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24 Alfred Street Development

TRAFFIC IMPACT BRIEF

Pheasant Run Realty Holdings Inc.

Document Control

File:

121108

Date:

May
30, 2022

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Issue	Date	Description
1	February 14, 2022	Draft Plan of Submission Application
2	May 30, 2022	Revised Site Plan

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1 Introduction

Tatham Engineering has been retained by Pheasant Run Realty Holdings Inc. to prepare a Traffic Impact Brief to support a Draft Plan of Subdivision Application (or Approval) for the proposed 24 Alfred Street Development in Thornbury, Town of The Blue Mountains. The location of the development site is illustrated in Figure 1.

The purpose of this study is to review the proposed development from a transportation perspective, addressing site traffic volumes, site circulation, parking requirements and potential impacts to the adjacent road system. Recognizing that the trip generation associated with the proposed expansion will not be significant, the scope of the study has been limited to a traffic brief with a focus on the following:

- existing conditions, including a description of the study area road network, traffic volumes, operations and planned/proposed improvements;
- details of the proposed development and anticipated trip generation;
- on-site circulation and parking provision; and
- transportation impacts associated with the proposed development.

An initial traffic impact brief was submitted in February 2022 as part of the Draft Plan of Subdivision application, with consideration for 13 single family residential units. Through consultation with the County, the density was increased amounting to 17 residential units (4 lots were converted from singles to semi-detached units). This updated brief reflects the revised unit count.



2 Existing Conditions

This chapter will describe the road network, traffic volumes and operations for the existing conditions.

2.1 ROAD NETWORK

The road network to be addressed by this study consists of Alice Street; Elma Street, Alfred Street (Grey County 113) and Bruce Street (Grey County 13), and their respective intersections, namely:

- Alice Street with Elma Street;
- Alice Street with Bruce Street (Grey County 13);
- Alfred Street (Grey County 113) with Elma Street; and
- Alfred Street (Grey County 113) with Bruce Street (Grey County 13).

The study area road network is illustrated in Figure 1 with photographs provided in Figure 2. For purposes of this report, Elma Street and Bruce Street are considered as having a north-south orientation, whereas Alfred Street and Alice Street are considered east-west.

2.1.1 Key Roads

Elma Street and Alice Street are local roads under the jurisdiction of the Town of The Blue Mountains. The roads share the following characteristics:

- 1 travel lane per direction;
- urban cross-section with curb and gutter on both sides and sidewalk on one side (west side of Elma Street and north side of Alice Street); and
- 50 km/h speed limit (60 km/h design speed assumed).

Alfred Street (Grey County 113) and Bruce Street (Grey County 13) are both under the jurisdiction of Grey County and are designated County Local Roads as per the County's Official Plan. County Local Roads are defined as follows (as per the Official Plan):

County Local Roads are roads that are serving more local traffic and typically distribute traffic from County Arterial and County Collector roads to individual properties. County local roads can also serve a collector road function by distributing traffic between County Collector roads and other County/municipal local roads.



Characteristics of these roads are as follows:

- 1 travel lane per direction with provision of on-street parking (restricted to the west side on Bruce Street);
- urban cross-section with curb and gutter on both sides;
- sidewalk on the north side of Alfred Street and both sides of Bruce Street; and
- 50 km/h speed limit (60 km/h design speed assumed).

2.1.2 Key Intersections

Alice Street & Elma Street

The intersection of Alice Street with Elma Street is a 4-leg intersection with 4-way stop control. All approaches consist of shared left-through-right lanes.

Alice Street & Bruce Street

The intersection of Alice Street with Bruce Street is a 4-leg intersection with stop control on Alice Street. All approaches consist of shared left-through-right lanes. There is a pedestrian crossover on the north leg of the intersection, to provide a protected crossing opportunity of Bruce Street.

Alfred Street with Elma Street

The intersection of Alfred Street with Elma Street is a 3-leg intersection with stop control on Elma Street, the north leg. The north approach has a single shared left-right lane, the west approach has a shared left-through lane and the east approach has a shared through-right lane.

Alfred Street with Bruce Street

Similar to the intersection of Alice Street with Bruce Street, the intersection of Alfred Street with Bruce Street is a 4-leg intersection with stop control on Alfred Street and single shared lane approaches.

2.2 TRAFFIC VOLUMES

To establish traffic volumes through the study area, information was collected from the following:

- intersection traffic count completed at Bruce Street and Alfred Street on Wednesday January 26, 2022;
- intersection traffic count completed at Victoria Street and Alice Street on Wednesday November 20, 2019; and



- Average Annual Daily Traffic (AADT) traffic volumes reported on Alice Street, Elma Street and Victoria Street as per the *Road Needs Study Update – 2018*¹.

To consider peak hour operations (which are the critical periods when considering road system operations), peak hour volumes were established from the intersection traffic counts. For the remaining road sections for only AADT volumes were available, the peak hour volumes have been based on the following:

- 12% of daily traffic occurs during the AM peak hour and 15% during the PM peak hour (which corresponds to the findings of the *The Town of The Blue Mountains Comprehensive Transportation Strategic Plan*²); and
- an equal directional distribution of traffic volumes on each road section.

To reflect current (2022) conditions, all volumes were increased by 2% per annum (further discussion on this growth rate is provided in Section 4.1). Furthermore, recognizing that the traffic counts at the intersection of Bruce Street and Alfred Street were completed during the COVID-19 pandemic (during which time restrictions were in place for retail/commercial operations and thus travel patterns were likely impacted), the resulting peak hour volumes were increased by 25% (this is considered a conservative approximation).

The associated traffic counts and peak hour volumes are provided in Figure 3 with additional information provided in Appendix A. Traffic volumes for the 2022 horizon (representative of existing conditions) are illustrated in Figure 4.

2.3 TRAFFIC OPERATIONS

2.3.1 Road Section Operations

The assessment of existing conditions establishes the baseline operating conditions of the road network and provides an indication of the available capacity within the system. The assessment considers the following:

- the peak hour operations of the area road sections based on the peak directional volumes;
- an assumed lane capacity of 800 to 1000 vehicles per hour (vph) on County roads as per *The Town of The Blue Mountains Comprehensive Transportation Strategic Plan*;
- an assumed lane capacity of 400 vehicles per hour (vph) on the Town local roads; and
- the provision of one through lane per direction.

¹ *Road Needs Study Update – 2018*. GHD, December 10, 20198.

² *The Town of The Blue Mountains Comprehensive Transportation Strategic Plan*. AECOM with C.C. Tatham & Associates Ltd., March 201.



The resulting road section operations are summarized in Table 1 (assuming the lower threshold of 800 vph for both Grey Road 13 and 113). As noted, the County roads are currently operating at 75% or less of their assumed planning capacities, whereas the Town roads are operating at 10% or less of their capacities. In this regard, there is significant reserve capacity to accommodate additional growth.

Table 1: 2022 Road Section Operations

ROAD SECTION & LANES / DIRECTION		CAPACITY ¹		TRAFFIC VOLUMES (VPH)		VOLUME TO CAPACITY	
		WB	EB	WB	EB	WB	EB
Bruce Street (Grey Road 13)	1	800	800	425	595	0.53	0.74
Alfred Street (Grey Road 113)	1	800	800	70	75	0.09	0.09
Elma Street	1	400	450	35	45	0.09	0.10
Alice Street	1	400	450	30	30	0.08	0.07

¹ Capacity is denoted as vehicles per hour per direction

2.3.2 Intersection Operations

The operations of the Bruce Street intersection with Alfred Street were also reviewed. This is the most significant intersection within the study area, serving the greatest traffic volumes, and thus will reflect the most critical intersection operations. The intersection review has been based on the following:

- the peak 2022 traffic volumes;
- the existing intersection configuration and control at Bruce Street and Alfred Street; and
- procedures outlined in the *2000 Highway Capacity Manual*³ (using Synchro v.10 software).

For unsignalized intersections, the review considers the average delay (measured in seconds), level of service and volume to capacity for the critical movements, namely the noted stop-controlled movements. LOS A corresponds to the best operating condition with minimal delays whereas LOS F corresponds to unacceptable operations resulting from high intersection delays. A v/c ratio of less than 1.0 indicates operations less than capacity, whereas a v/c of 1.0 indicates

³ Highway Capacity Manual. Transportation Research Board, Washington DC, 2000.



capacity has been reached. A summary of the site access operations is provided in Table 2 whereas detailed operations worksheets are included in Appendix B.

Table 2: 2022 Intersection Operations

YEAR, INTERSECTION, CONTROL & MOVEMENT			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	V/C	Delay	LOS	V/C
Bruce Street & Alfred Street	stop	EB left-thru-right	20	C	0.26	30	D	0.36
	stop	WB left-thru-right	17	C	0.06	20	C	0.06

As indicated, the intersection provides acceptable operations (level of service D or better) under both the AM and PM peak hour periods.



3 Proposed Development

This section will provide additional details with respect to the proposed development, including its location, the projected site generated traffic volumes and the assignment of such to the adjacent road network.

3.1 LOCATION & LAND-USE

The subject site is located at 24 Alfred Street in the Town of The Blue Mountains (as per Figure 1). The property is bound by Alice Street to the north, Alfred Street to the south and existing residential development to the west and east.

As detailed in the site plan provided in Figure 5, the proposed development will consist of:

- 9 single detached residential units (Lots 3 through 11); and
- 8 semi-detached residential units (Lots 1, 2, 12 and 13).

Full build-out is assumed by 2025.

3.2 SITE ACCESS

3.2.1 Access Location & Configuration

The site will be served by a 6.5 metre wide internal road (measured from edge of pavement to edge of pavement; 7.5 metres when measured to back of curb) with direct access to both Alice Street to the north and Alfred Street to the south. As per Figure 5, the access points will be located as follows (measured centreline to centreline):

- Alice Street access: 108 metres east of Elma Street and 114 metres west of Bruce Street (approximate mid-block); and
- Alfred Street access: 78 metres east of Elma Street and 144 metres west of Bruce Street.

