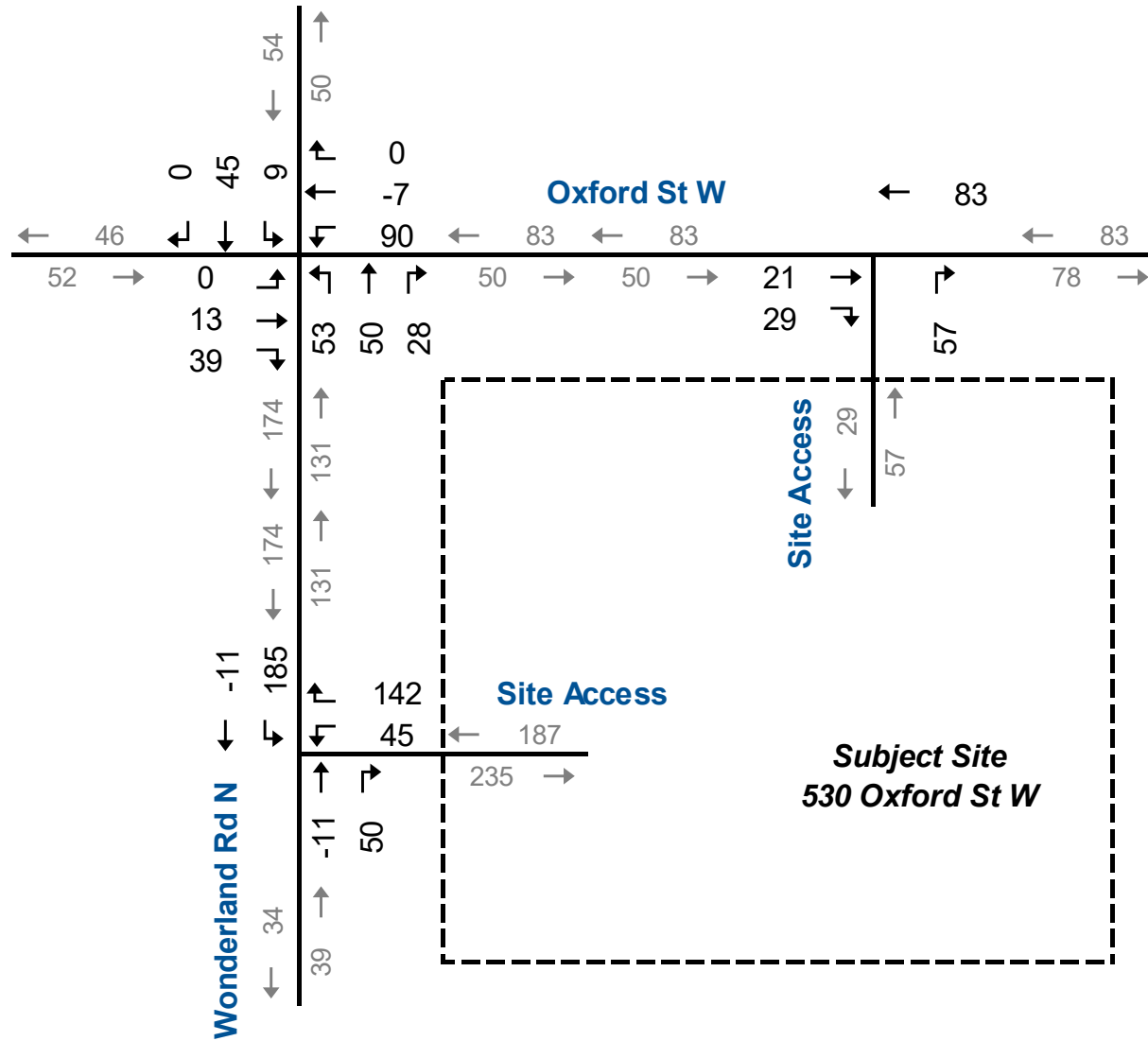
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## Site Generated Traffic Volumes RIRO Oxford St W Access AM and PM Peak Hour

Figure 5.1a





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## Site Generated Traffic Volumes RIRO Oxford St W Access Saturday Peak Hour

## 5.2 Background Traffic

Existing left-turn volumes at the Oxford Street West site access have also been re-assigned to the signalized Wonderland Road North site access as part of background conditions.

**Figure 5.2a** and **Figure 5.2b** illustrate the background traffic volumes with the site access on Oxford Street West operating as RIRO.

The re-assigned background traffic volumes have been analyzed following the methodology in **Section 4**. **Table 5.1** summarizes the results of the re-assigned background traffic operations. The results indicate that the intersections are forecast to operate with similar levels of service as under background traffic conditions with a full-moves signalized access on Oxford Street West (**Section 4.3**), with addition of the following critical movements:

### Wonderland Road North and Oxford Street West

- ▶ The westbound left-turn movement is forecast to operate with LOS F and a v/c ratio greater than 0.90 during the Saturday peak hour, and 95<sup>th</sup> percentile queues exceeding the available storage of 100 metres during the AM peak hour.

### Wonderland Road North and Site Access

- ▶ The southbound left-turn movement is forecast to operate with LOS F, a v/c ratio greater than 0.90 and 95<sup>th</sup> percentile queues exceeding the available storage of 25 metres during the PM and Saturday peak hours.

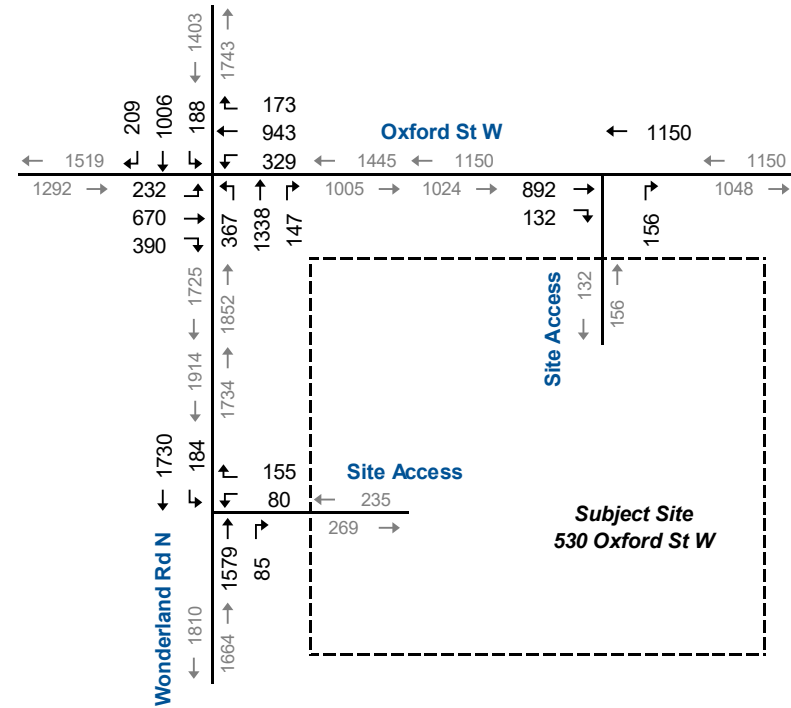
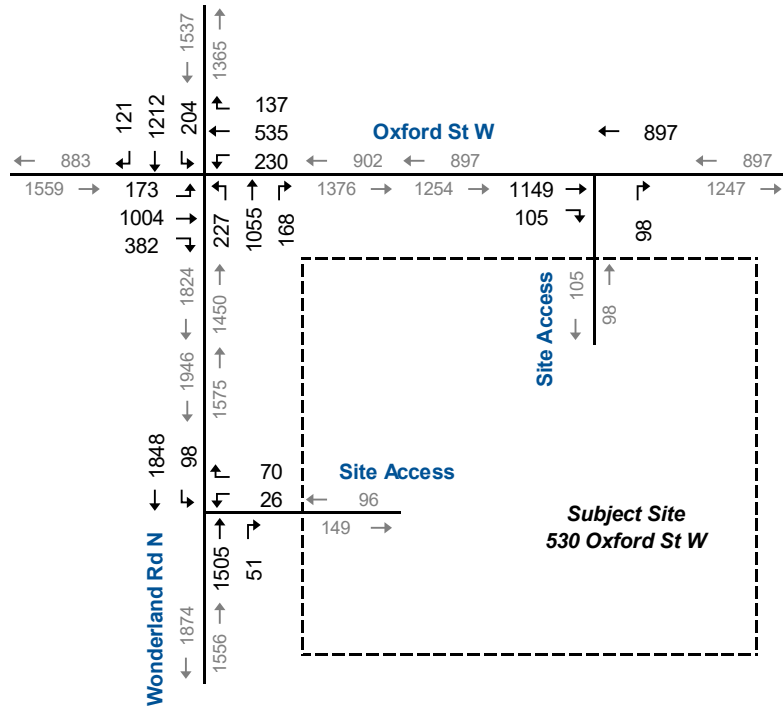
**Appendix J** contains the supporting detailed Synchro 11 reports.