3.2.2 Access Spacing

Transportation Association of Canada Guidelines

The Transportation Association of Canada's (TAC) *Geometric Design Guide for Canadian Roads* suggests the following separations (measured edge of access to edge of intersection):

- 15 metres between a driveway or public laneway and adjacent intersection along a local road (applicable to Alice Street); and



- 35 metres between a driveway or public laneway and adjacent intersection along an arterial road (applicable to Alfred Street).

As per Figure 5, the proposed locations of the site access points provide in excess of the TAC intersection separations and thus are considered appropriately located.

Grey County Guidelines

Recognizing that Alfred Street is a County road, consideration has also been given to Grey County requirements as stipulated in their *Entrance Permit Corporate Procedure MS-TS-001-001*. The relevant procedural references and subsequent discussions are summarized below.

Section 2.5.2 Where a subdivision or individual lot fronts on both a County Road and a Local Road, the entrance will be from the Local Road where feasible.

The development site has frontage to both a local road (Alice Street) and a County road (Alfred Street). Given the configuration and the orientation of the site, and the desire to avoid the need for an internal cul-de-sac, access to both the local road and County road has been proposed and is supported through the traffic review.

Section 2.5.10 The distance between municipal intersecting roads shall be at least 400 m.

The access to Alfred Street will be located 78 metres east of Elma Street and 144 metres west of Bruce Street (222 metres total separation between the noted roads). The site access will not be a municipal road, but will rather serve as a private driveway to a private road, and thus this requirement would not apply in that a new municipal road is not being proposed.

Section 2.5.11 The Director of Transportation Services may approve a variance to this section if in his/her opinion the variance is a result of sight, physical or existing conditions and will not affect the safety or the operation of the County Road.

A variance re: Section 2.5.2 will be required, and is supported given the findings of this traffic brief.

Section 3.2.2 For Commercial/Farm/Field/Residential Entrances on a Class 3 and Class 4 Road, the minimum separation distance between entrances shall be 100 m.

The separation between the proposed access to Alfred Street and existing residential driveways on either side do not meet the 100 metre requirement, given that Alfred Street is effectively a local road, with direction driveway access along its length.

Section 3.2.5 The Director of Transportation Services may approve a variance to this section if in his/her opinion the variances are a result of sight, physical or existing conditions and will not affect the safety or the operation of the County Road.

A variance re: Section 3.2.5 will be required, and is supported given the findings of this traffic brief.



3.2.3 Access Sightlines

Transportation Association of Canada Guidelines

An analysis of the available sight lines at each site access has been undertaken considering both minimum stopping sight distance and intersection sight distance as per TAC guidelines and defined below.

- Minimum stopping sight distance provides sufficient distance for an approaching motorist to observe a hazard in the road and bring their vehicle to a complete stop prior to the hazard.
- Intersection sight distance allows a vehicle to enter a main road from a side street (or site access) and attain the appropriate operating speed without significantly impacting the operating speed of an approaching vehicle.

The corresponding sight distance requirements are provided in Table 3, as are the available sight distances (and further evident in the photos of Figure 2). In some instances the available sight lines are slightly less than the TAC guideline noted; however such extend to the adjacent stop controlled intersections and thus motorists will be approaching at a reduced speed having just travelled through the intersection. In all cases, the available sight lines are considered appropriate in context of the required standards, area speed limits and anticipated road operations.

Table 3: Sight Line Assessment

ACCESS	DESIGN SPEED	STOPPING SIGHT DISTANCE	INTERSECTION SIGHT DISTANCE		SIGHT DISTANCE TO/FROM	
			Left Turn	Right Turn	West	East
Alice Street	60 km/h	85 m	130 m	110 m	100 m ¹	110 m ¹
Alfred Street	60 km/h	85 m	130 m	110 m	>130 m	140 m ¹

¹ sight lines noted extend to the adjacent stop controlled intersection

Grey County Guidelines

The Grey County *Entrance Permit Corporate Procedure* dictates a minimum sight distance of 110 metres for a speed limit of 50 km/h. As noted in Table 3, this requirement is satisfied along Alfred Street in both directions.

3.3 SITE CIRCULATION

The internal road will extend through the site from Alice Street to Alfred Street, thus providing ready access between all of the proposed units and the external road system.



Given the nature and limited size of the development, no sidewalks are proposed. Rather, pedestrian and cyclist travel will be accommodated within the proposed internal road. External sidewalks are provided on the north side of both Alice Street and Alfred Street.

3.4 SITE PARKING

As per the Town's Zoning By-law 2018-65, the following parking requirement applies:

- 2 parking spaces for each single detached, semi-detached, rowhouse and townhouse dwelling unit.

Each residential lot will be developed so as to provide driveway and garage parking to satisfy the Town requirements of 2 spaces per lot (or per unit).

3.5 SITE TRAFFIC

3.5.1 Trip Generation

The number of vehicle trips to be generated by the proposed development for the weekday AM and PM peak hours has been determined based on type of use, development size, and trip generation rates as per the *ITE Trip Generation Manual, 10th Edition*. Based on the proposed development, trip rates for the following ITE land use category have been considered:

- *single family detached* - ITE code 210; and
- *multifamily housing -low-rise (1 or 2 storey)* - ITE code 220.

The associated trip rates and trip estimates are provided in Table 4 and Table 5 respectively; the rates for the single family detached units have been applied to both the single and semi-detached units to adopt a conservative approach (in that the rates are greater than those for the multifamily housing). As indicated, the proposed development is expected to generate 13 trips during the AM peak hour and 17 trips during the PM peak hour, which is considered relatively minor.

Table 4: Trip Rates

LAND USE & CODE		VARIABLE	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			In	Out	Total	In	Out	Total
single family	210	units	0.19	0.56	0.74	0.62	0.37	0.99
multifamily	220	units	0.11	0.35	0.46	0.35	0.21	0.56



Table 5: Trip Estimates

LAND USE	UNITS	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
		In	Out	Total	In	Out	Total
single detached units	9 units	2	5	7	6	3	9
semi-detached units	8	1	4	6	5	3	8
Total	17	3	9	13	11	6	17

3.5.2 Trip Distribution & Assignment

The distribution and assignment of site traffic volumes to the road system have been based on the travel patterns and trends reflected in the traffic count data. To consider the greatest possible impacts to Bruce Street (which has the greatest traffic volumes) all site traffic was assumed to travel to/from Bruce Street. Travel to/from the north and south was then based on the directional distribution reflected in the current volumes on Bruce Street.

With respect to assignment to the site access points, the following were assumed:

- for travel to/from the north, 75% to use Alice Street and 25% to use Alfred Street; and
- for travel to/from the south, 75% to use Alfred Street and 25% to use Alice Street.

The resulting site generated traffic assigned to the road network is illustrated in Figure 6. As noted, the resulting volumes are minor in nature (increases of less than 5 vehicles per hour per peak direction). In this regard, should the distribution and assignment of the site traffic differ from that which has been assumed, it will not have any appreciable impacts. Even if all of the site traffic utilized a single access and travelled on the same road sections, the increase in traffic volumes would remain minimal (11 vehicles or less per hour per direction).



4 Future Conditions

This chapter will address the resulting impacts of the proposed development on the adjacent road system. The following areas are to be addressed:

- operations at the study area road system and site access; and
- potential improvements to the study area road network, if necessary.

For the purpose of this study, 2025 and 2030 horizons have been considered to assess the impact of the development on the road network - 2025 represents assumed full build-out of the site, whereas 2030 reflects a further 5-year horizon.

4.1 TRAFFIC VOLUMES

The future volumes have been determined based on the existing volumes with consideration for historical and projected growth for the area.

4.1.1 Historical Traffic Growth

Historical traffic volumes were obtained from MTO for the segments of Highway 26 to the east and west of Thornbury. The Annual Average Daily Traffic (AADT) volumes on Highway 26 for the 10-year period of 2006 to 2016 (with 2016 being the most current published data) indicate an average annual increase of 1.14% to the east of Thornbury and 0.69% to the west.

4.1.2 Population & Employment Growth

As per census data:

- the population of the Town of The Blue Mountains increased from 6,450 in 2011 to 7,025 in 2016 (1.7% growth per annum on average); and
- the population of Thornbury increased from 2,363 in 2011 to 2,485 in 2016 (1.0% per annum).

As per population and employment projections, the *Grey County Growth Management Strategy Update*⁴ forecasted the following for the Town of The Blue Mountains:

- population to increase from 6,850 in 2016 to 8,460 in 2036 (1.06% per annum); and
- employment to increase from 4,170 in 2016 to 4,330 in 2036 (0.19% per annum).

⁴ *Grey County Growth Management Strategy Update*. Hemson Consulting Ltd. December 17, 2015.



4.1.3 Overall Background Growth

While historic growth and projected population and employment data indicates that an annual growth rate of 1.0% is appropriate, a conservative growth rate of 2.0% per annum has been applied to the traffic volumes on the study area road network.

4.1.4 Development Growth

In reviewing the Town's development activity map, the following residential developments were located in the immediate area (refer also to Figure 7):

- Ashbury (Applevale) Subdivision - 11 single units located on the southwest corner of the intersection of Alfred Street with Victoria Street;
- Thornbury Meadows Subdivision - 86 units (singles, semis and towns) adult lifestyle development located on the southeast corner of the intersection of Napier Street with Victoria Street; and
- Towns of Thornbury Subdivision - 23 townhouse units located south of Louisa Street, between Lansdowne Street and Beaver Street (with access proposed to each).

The Ashbury (Applevale) Subdivision is built-out, whereas the Thornbury Meadows Subdivision and Towns of Thornbury are under construction.

Given that trips associated with the Ashbury development and partially built Thornbury Meadows development were captured during the traffic counts, and further recognizing that the remaining units to be constructed are not expected to generate significant volumes (23 townhouses in the Towns of Thornbury plus the remaining adult lifestyle units in Thornbury Meadows will generate in the order of 30 trips during the PM peak hour), no adjustments have been made to account for the remaining development - rather, the 2% background growth rate is considered sufficient in addressing future traffic volumes. Regardless, the volumes on the local road network are very low and the operations will not be impacted by the remaining development.