### AM Peak Hour

### PM Peak Hour

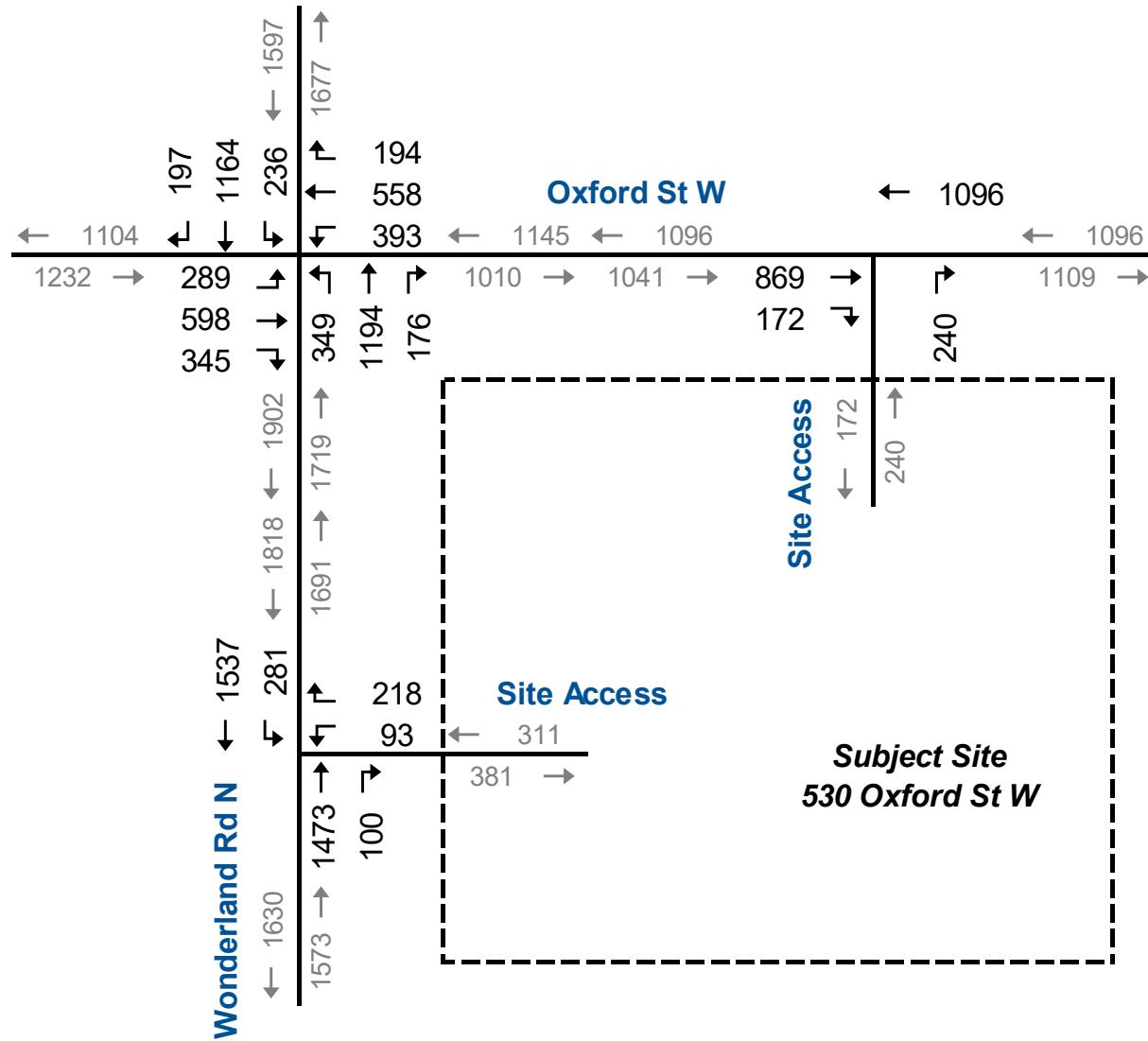


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## Background Traffic Volumes RIRO Oxford St W Access AM and PM Peak Hour

Figure 5.2a



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## Background Traffic Volumes RIRO Oxford St W Access Saturday Peak Hour

**TABLE 5.1: BACKGROUND TRAFFIC OPERATIONS – RIRO OXFORD ST W ACCESS**

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Wonderland Rd N & Oxford St W	TCS	LOS Delay V/C Q Stor. Avail.	F 0.87 92 100 8	F 1.04 211 -	C 0.62 104 -	E 71	F 393 1.74 155 100 -55	D 48 0.67 96 -	B 12 0.26 24 60 36	F 130	F 127 1.13 114 135 21	D 12 0.89 188 -	A 6 0.24 20 45 25	D 53	F 109 1.05 101 75 -26	E 71 1.02 242 -	A 8 0.17 19 50 31	E 71	E 76
	Site Access & Wonderland Rd N	TCS	LOS Delay V/C Q Stor. Avail.					E 60 0.22 17 -		D 42 0.51 25 -	D 47		A 4 0.57 88 -	A 2 0.04 4 15 11	A 4	A 10 0.50 7 25 18	A 8 0.71 68 -		A 8	A 7
	Site Access & Oxford St W	TWSC	LOS Delay V/C Q		A 0 0.00 0	> > >	A 0		A 0 0.00 0		A 0			C 18 0.28 8	C 18					
PM Peak Hour	Wonderland Rd N & Oxford St W	TCS	LOS Delay V/C Q Stor. Avail.	F 1.04 128 100 -28	D 0.81 122 -	C 0.63 107 -	E 58	F 275 1.48 195 100 -95	F 111 1.12 210 -	B 16 0.33 35 60 25	F 137	F 206 1.34 187 135 -52	E 78 1.07 275 -	A 5 0.19 7 45 38	F 97	F 159 1.19 101 75 -26	E 67 0.98 202 -	B 12 0.29 35 50 15	E 71	F 92
	Site Access & Wonderland Rd N	TCS	LOS Delay V/C Q Stor. Avail.					E 55 0.39 37 -		E 61 0.73 57 -	E 59		A 8 0.62 139 -	A 3 0.08 10 15 5	A 8	F 190 1.33 83 25 -58	A 7 0.68 83 -		C 25	B 20
	Site Access & Oxford St W	TWSC	LOS Delay V/C Q		A 0 0.00 0	> > >	A 0		A 0 0.00 0		A 0			C 18 0.38 14	C 18					
Saturday Peak Hour	Wonderland Rd N & Oxford St W	TCS	LOS Delay V/C Q Stor. Avail.	F 1.15 158 100 -58	E 0.84 108 -	C 0.59 94 -	E 71	F 305 1.56 228 100 -128	D 54 0.77 100 -	C 21 0.36 48 60 12	F 135	F 149 1.20 191 135 -56	E 69 1.04 239 -	A 6 0.23 10 45 35	E 79	F 86 0.98 124 75 -49	F 103 1.11 249 -	B 13 0.27 36 50 14	F 90	F 91
	Site Access & Wonderland Rd N	TCS	LOS Delay V/C Q Stor. Avail.					D 49 0.34 39 -		E 61 0.80 76 -	E 57		A 10 0.61 146 -	A 4 0.09 13 15 2	A 10	F 406 1.85 116 25 -91	A 8 0.63 64 -		E 69	D 43
	Site Access & Oxford St W	TWSC	LOS Delay V/C Q		A 0 0.00 0	> > >	A 0		A 0 0.00 0		A 0			C 23 0.57 26	C 23					

MOE - Measure of Effectiveness  
 LOS - Level of Service  
 Delay - Average Delay per Vehicle in Seconds  
 V/C - Volume to Capacity Ratio  
 Q - 95th Percentile Queue Length (m)  
 Stor. - Existing Storage (m)  
 Avail. - Available Storage (m)  
 TCS - Traffic Control Signal  
 TWSC - Two-Way Stop Control  
 </> - Shared with through movement



### 5.3 Total Traffic

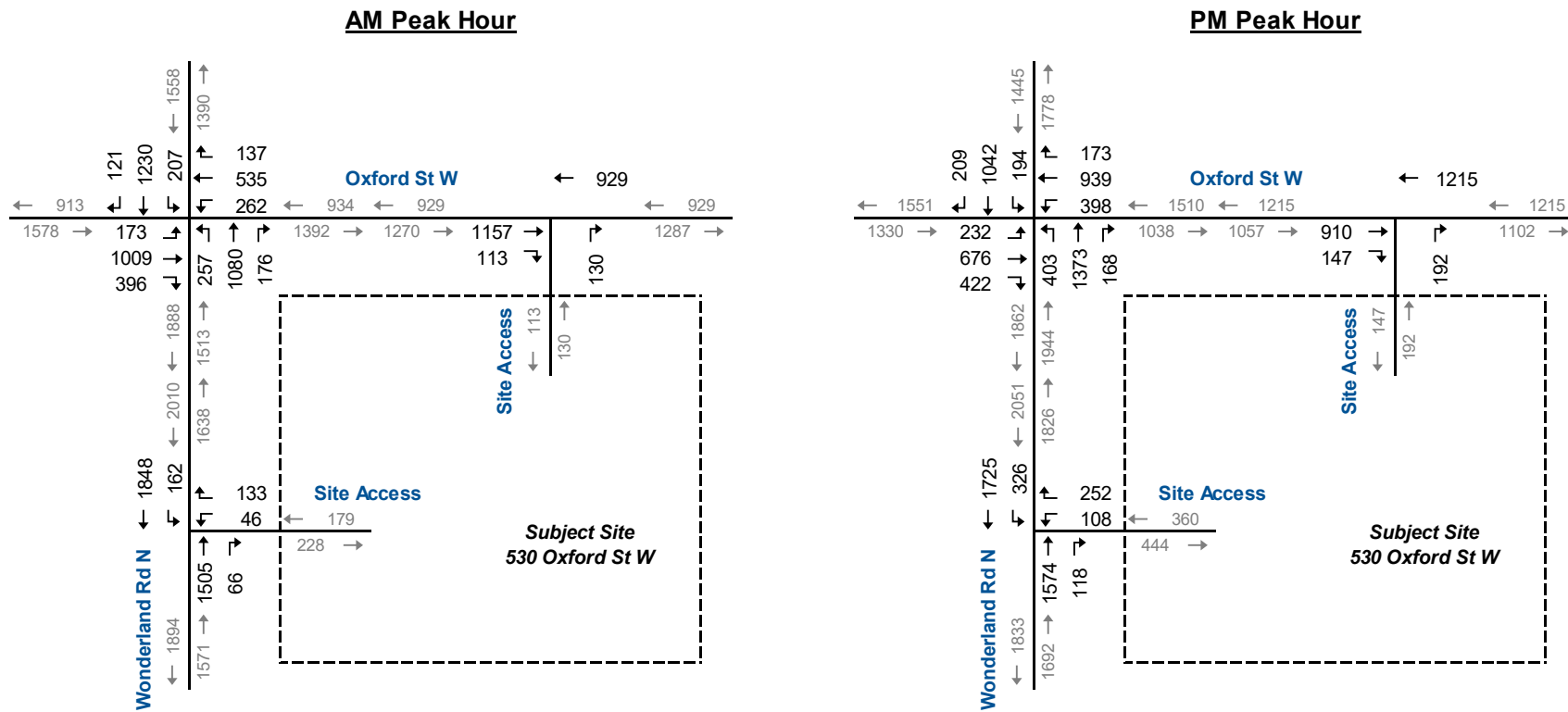
**Figure 5.3a** and **Figure 5.3b** illustrate the 2033 total traffic volumes, including the re-assigned site-generated traffic (**Figure 5.1a** and **Figure 5.1b**) and re-assigned existing trips under background conditions (**Figure 5.2a** and **Figure 5.2b**).