4.1.5 Future Volumes

The traffic volumes for the 2025 and 2030 horizons are provided in Figure 8 and Figure 9 respectively, including consideration for the subject development. To consider the variability in the distribution and assignment of the site generated traffic to the road system, a minimum volume of 5 vehicles per movement has been assumed for each movement to/from the site.



4.2 TRAFFIC OPERATIONS

4.2.1 Road Section Operations

The operations of the study area road sections were again investigated considering the 2025 and 2030 traffic volumes, summaries of which are provided in Table 6 and Table 7. As noted, the County roads will continue to operate at 88% or less of capacity whereas the Town roads will operate at 11% or less. In consideration of the additional traffic to be generated by the development site and the implications of such on the road system, such will be minimal.

Table 6: 2025 Road Section Operations

ROAD SECTION & LANES / DIRECTION		CAPACITY ¹		TRAFFIC VOLUMES (VPH)		VOLUME TO CAPACITY	
		WB	EB	WB	EB	WB	EB
Bruce Street (Grey Road 13)	1	800	800	455	635	0.57	0.79
Alfred Street (Grey Road 113)	1	800	800	80	85	0.10	0.11
Elma Street	1	400	450	40	45	0.10	0.10
Alice Street	1	400	450	35	35	0.09	0.08

¹ Capacity is denoted as vehicles per hour per direction

Table 7: 2030 Road Section Operations

ROAD SECTION & LANES / DIRECTION		CAPACITY ¹		TRAFFIC VOLUMES (VPH)		VOLUME TO CAPACITY	
		WB	EB	WB	EB	WB	EB
Bruce Street (Grey Road 13)	1	800	800	505	700	0.63	0.88
Alfred Street (Grey Road 113)	1	800	800	85	95	0.11	0.12
Elma Street	1	400	450	40	50	0.10	0.11
Alice Street	1	400	450	40	35	0.10	0.08

¹ Capacity is denoted as vehicles per hour per direction



4.2.2 Intersection Operations

The operations of the Bruce Street intersection with Alfred Street were again considered, as were the operations at the site access intersections. The intersection operational reviews have been based on the following:

- the peak 2030 traffic volumes (the most critical of the future horizons);
- stop control on the site access points with a single entry lane and single exit lane for each, and shared left-through and through-right lanes on Alice Street and Alfred Street (given the associated site volumes, exclusive left and/or right turn lanes are not warranted);
- the existing intersection configuration and control at Bruce Street/Alfred Street; and
- procedures outlined in the *2000 Highway Capacity Manual*⁵ (using Synchro v.10 software).

A summary of the site access operations is provided in Table 8 whereas detailed operations worksheets are included in Appendix B.

Table 8: 2030 Intersection Operations

YEAR, INTERSECTION, CONTROL & MOVEMENT			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	V/C	Delay	LOS	V/C
Site Access & Alice Street	stop	NB left-right	9	A	0.01	9	A	0.01
	free	WB left-thru	1	A	0.00	1	A	0.00
Site Access & Alfred Street	stop	SB left-right	9	A	0.01	9	A	0.01
	free	EB left-thru	<1	A	0.00	<1	A	0.00
Bruce Street & Alfred Street	stop	EB left-thru-right	27	D	0.39	54	F	0.60
	stop	WB left-thru-right	20	C	0.08	26	D	0.08

As noted, the site access intersections will provide excellent levels of service (LOS A) with minimal delays based on the projected traffic volumes and noted intersection control and configuration. As previously noted, the operational assessment has assumed a minimum volume of 5 vehicles per hour per movement to/from the site (which is greater than the projected volumes in most cases) and thus reflects a more conservative approach.

⁵ *Highway Capacity Manual*. Transportation Research Board, Washington DC, 2000.



The intersection of Bruce Street with Alfred Street will also provide acceptable operations. While a level of service F is noted in the 2030 PM peak hour, the delay is not excessive (54 seconds) and the corresponding eastbound approach will operate at only 60% capacity. It is also noted that this operating level is largely a result of the through volumes on Bruce Street (which reflect a conservative 25% increase for COVID-19 and a 2% annual growth) and is not otherwise associated with the subject development - the site volumes constitute less than 1% of the total intersection volumes. As this latter intersection serves the greatest traffic volumes in the study area, it can be inferred that the remaining intersections, while not specifically investigated, will also provide acceptable operations.



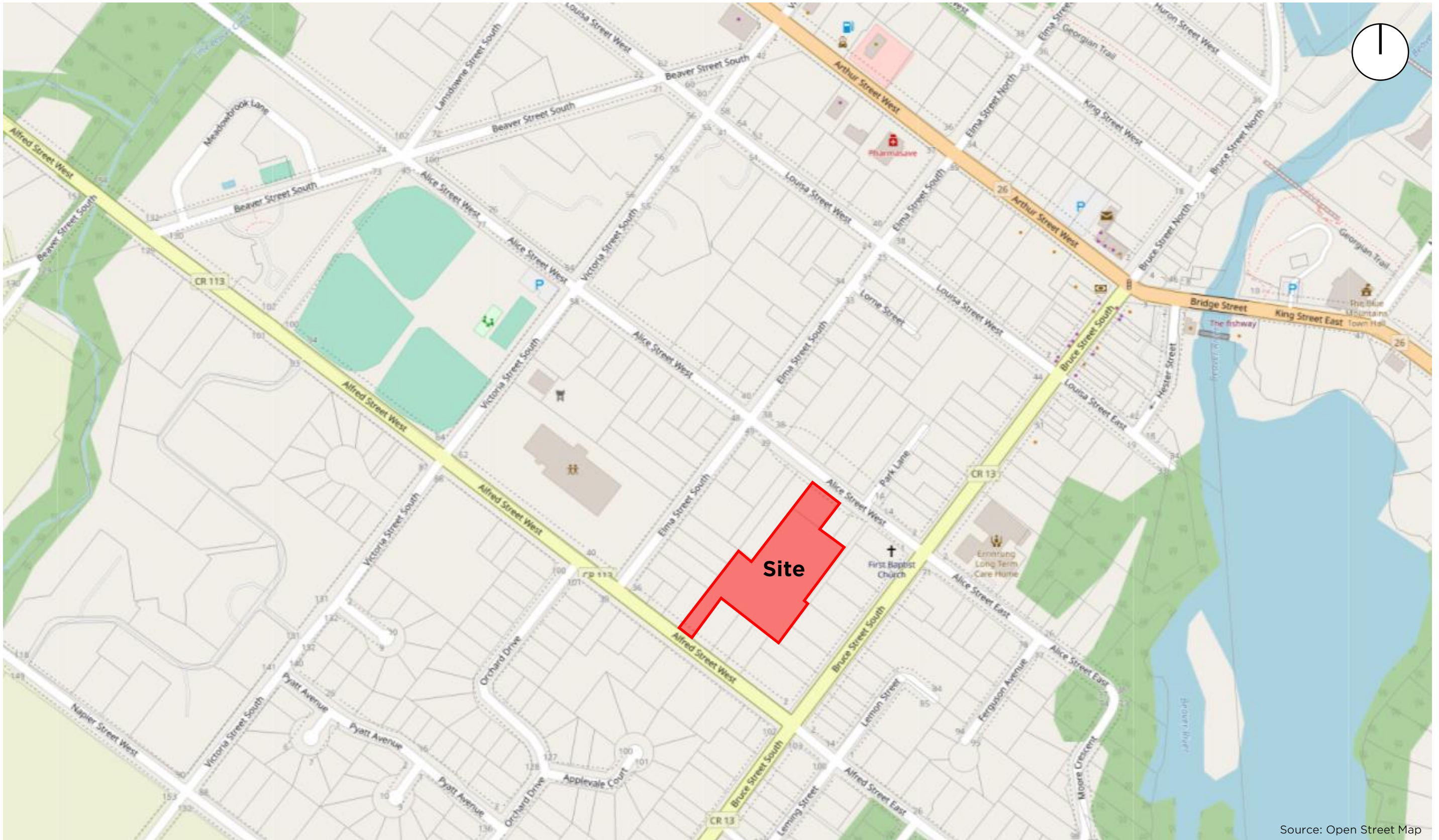
5 Summary

Given the limited traffic volume to be generated by the development of the site and in considering the traffic volumes on the road system, such will not have any significant operational impacts on the operations of the local road system. The operational assessment of the site access points indicates that these intersections will experience excellent levels of service and minimal traffic delays for exiting traffic. Therefore no operational improvements are required to support the development.

The proposed locations of the site access points were also reviewed to ensure the provision of adequate spacing between adjacent intersections. In consideration of the road classifications, projected traffic volumes and the Transportation Association of Canada intersection spacing guidelines, the proposed locations are considered appropriate.

The available sight lines on both Alice Street and Alfred Street to/from the east and west of the site access points are considered appropriate for a design speed of 60 km/h. Vehicles manoeuvring to and from the site can do so in a safe and efficient manner. As such, no further improvements are required to address sight line constraints.