The re-assigned total traffic volumes have been analyzed following the methodology in **Section 4**. **Table 5.2** summarizes the results of the re-assigned total traffic operations. The results indicate that the intersections are forecast to operate with similar levels of service as under total traffic conditions with a full-moves signalized access on Oxford Street West (**Section 4.4**), with addition of the following critical movements at the Wonderland Road North Site Access intersection:

- ▶ The southbound left-turn movement is forecast to operate with 95<sup>th</sup> percentile queues exceeding the available storage of 25 metres during the AM peak hour;
- ▶ The northbound right-turn movement is forecast to operate with 95<sup>th</sup> percentile queues exceeding the available storage of 15 metres during the PM and Saturday peak hours; and
- ▶ The westbound right-turn movement is forecast to operate with LOS F and a v/c ratio greater than 0.90 during the Saturday peak hour.

**Appendix K** contains the supporting detailed Synchro 11 reports.

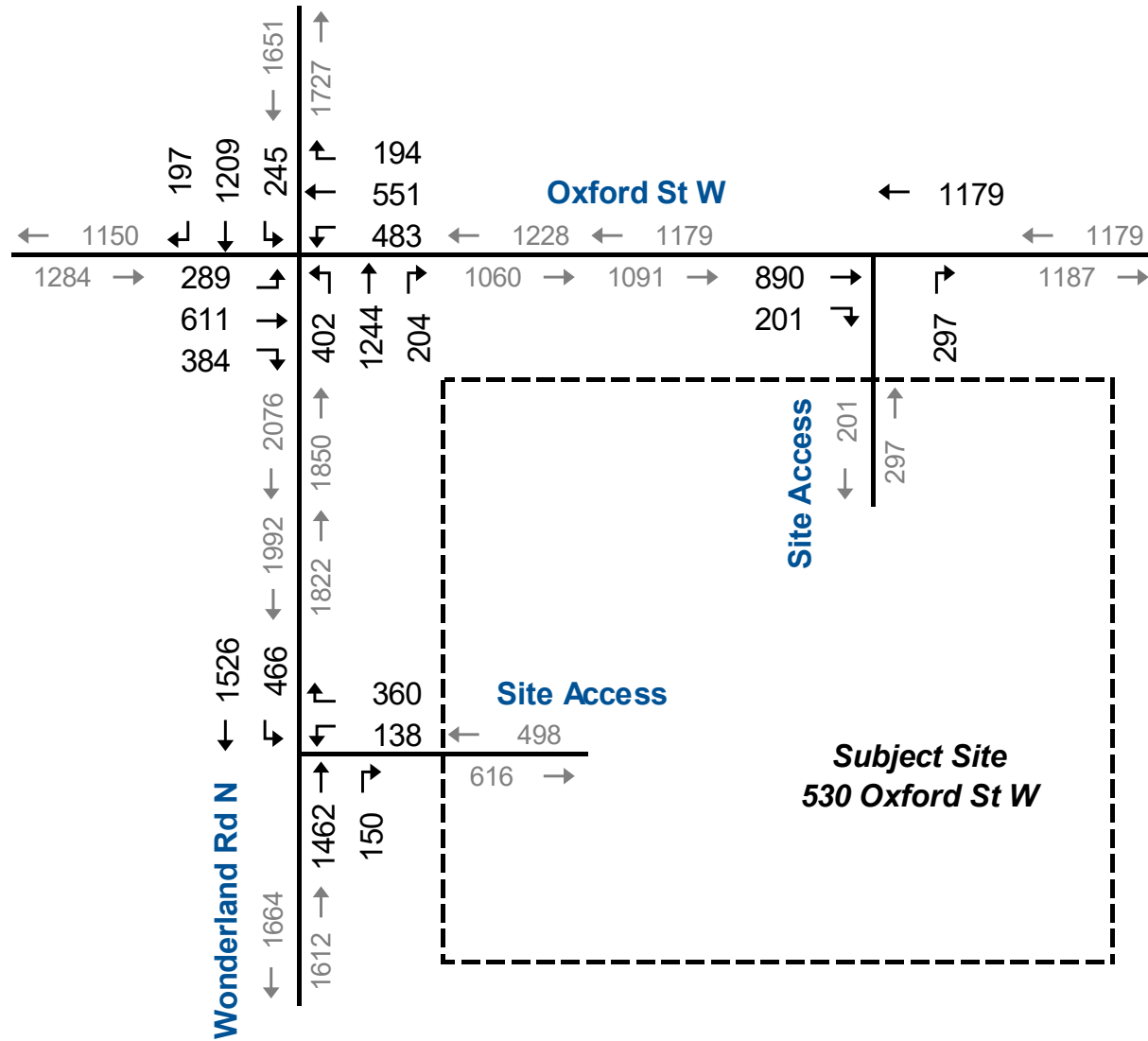




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## Total Traffic Volumes RIRO Oxford St W Access AM and PM Peak Hour



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## Total Traffic Volumes RIRO Oxford St W Access Saturday Peak Hour



**TABLE 5.2: TOTAL TRAFFIC OPERATIONS – RIRO OXFORD ST W ACCESS**

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Wonderland Rd N & Oxford St W	TCS	LOS Delay V/C Q Stor. Avail.	F 0.87 92 100 8	F 86 213 -	C 0.64 110 -	E 72	F 495 1.98 177 100 -77	D 48 0.67 96 -	B 12 0.26 24 60 36	F 168	F 181 1.27 135 135 0	D 45 0.92 202 -	A 6 0.25 12 45 33	E 63	F 113 1.07 103 75 -28	E 8 1.03 248 -	A 19 0.17 19 50 31	E 75	F 86
	Site Access & Wonderland Rd N	TCS	LOS Delay V/C Q Stor. Avail.					D 54 0.25 24 -	E 57 0.70 48 -	E 56		A 7 0.61 122 -	A 3 0.06 7 15 8	A 7	D 37 0.97 57 25 -32	A 10 0.77 85 -			B 12	B 12
	Site Access & Oxford St W	TWSC	LOS Delay V/C Q		A 0 0.00 0	> > >	A 0		A 0 0.00 0		A 0			C 20 0.37 13	C 20					
PM Peak Hour	Wonderland Rd N & Oxford St W	TCS	LOS Delay V/C Q Stor. Avail.	F 123 1.04 128 100 -28	D 54 0.82 123 -	C 31 0.69 120 -	E 59	F 404 1.79 241 100 -141	F 110 1.11 209 -	B 16 0.33 35 60 25	F 176	F 262 1.47 218 135 -83	F 86 1.10 281 -	A 5 0.22 12 45 33	F 115	F 174 1.23 105 75 -30	E 76 1.02 214 -	B 12 0.29 35 50 15	E 80	F 110
	Site Access & Wonderland Rd N	TCS	LOS Delay V/C Q Stor. Avail.					D 47 0.35 44 -	E 67 0.85 92 -	E 61		B 13 0.67 169 -	A 5 0.11 16 15 -1	B 12	F 895 2.95 165 25 -140	B 10 0.74 83 -			F 151	F 86
	Site Access & Oxford St W	TWSC	LOS Delay V/C Q		A 0 0.00 0	> > >	A 0		A 0 0.00 0		A 0			C 21 0.48 20	C 21					
Saturday Peak Hour	Wonderland Rd N & Oxford St W	TCS	LOS Delay V/C Q Stor. Avail.	F 148 1.15 158 100 -58	E 59 0.85 111 -	C 31 0.66 109 -	E 71	F 456 1.92 288 100 -188	D 53 0.75 98 -	C 21 0.36 48 60 12	F 206	F 230 1.40 215 135 -80	E 80 1.08 251 -	A 6 0.27 16 45 29	F 104	F 100 1.03 129 75 -54	F 119 1.15 264 -	B 13 0.27 36 50 14	F 104	F 118
	Site Access & Wonderland Rd N	TCS	LOS Delay V/C Q Stor. Avail.					D 44 0.35 54 -	F 81 0.97 160 -	E 71		B 14 0.66 148 -	A 6 0.15 19 15 -4	B 14	F 1325 3.90 204 25 -179	B 11 0.69 62 -			F 319	F 169
	Site Access & Oxford St W	TWSC	LOS Delay V/C Q		A 0 0.00 0	> > >	A 0		A 0 0.00 0		A 0			D 33 0.74 45	D 33					

MOE - Measure of Effectiveness  
 LOS - Level of Service  
 Delay - Average Delay per Vehicle in Seconds  
 V/C - Volume to Capacity Ratio  
 Q - 95th Percentile Queue Length (m)  
 Stor. - Existing Storage (m)  
 Avail. - Available Storage (m)  
 TCS - Traffic Control Signal  
 TWSC - Two-Way Stop Control  
 </> - Shared with through movement



## 5.4 Remedial Measures

Applying signal timing optimization and a southbound left-turn advance phase to the Wonderland Road North Site Access, as in **Section 4.5**, results in higher delays and longer queues. **Table 5.3** summarizes the operational results at the Wonderland Road North Site Access.

**Appendix L** contains the supporting detailed Synchro 11 reports.



**TABLE 5.3: TOTAL TRAFFIC OPERATIONS WITH IMPROVEMENTS – RIRO OXFORD ST W ACCESS**

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Site Access & Wonderland Rd N	TCS	LOS Delay V/C Q Stor. Avail.					E 66 0.39 26 -	B 19 0.59 21 -	C 31		B 15 0.70 191 -	A 6 0.07 12 15 3	B 15	C 24 0.56 15 25 10	A 5 0.73 38 -		A 7	B 11	
PM Peak Hour	Site Access & Wonderland Rd N	TCS	LOS Delay V/C Q Stor. Avail.					E 69 0.62 50 -	B 16 0.68 28 -	C 32		D 41 0.94 290 -	B 15 0.16 28 15 -13	D 39	C 29 0.71 79 25 -54	A 9 0.66 115 -		B 12	C 25	
Saturday Peak Hour	Site Access & Wonderland Rd N	TCS	LOS Delay V/C Q Stor. Avail.					E 69 0.67 60 -	B 17 0.76 39 -	C 31		E 69 1.03 287 -	C 20 0.24 39 15 -24	E 64	C 24 0.79 95 25 -70	B 17 0.59 143 -		B 19	D 38	