24 ALFRED STREET DEVELOPMENT

Figure 1: Site Location





Source: Grey County Maps

24 ALFRED STREET DEVELOPMENT

Figure 2A: Area Road Network





↑ Looking west along Alfred St from the proposed side access

↓ Looking east along Alfred St from the proposed side access



Source: Google Maps

24 ALFRED STREET DEVELOPMENT

Figure 2B: Area Road Network





↑ Looking west long Alice St from the proposed side access

↓ Looking east along Alice St from the proposed side access

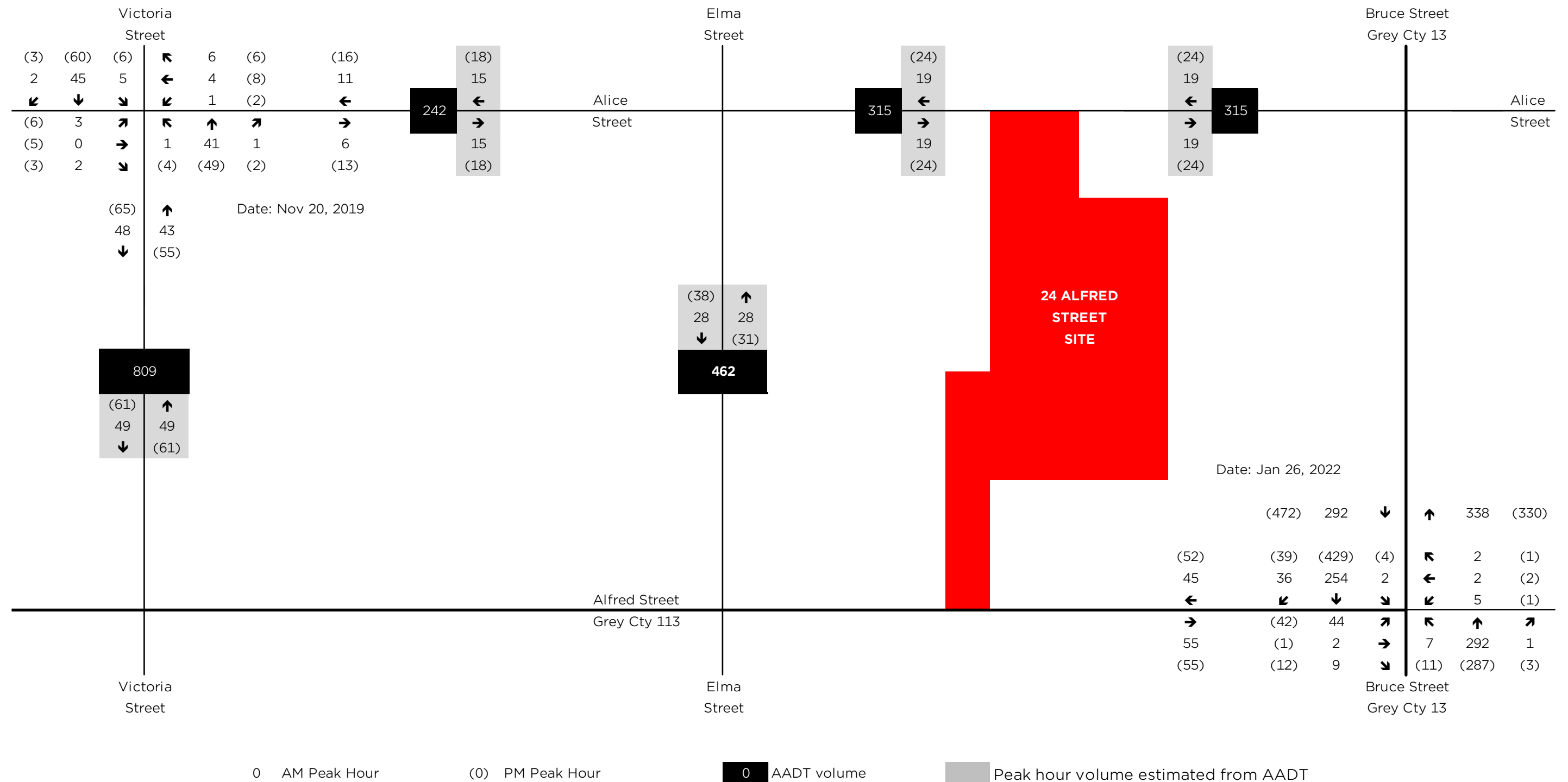
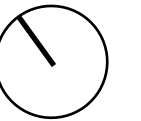


Source: Google Maps

24 ALFRED STREET DEVELOPMENT

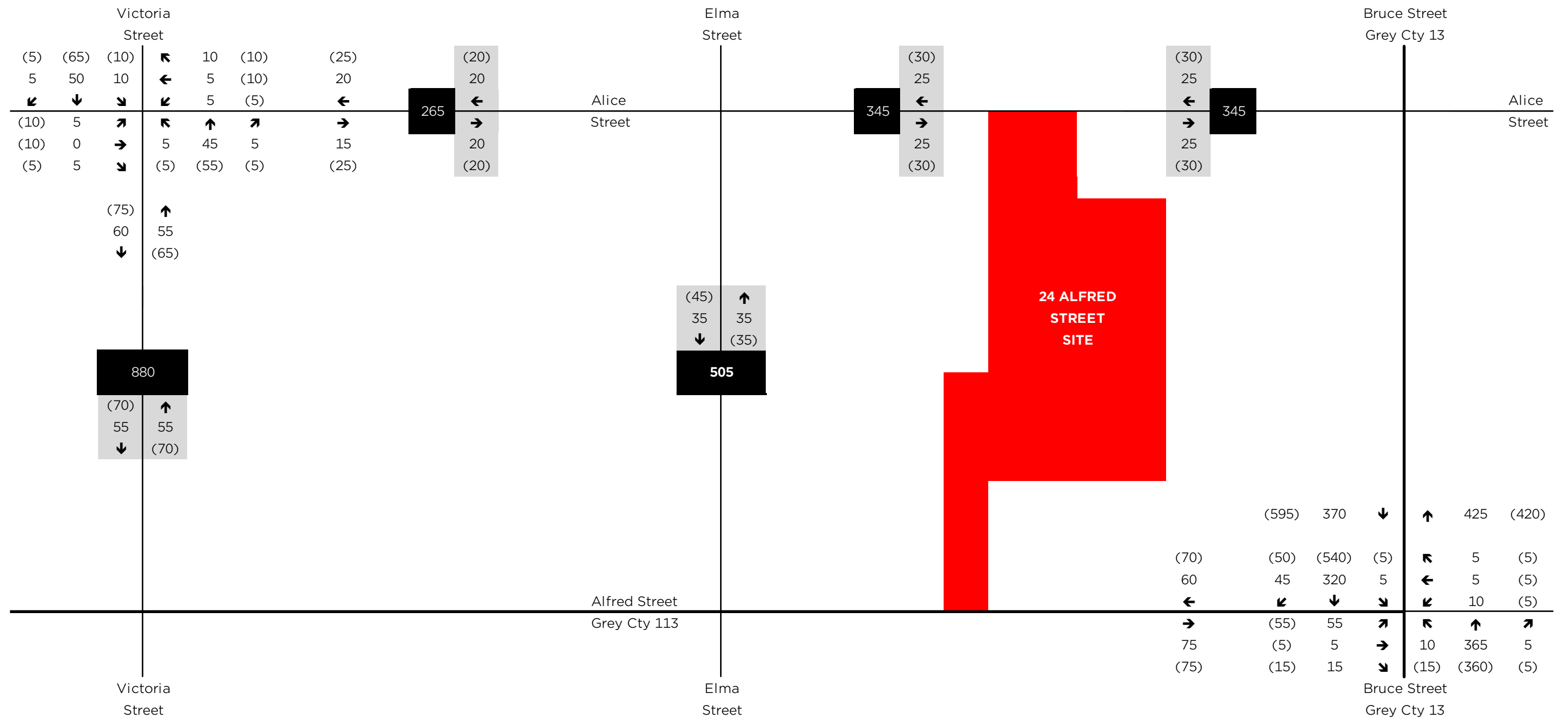
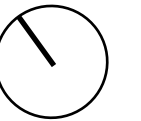
Figure 2C: Area Road Network





24 ALFRED STREET DEVELOPMENT
Figure 3: Traffic Counts



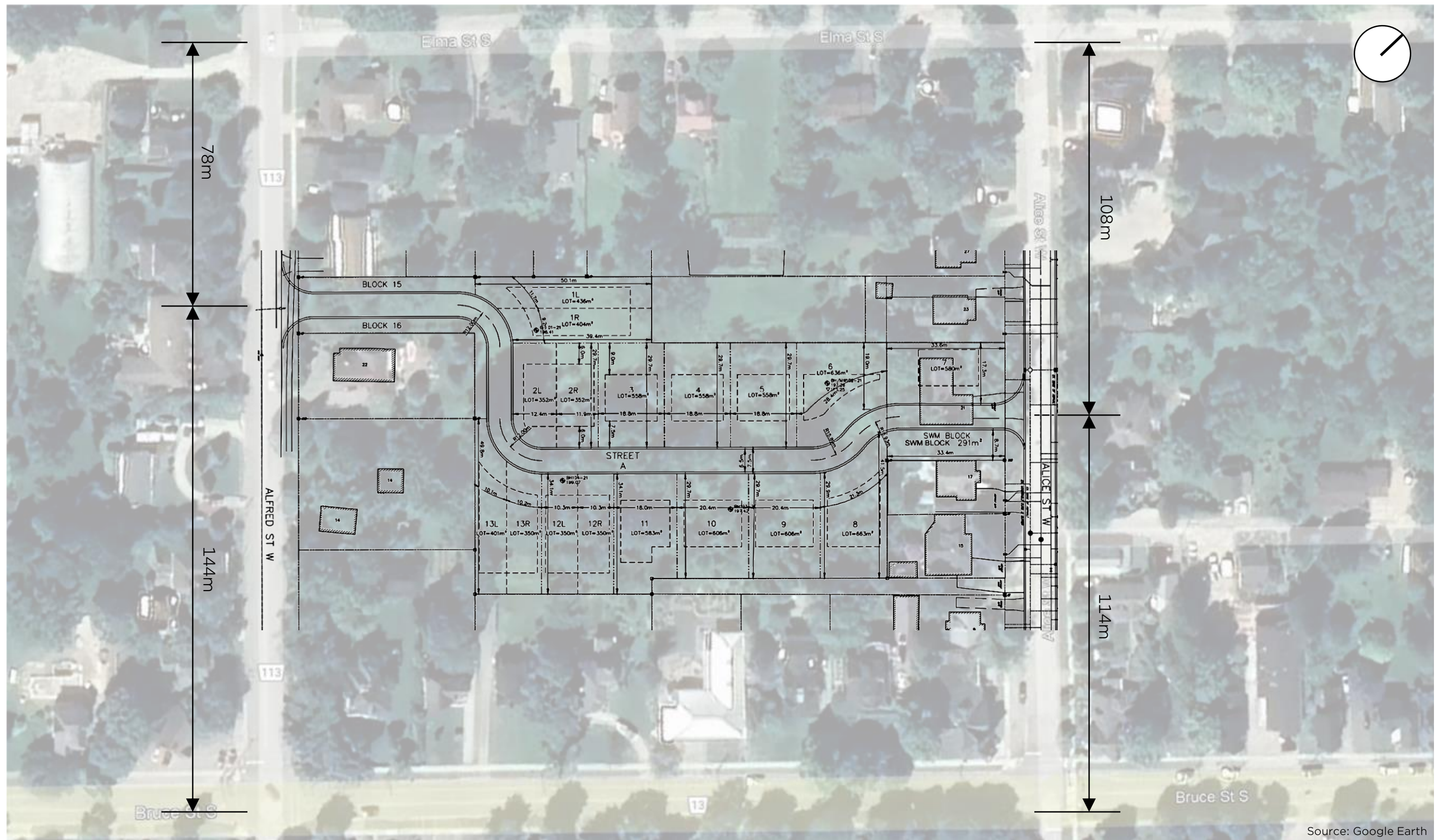


0 AM Peak Hour (0) PM Peak Hour 0 AADT volume Peak hour volume estimated from AADT

24 ALFRED STREET DEVELOPMENT

Figure 4: 2022 Traffic Volumes

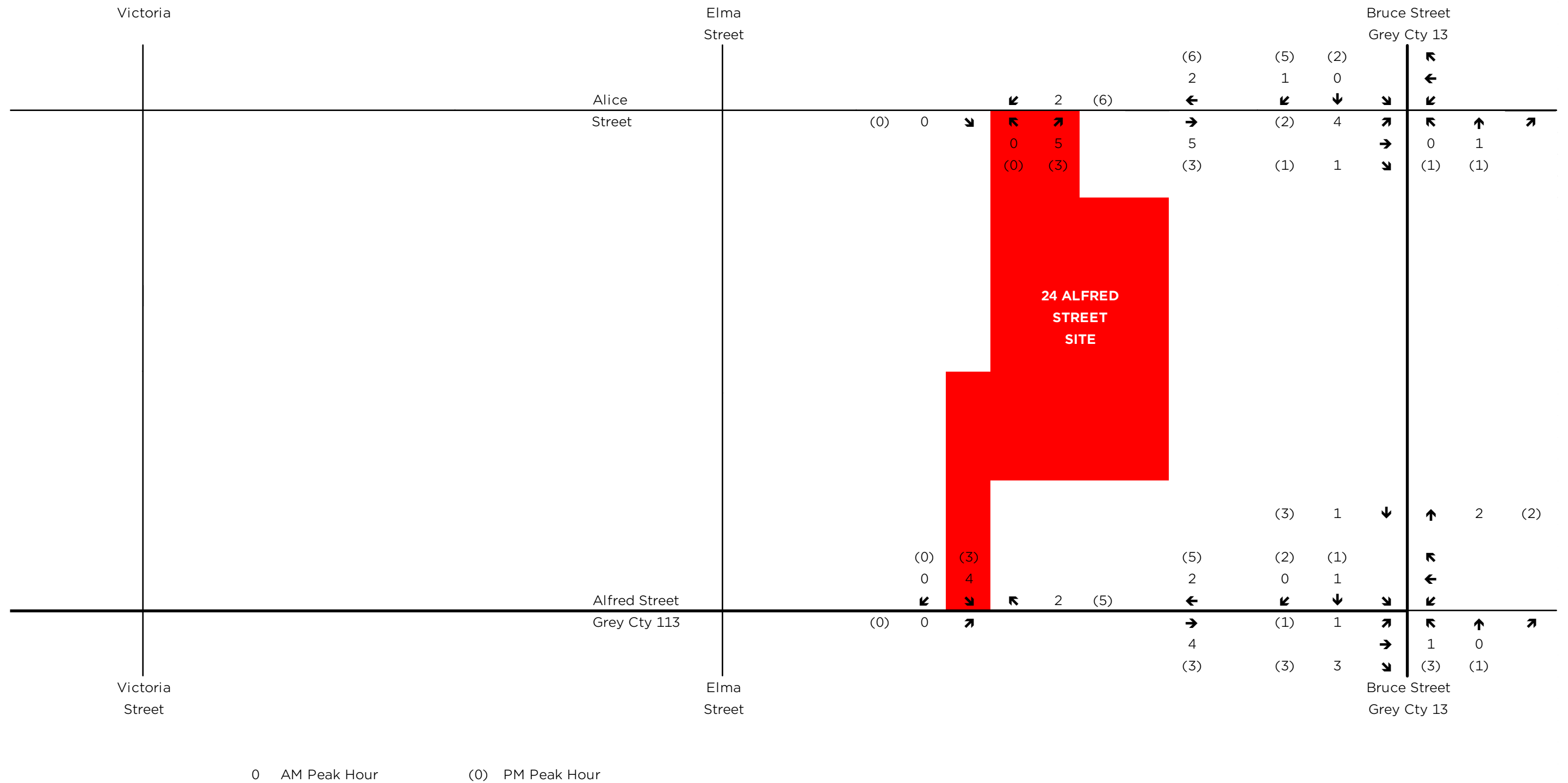
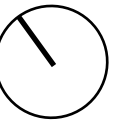