MOE - Measure of Effectiveness  
 LOS - Level of Service  
 Delay - Average Delay per Vehicle in Seconds  
 V/C - Volume to Capacity Ratio  
 Q - 95th Percentile Queue Length (m) </> - Shared with through movement  
 Stor. - Existing Storage (m)  
 Avail. - Available Storage (m)  
 TCS - Traffic Control Signal



## 6 Parking and TDM

### 6.1 Parking

The subject site will accommodate 402 surface and 426 podium parking spaces on-site after redevelopment.

The City's Zoning By-law<sup>6</sup> was recently updated to revise parking requirements with no parking required within the downtown, transit villages, rapid transit corridors or main street place types. The subject site is located within the areas exempt from minimum parking requirements.

### 6.2 Transportation Demand Management

Transportation Demand Management (TDM) refers to ways of making the capacity of roads more efficient by reducing vehicle demand. TDM approaches consider how people's choices of travel mode are affected by land use patterns, development design, parking availability, parking cost, and the relative cost, convenience, and availability of alternative modes of travel. Various TDM strategies are used to influence those factors so that the alternatives are more competitive with single-occupancy travel and potentially reduce reliance on motor vehicles.

The City of London requires TIA submissions to include a suitable travel demand management plan with reasonable measures to facilitate reduced automobile reliance and promote transit, cycling and walking for trips to and from the site. This requirement is consistent with the goal established by the 2004 Transportation Master Plan to reduce SOV (single occupancy vehicle) dependency by 10%<sup>7</sup>.

The following TMD measures are located on-site or nearby and facilitate the use of alternative modes:

- ▶ **Walking:** Sidewalks are provided on both sides of the surrounding roadways with existing internal connections to the subject site. As part of the redevelopment, additional connections are proposed to the site.
- ▶ **Cycling:** The City's Zoning By-law requires 1 bike parking space per residential unit and 3 spaces plus 0.30 spaces for each 100 m<sup>2</sup> commercial GFA. This results in a requirement of 408 residential spaces and 12 commercial spaces. The development is proposing to provide 47 commercial bike

<sup>6</sup> City of London Zoning bylaw Z.-1, § section 4.19.

<sup>7</sup> Transportation Impact Assessment Guidelines, City of London, April 2012.



parking spaces and 209 residential spaces on-site. Given the opportunities for cycling nearby, it is recommended that the development provide the minimum bike parking required by the Zoning By-law.

- ▶ **Transit:** The subject site is within walking distance to six bus routes providing connections to major destinations including Downtown London, Western University and Fanshawe College. The nearby bus stops are easily accessible via the existing sidewalks along adjacent roadways and signalized intersections with pedestrian activated push buttons at Wonderland Road North/Oxford Street West and Wonderland Road North site access. All nearby bus stops have shelter and seating available, except for Stop #2117 on Wonderland Road North between Oxford Street West and the site access.

The future BRT network is proposed to travel along Oxford Street West fronting the subject site with a station at Wonderland Road North providing rapid transit to major destinations in the city.

- ▶ **Parking Management:** Unbundled parking separates the rent/purchase of units from the cost of a parking space. This process encourages a mix of auto-owning and non-auto owning tenants and contributes to reducing the use of single-occupancy vehicles in new developments. The residential buildings should consider unbundling the sale/rental agreement of units from the supply of parking spaces.
- ▶ **Carshare:** Community Carshare is one of the carshare providers in the City of London with the nearest vehicle/space located at Oxford Street West and Wharncliffe Road North (2.2 km from the subject site). A carshare space in a premium location on-site would provide residents/visitors of the development and surrounding community with convenient access to a vehicle while reducing auto ownership.
- ▶ **Education/Promotion:** Increasing awareness of sustainable transportation opportunities for residents and visitors of the development should be considered. Residents and employees should be provided with a package that outlines the available transit routes, future BRT network, and active transportation options. Wayfinding signage on-site should also be considered on-site in common areas such as lobbies or near main entrances to direct residents and users of the site to nearby transit routes and active transportation options.