24 ALFRED STREET DEVELOPMENT

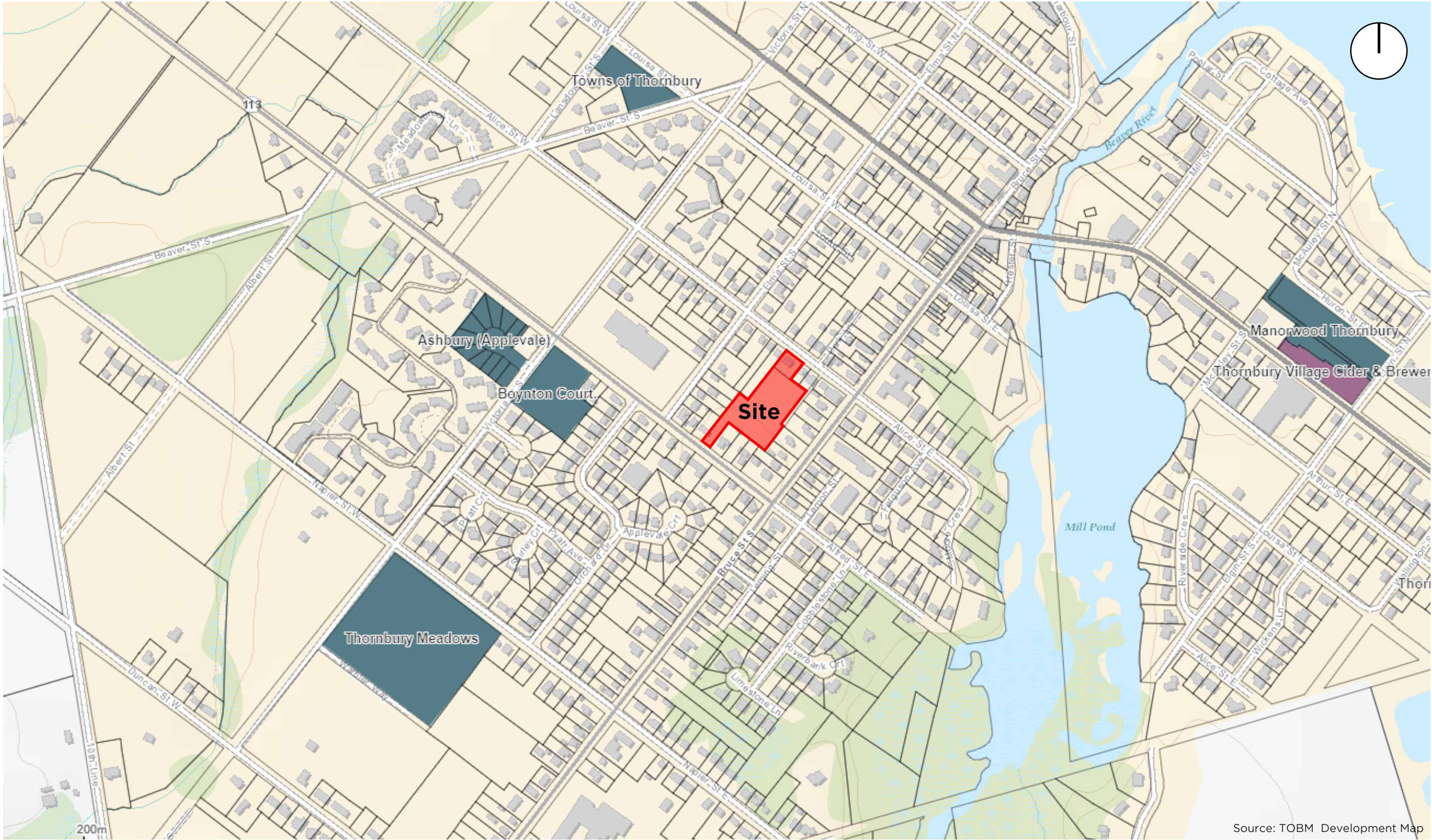
Figure 5: Site Plan





24 ALFRED STREET DEVELOPMENT
Figure 6: Site Traffic Volumes

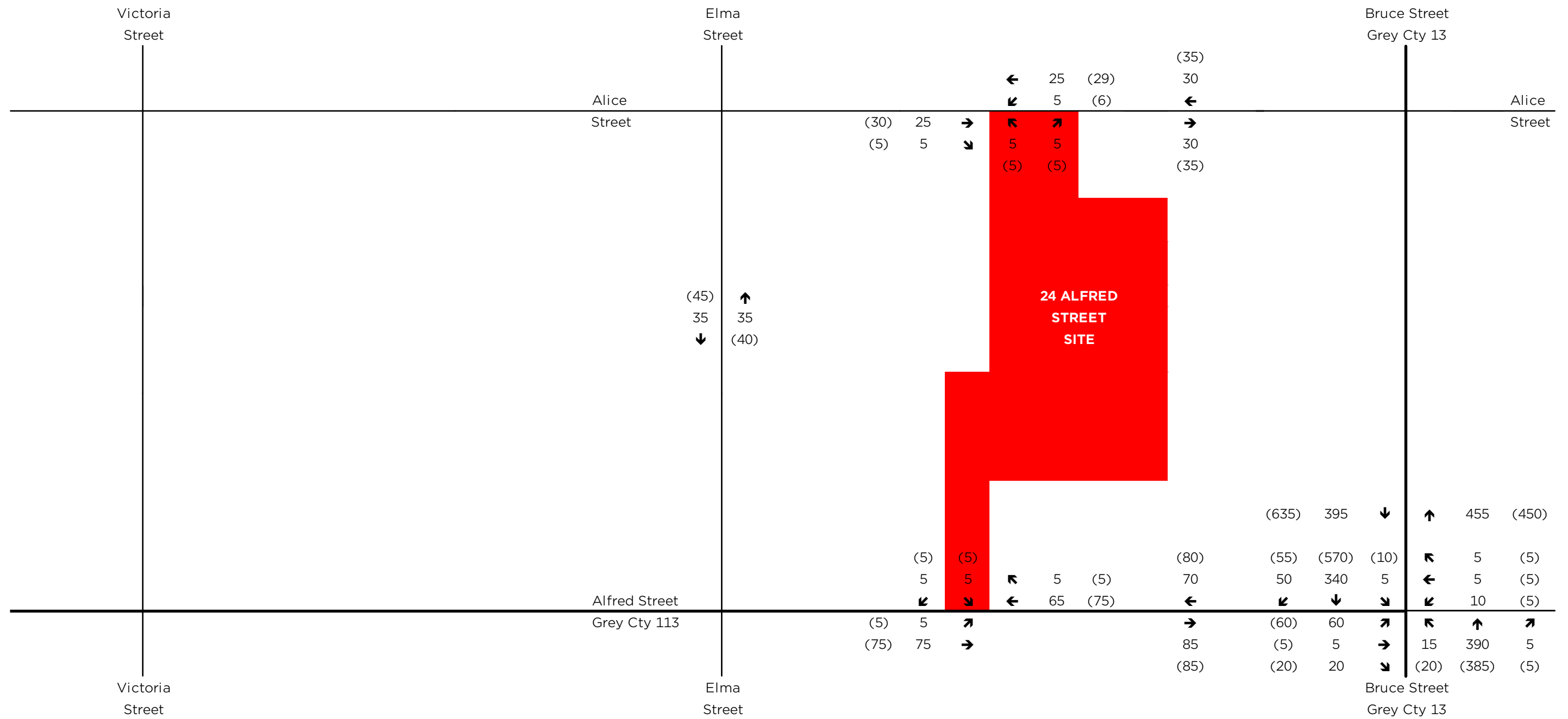
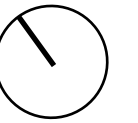




24 ALFRED STREET DEVELOPMENT

Figure 7: Other Area Developments





0 AM Peak Hour

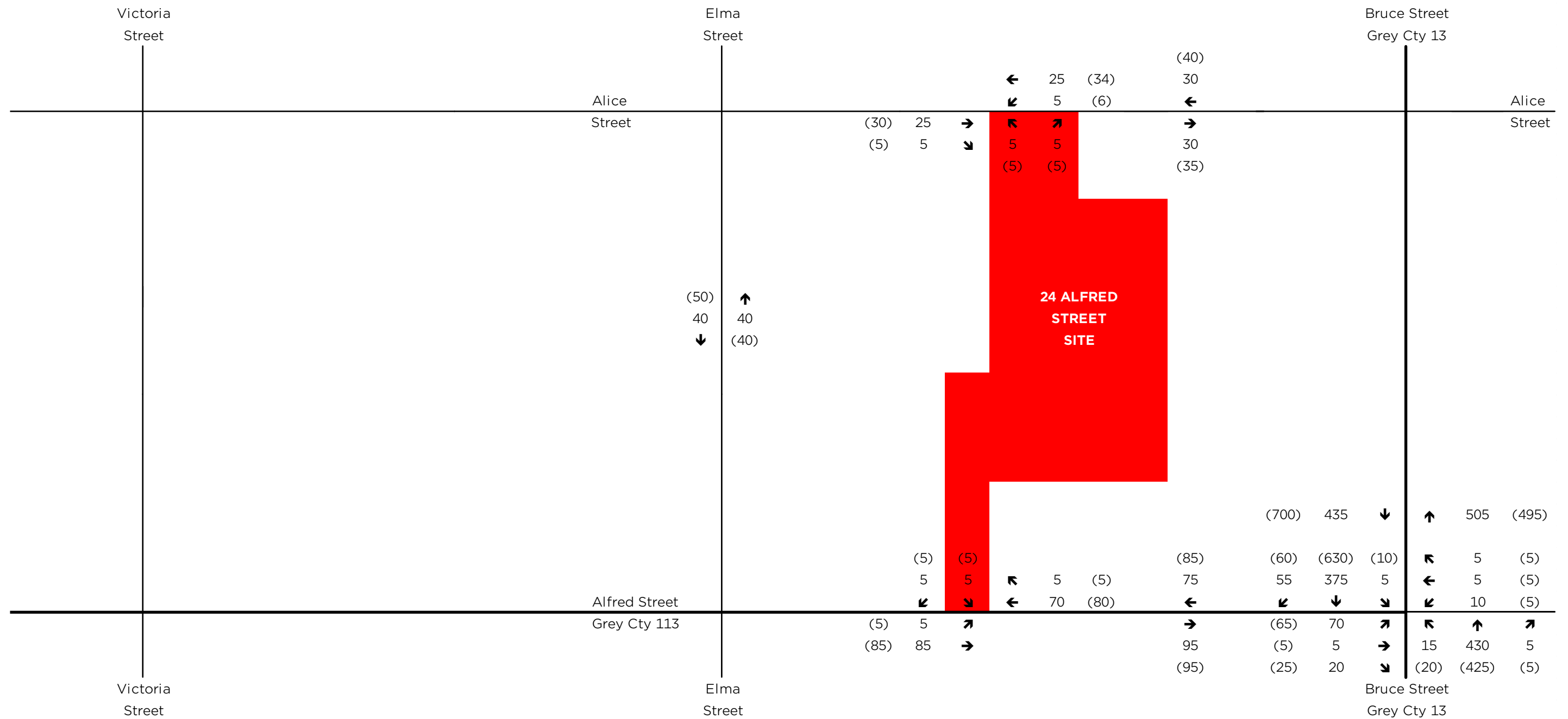
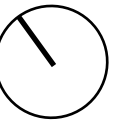
(0) PM Peak Hour

Note: minimum volume of 5 assumed to/from the site for each movement

24 ALFRED STREET DEVELOPMENT

Figure 8: 2025 Traffic Volumes





0 AM Peak Hour

(0) PM Peak Hour

Note: minimum volume of 5 assumed to/from the site for each movement

24 ALFRED STREET DEVELOPMENT

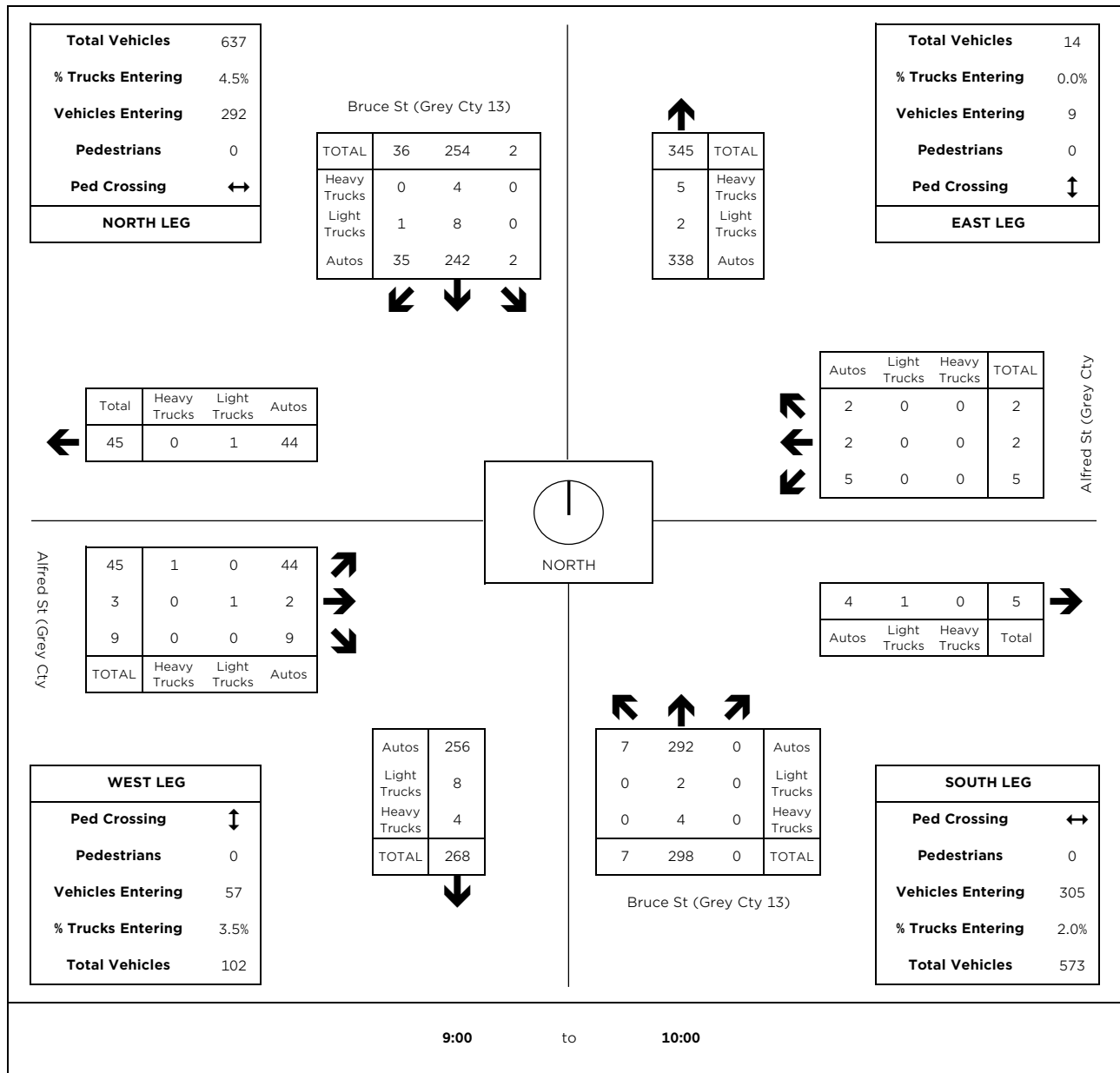
Figure 9: 2030 Traffic Volumes



Appendix A: Traffic Counts

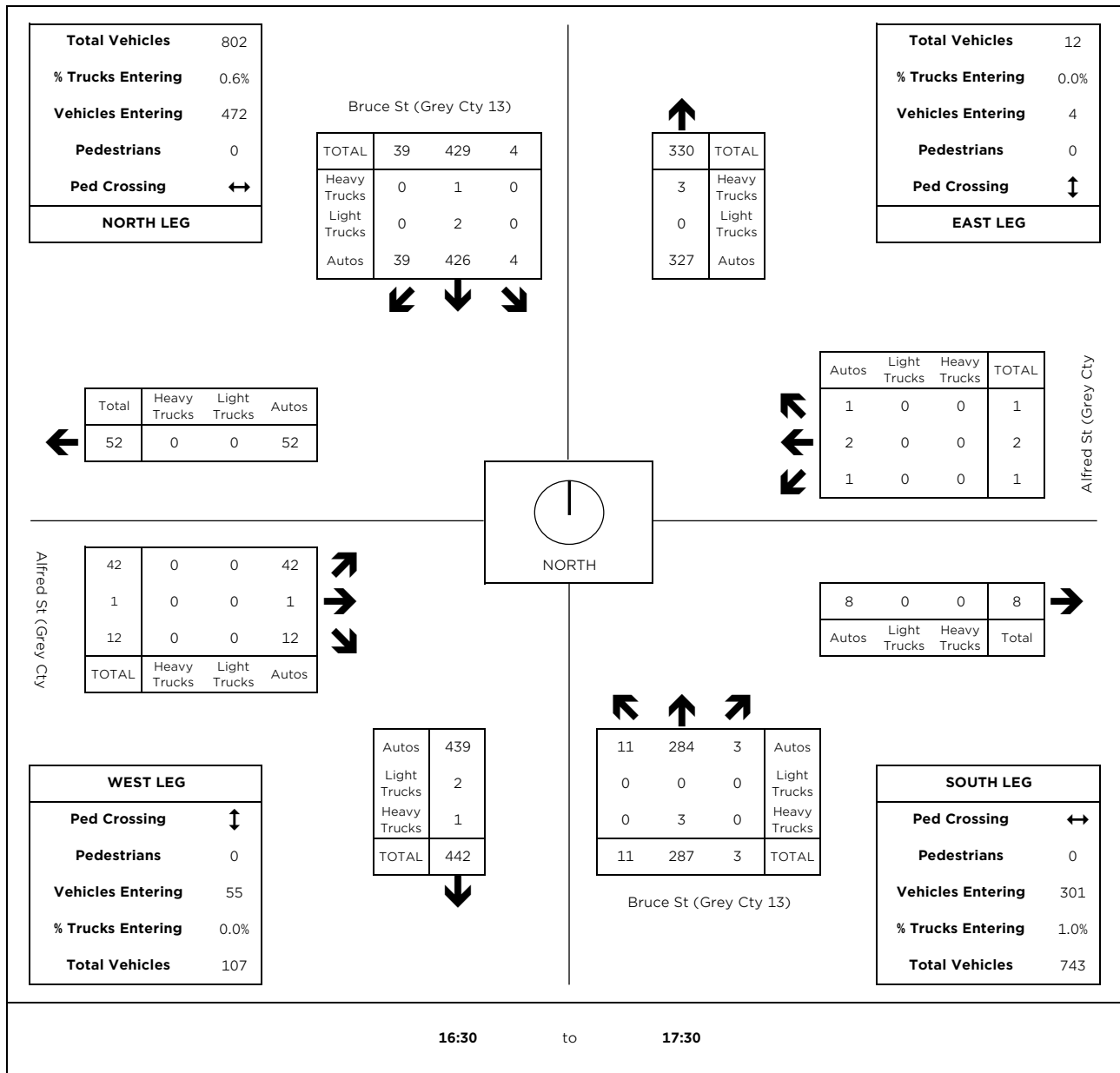
INTERSECTION COUNT AM PEAK HOUR

GENERAL INFORMATION					
Surveyor Name	John Birchard	Jurisdiction/Date	Town of The Blue Mountains	Wed Jan 26, 2022	
Weather Conditions	-12degrees and clear	Major Street	Bruce St (Grey Cty 13)	N-S	
Project Name	24 Alfred Street	Minor Street	Alfred St (Grey Cty 113)	E-W	
Project Number	121108	Intersection Control	stop control on minor street		
Additional Comments					



INTERSECTION COUNT PM PEAK HOUR

GENERAL INFORMATION					
Surveyor Name	John Birchard	Jurisdiction/Date	Town of The Blue Mountains	Wed Jan 26, 2022	
Weather Conditions	-12degrees and clear	Major Street	Bruce St (Grey Cty 13)	N-S	
Project Name	24 Alfred Street	Minor Street	Alfred St (Grey Cty 113)	E-W	
Project Number	121108	Intersection Control	stop control on minor street		
Additional Comments					



Accu-Traffic Inc.

Morning Peak Diagram		Specified Period From: 7:00:00 To: 10:00:00	One Hour Peak From: 9:00:00 To: 10:00:00
Municipality: The Blue Mountains Site #: 1918900004 Intersection: Victoria St S & Alice St W TFR File #: 1 Count date: 20-Nov-19		Weather conditions: Person counted: Person prepared: Person checked:	
** Non-Signalized Intersection **		Major Road: Victoria St S runs W/E	

North Leg Total: 12 North Entering: 5 North Peds: 7 Peds Cross:	<table style="width: 100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Trucks</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Cars</td><td>3</td><td>0</td><td>2</td><td>5</td></tr> <tr style="border-top: 1px solid black;"><td>Totals</td><td>3</td><td>0</td><td>2</td><td></td></tr> </table>	Heavys	0	0	0	0	Trucks	0	0	0	0	Cars	3	0	2	5	Totals	3	0	2			<table style="width: 100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>0</td></tr> <tr><td>Trucks</td><td>0</td></tr> <tr><td>Cars</td><td>7</td></tr> <tr style="border-top: 1px solid black;"><td>Totals</td><td>7</td></tr> </table>	Heavys	0	Trucks	0	Cars	7	Totals	7	East Leg Total: 101 East Entering: 52 East Peds: 8 Peds Cross:
Heavys	0	0	0	0																												
Trucks	0	0	0	0																												
Cars	3	0	2	5																												
Totals	3	0	2																													
Heavys	0																															
Trucks	0																															
Cars	7																															
Totals	7																															

Heavys	Trucks	Cars	Totals
2	0	47	49

Alice St W

Cars	Trucks	Heavys	Totals
2	0	0	2
43	0	2	45
5	0	0	5
50	0	2	

Victoria St S

Victoria St S

Heavys	Trucks	Cars	Totals
0	0	1	1
0	0	41	41
0	0	1	1
0	0	43	

Alice St W

Cars	Trucks	Heavys	Totals
49	0	0	49

Comments

Accu-Traffic Inc.

Mid-day Peak Diagram		Specified Period From: 12:00:00 To: 14:00:00	One Hour Peak From: 12:00:00 To: 13:00:00
Municipality: The Blue Mountains Site #: 1918900004 Intersection: Victoria St S & Alice St W TFR File #: 1 Count date: 20-Nov-19		Weather conditions: Person counted: Person prepared: Person checked:	
** Non-Signalized Intersection **		Major Road: Victoria St S runs W/E	

North Leg Total: 31 North Entering: 17 North Peds: 3 Peds Cross:	<table style="width: 100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Trucks</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Cars</td><td>5</td><td>7</td><td>5</td><td>17</td></tr> <tr><td>Totals</td><td>5</td><td>7</td><td>5</td><td></td></tr> </table>	Heavys	0	0	0	0	Trucks	0	0	0	0	Cars	5	7	5	17	Totals	5	7	5			<table style="width: 100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>0</td></tr> <tr><td>Trucks</td><td>0</td></tr> <tr><td>Cars</td><td>14</td></tr> <tr><td>Totals</td><td>14</td></tr> </table>	Heavys	0	Trucks	0	Cars	14	Totals	14	East Leg Total: 116 East Entering: 72 East Peds: 4 Peds Cross:
Heavys	0	0	0	0																												
Trucks	0	0	0	0																												
Cars	5	7	5	17																												
Totals	5	7	5																													
Heavys	0																															
Trucks	0																															
Cars	14																															
Totals	14																															

Heavys	Trucks	Cars	Totals
0	0	71	71

Alice St W

Victoria St S

Heavys	Trucks	Cars	Totals
0	0	4	4
0	0	36	36
0	0	1	1
0	0	41	

Alice St W

Victoria St S

Cars	Trucks	Heavys	Totals
3	0	0	3
66	0	0	66
2	1	0	3
71	1	0	

Comments

Accu-Traffic Inc.