## 7 Conclusions and Recommendations

### 7.1 Conclusions

Based on the investigations carried out, it is concluded that:

- ▶ **Existing Traffic Conditions:** The study area intersections are operating with acceptable levels of service, except for the following critical movements:
  - Wonderland Road North and Oxford Street West:

The eastbound left-turn movement is operating with poor levels of service and queueing issues during the PM and Saturday peak hours;

The eastbound through movement is operating with poor levels of service during the AM peak hour; and

The westbound through and northbound left-turn movements are operating with poor levels of service during the PM peak hour.
  - Oxford Street West and Site Access: The northbound left-turn movement is operating with poor levels of service during the Saturday peak hour.
- ▶ **Development Trip Generation:** The redevelopment is forecast to generate 202 AM peak hour trips, 317 PM peak hour trips, and 436 Saturday peak hour trips.
- ▶ **Background Traffic Conditions:** The study area intersections are forecast to operate with similar levels of service as under existing conditions, with the addition of the following critical movements:
  - Wonderland Road North and Oxford Street West:

The westbound left-turn movement is forecast to operate with poor levels of service during the AM and PM peak hours, and queueing issues during the PM and Saturday peak hours;

The northbound left-turn movement is forecast to operate with poor levels of service and queueing issues during the PM and Saturday peak hours;

The northbound through movement is forecast to operate with poor levels of service during the PM and Saturday peak hours;



The southbound left-turn movement is forecast to operate with poor levels of service and queueing issues during all peak hours; and

The southbound through movement is forecast to operate with poor levels of service during all peak hours.

- Oxford Street West and Site Access: The westbound left-turn movement is forecast to operate with queueing issues during the PM and Saturday peak hours.
- ▶ **Total Traffic Conditions:** The study area intersections are forecast to operate with similar levels of service as under background traffic conditions, with the addition of the following critical movements:
  - Wonderland Road North and Oxford Street West: The westbound left-turn movement is forecast to operate with queueing issues during the AM peak hour and poor levels of service during the Saturday peak hour.
  - Oxford Street West and Site Access: The westbound left-turn movement is forecast to operate with poor levels of service during the PM peak hour and queueing issues during the AM peak hour.
  - Wonderland Road North and Site Access:

The southbound left-turn movement is forecast to operate with poor levels of service and queueing issues during the PM and Saturday peak hours; and

The northbound right-turn movement is forecast to operate with queueing issues during the Saturday peak hour.
- ▶ **Sensitivity Analysis:** The results of operational analysis of study area intersections assuming a restricted (RIRO) access on Oxford Street indicate additional critical movements under background and total traffic conditions. Specific to the existing signalized access on Wonderland Road, the following critical movements are noted under future total traffic conditions:
  - The southbound left-turn movement is forecast to operate with queueing issues during the AM peak hour;
  - The northbound right-turn movement is forecast to operate with queueing issues PM and Saturday peak hours; and
  - The westbound right-turn movement is forecast to operate with poor levels of service during the Saturday peak hour.
- ▶ **Oxford Street Access:** The results of the sensitivity analysis indicate that a restricted (RIRO) access on Oxford Street will



create adverse effects on other intersection operations including the existing signalized access on Wonderland Road North.

As identified in the preliminary BRT plans, the existing Oxford Street West access should continue as a full-moves access under traffic signal control. Potential negative effects could be addressed through:

- Operational changes involving signal optimization and phasing of all three traffic signals;
  - Geometric changes to road/intersection lane configurations including storage length increases and/or considering two-way centre-turn lanes where feasible; and
  - Appropriately accounting for changes in modal share and reduction/rerouting of background road traffic due to BRT implementation.
- ▶ **Wonderland Road North and Oxford Street West:** Intersection operations are noted to deteriorate under future traffic conditions as a result of assumed growth in background road traffic and the proposed BRT network signal timing changes. These could be addressed during the detailed design stage for BRT implementation, including new traffic signals at the existing Oxford Street West access and other modifications as noted above.
- ▶ **Parking:** The subject site is located within an area exempt from minimum parking requirements.
- ▶ **Transportation Demand Management:** The following TDM measures are identified for the development:
- Internal walkways on-site with connections to the existing municipal network;
  - A total of 47 commercial bike parking spaces and 209 residential spaces; and
  - Frequent and convenient bus transit is provided with six routes available nearby and the future BRT network is proposed to run along the frontage of the site with a station at Wonderland Road North.

Additional TDM measures appropriate to the development include:

- Provide an additional 199 residential bicycle parking spaces;
- Unbundled parking from the sale/rent of units;
- Provide a carshare space/vehicle in a premium location on-site;





- Provide a welcome package to new residents and employees that informs them of available transit, future BRT network and active transportation infrastructure; and
- Wayfinding signage on-site to direct users of the site to available transit, future BRT network and active transportation infrastructure.

## 7.2 Recommendations

Based on the findings of this study, it is recommended that the City consider:

- ▶ Implementing traffic signal control for the existing full-moves Oxford Street West access, as currently identified in the BRT implementation plan;
- ▶ Operational and geometric modifications to the three study area intersections, as noted in this study; and

Approval of the proposed redevelopment with additional TDM measures, as noted in this study.



# Appendix A

## Pre-Study Consultation



# Appendix B

## Existing Traffic Data



# Appendix C

## Existing Traffic Operations Reports



# Appendix D

## Internal Capture Worksheet



# Appendix E

## Preliminary BRT Plans



# Appendix F

## Background Traffic Operations Reports



# Appendix G

## Total Traffic Operations Reports





# Appendix H

## Signal Warrants



# Appendix I

## Full Moves Access Improvements Operations Reports



# Appendix J

## RIRO Access Background Traffic Operations Reports



# Appendix K

## RIRO Access Total Traffic Operations Reports



# Appendix L

## RIRO Access with Improvements Operations Reports