Afternoon Peak Diagram		Specified Period From: 16:00:00 To: 19:00:00	One Hour Peak From: 16:15:00 To: 17:15:00
Municipality: The Blue Mountains Site #: 1918900004 Intersection: Victoria St S & Alice St W TFR File #: 1 Count date: 20-Nov-19		Weather conditions: Person counted: Person prepared: Person checked:	
** Non-Signalized Intersection **		Major Road: Victoria St S runs W/E	

North Leg Total: 29 North Entering: 14 North Peds: 2 Peds Cross:	<table style="width: 100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Trucks</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Cars</td><td>3</td><td>5</td><td>6</td><td>14</td></tr> <tr><td>Totals</td><td>3</td><td>5</td><td>6</td><td></td></tr> </table>	Heavys	0	0	0	0	Trucks	0	0	0	0	Cars	3	5	6	14	Totals	3	5	6		<table style="width: 100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>1</td></tr> <tr><td>Trucks</td><td>0</td></tr> <tr><td>Cars</td><td>14</td></tr> <tr><td>Totals</td><td>15</td></tr> </table>	Heavys	1	Trucks	0	Cars	14	Totals	15	East Leg Total: 130 East Entering: 69 East Peds: 2 Peds Cross:
Heavys	0	0	0	0																											
Trucks	0	0	0	0																											
Cars	3	5	6	14																											
Totals	3	5	6																												
Heavys	1																														
Trucks	0																														
Cars	14																														
Totals	15																														

Heavys	Trucks	Cars	Totals
0	0	65	65

Alice St W

 Alice St W

 Alice St W

Victoria St S

 Victoria St S

 Victoria St S

Alice St W

 Alice St W

 Alice St W

Heavys	Trucks	Cars	Totals
0	0	4	4
1	2	46	49
0	0	2	2
1	2	52	

Victoria St S

 Victoria St S

 Victoria St S

Alice St W

 Alice St W

 Alice St W

Victoria St S

 Victoria St S

 Victoria St S

Peds Cross: West Peds: 0 West Entering: 55 West Leg Total: 120	<table style="width: 100%; border-collapse: collapse;"> <tr><td>Cars</td><td>13</td></tr> <tr><td>Trucks</td><td>0</td></tr> <tr><td>Heavys</td><td>0</td></tr> <tr><td>Totals</td><td>13</td></tr> </table>	Cars	13	Trucks	0	Heavys	0	Totals	13	<table style="width: 100%; border-collapse: collapse;"> <tr><td>Cars</td><td>2</td><td>7</td><td>6</td><td>15</td></tr> <tr><td>Trucks</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Heavys</td><td>0</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>Totals</td><td>2</td><td>8</td><td>6</td><td></td></tr> </table>	Cars	2	7	6	15	Trucks	0	0	0	0	Heavys	0	1	0	1	Totals	2	8	6		Peds Cross: South Peds: 2 South Entering: 16 South Leg Total: 29
Cars	13																														
Trucks	0																														
Heavys	0																														
Totals	13																														
Cars	2	7	6	15																											
Trucks	0	0	0	0																											
Heavys	0	1	0	1																											
Totals	2	8	6																												

Comments

Appendix B: Intersection Operations

HCM Unsignalized Intersection Capacity Analysis

3: Alfred St & Bruce St

2022 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	5	15	10	5	5	10	365	5	5	320	45
Future Volume (Veh/h)	55	5	15	10	5	5	10	365	5	5	320	45
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	5	16	11	5	5	11	397	5	5	348	49
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	812	806	372	822	828	400	397				402	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	812	806	372	822	828	400	397				402	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	79	98	98	96	98	99	99				100	
cM capacity (veh/h)	289	311	673	279	302	650	1162				1157	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	81	21	413	402								
Volume Left	60	11	11	5								
Volume Right	16	5	5	49								
cSH	327	330	1162	1157								
Volume to Capacity	0.25	0.06	0.01	0.00								
Queue Length 95th (m)	7.3	1.5	0.2	0.1								
Control Delay (s)	19.6	16.6	0.3	0.1								
Lane LOS	C	C	A	A								
Approach Delay (s)	19.6	16.6	0.3	0.1								
Approach LOS	C	C										
Intersection Summary												
Average Delay			2.3									
Intersection Capacity Utilization			38.2%	ICU Level of Service					A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

3: Alfred St & Bruce St

2022 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	5	15	5	5	5	15	360	5	5	540	50
Future Volume (Veh/h)	55	5	15	5	5	5	15	360	5	5	540	50
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	5	16	5	5	5	16	391	5	5	587	54
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1057	1052	614	1068	1076	394	641			396		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1057	1052	614	1068	1076	394	641			396		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	69	98	97	97	98	99	98			100		
cM capacity (veh/h)	195	222	492	187	214	655	943			1163		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	81	15	412	646								
Volume Left	60	5	16	5								
Volume Right	16	5	5	54								
cSH	223	260	943	1163								
Volume to Capacity	0.36	0.06	0.02	0.00								
Queue Length 95th (m)	12.0	1.4	0.4	0.1								
Control Delay (s)	30.1	19.7	0.5	0.1								
Lane LOS	D	C	A	A								
Approach Delay (s)	30.1	19.7	0.5	0.1								
Approach LOS	D	C										
Intersection Summary												
Average Delay			2.6									
Intersection Capacity Utilization			48.4%	ICU Level of Service					A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

1: Site Access & Alice St

2030 AM Peak Hour

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	25	5	5	25	5	5
Future Volume (Veh/h)	25	5	5	25	5	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	5	5	27	5	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)				117		
pX, platoon unblocked						
vC, conflicting volume			32	66	30	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			32	66	30	
tC, single (s)			4.1	6.4	6.2	
tC, 2 stage (s)						
tF (s)			2.2	3.5	3.3	
p0 queue free %			100	99	100	
cM capacity (veh/h)			1580	936	1045	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	32	32	10			
Volume Left	0	5	5			
Volume Right	5	0	5			
cSH	1700	1580	987			
Volume to Capacity	0.02	0.00	0.01			
Queue Length 95th (m)	0.0	0.1	0.2			
Control Delay (s)	0.0	1.2	8.7			
Lane LOS		A	A			
Approach Delay (s)	0.0	1.2	8.7			
Approach LOS			A			
Intersection Summary						
Average Delay			1.7			
Intersection Capacity Utilization			15.6%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

2: Alfred St & Site Access

2030 AM Peak Hour

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	85	70	5	5	5
Future Volume (Veh/h)	5	85	70	5	5	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	92	76	5	5	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)			134			
pX, platoon unblocked						
vC, conflicting volume	81				180	78
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	81				180	78
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	99
cM capacity (veh/h)	1517				806	982
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	97	81	10			
Volume Left	5	0	5			
Volume Right	0	5	5			
cSH	1517	1700	886			
Volume to Capacity	0.00	0.05	0.01			
Queue Length 95th (m)	0.1	0.0	0.3			
Control Delay (s)	0.4	0.0	9.1			
Lane LOS	A		A			
Approach Delay (s)	0.4	0.0	9.1			
Approach LOS			A			
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization		18.6%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

3: Alfred St & Bruce St

2030 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	5	20	10	5	5	15	430	5	5	375	55
Future Volume (Veh/h)	70	5	20	10	5	5	15	430	5	5	375	55
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	5	22	11	5	5	16	467	5	5	408	60
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)												216
pX, platoon unblocked												
vC, conflicting volume	957	952	438	974	980	470	468				472	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	957	952	438	974	980	470	468				472	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	67	98	96	95	98	99	99				100	
cM capacity (veh/h)	228	254	619	216	245	594	1094				1090	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	103	21	488	473								
Volume Left	76	11	16	5								
Volume Right	22	5	5	60								
cSH	265	264	1094	1090								
Volume to Capacity	0.39	0.08	0.01	0.00								
Queue Length 95th (m)	13.3	2.0	0.3	0.1								
Control Delay (s)	26.9	19.8	0.4	0.1								
Lane LOS	D	C	A	A								
Approach Delay (s)	26.9	19.8	0.4	0.1								
Approach LOS	D	C										
Intersection Summary												
Average Delay	3.2											
Intersection Capacity Utilization	46.7%			ICU Level of Service					A			
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

1: Site Access & Alice St

2030 PM Peak Hour

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	30	5	6	34	5	5
Future Volume (Veh/h)	30	5	6	34	5	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	5	7	37	5	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			38		86	36
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			38		86	36
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1572		911	1037
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	38	44	10			
Volume Left	0	7	5			
Volume Right	5	0	5			
cSH	1700	1572	970			
Volume to Capacity	0.02	0.00	0.01			
Queue Length 95th (m)	0.0	0.1	0.2			
Control Delay (s)	0.0	1.2	8.8			
Lane LOS		A	A			
Approach Delay (s)	0.0	1.2	8.8			
Approach LOS			A			
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			16.9%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

2: Alfred St & Site Access

2030 PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	85	80	5	5	5
Future Volume (Veh/h)	5	85	80	5	5	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	92	87	5	5	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	92				192	90
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	92				192	90
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	99
cM capacity (veh/h)	1503				795	968
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	97	92	10			
Volume Left	5	0	5			
Volume Right	0	5	5			
cSH	1503	1700	873			
Volume to Capacity	0.00	0.05	0.01			
Queue Length 95th (m)	0.1	0.0	0.3			
Control Delay (s)	0.4	0.0	9.2			
Lane LOS	A		A			
Approach Delay (s)	0.4	0.0	9.2			
Approach LOS			A			
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			18.6%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Alfred St & Bruce St

2030 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	5	25	5	5	5	20	425	5	10	630	60
Future Volume (Veh/h)	65	5	25	5	5	5	20	425	5	10	630	60
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	71	5	27	5	5	5	22	462	5	11	685	65
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None								None			
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1256	1250	718	1278	1280	464	750	467				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1256	1250	718	1278	1280	464	750	467				
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	49	97	94	96	97	99	97	99				
cM capacity (veh/h)	140	167	429	128	160	598	859	1094				
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	103	15	489	761								
Volume Left	71	5	22	11								
Volume Right	27	5	5	65								
cSH	171	190	859	1094								
Volume to Capacity	0.60	0.08	0.03	0.01								
Queue Length 95th (m)	24.9	1.9	0.6	0.2								
Control Delay (s)	53.5	25.5	0.7	0.3								
Lane LOS	F	D	A	A								
Approach Delay (s)	53.5	25.5	0.7	0.3								
Approach LOS	F	D										
Intersection Summary												
Average Delay	4.7											
Intersection Capacity Utilization	57.3%			ICU Level of Service					B			
Analysis Period (min)	15											