

#201, 8506 - 200th Street, Langley, BC V2Y 0M1 T: 604.371.0091 F: 604.371.0098

September 11, 2020

Our Reference: 32096

Vanhome Properties
433 - 5811 Cooney Road,
Richmond, BC V6X 3M1

Attention: Mr. Kai Zhao, Project Manager (kai@vanho.ca)

Dear Sir,

Reference: **Traffic Impact Study for Residential Development at 1453 Stayte Road in White Rock, BC**

1.0 Introduction

1.1 Background

Vanhome Properties (Vanhome) retained ISL Engineering and Land Services (ISL) to undertake a Traffic Impact Study (TIS) to cover the transportation engineering services for the proposed development at 1453 Stayte Road in White Rock, British Columbia. The findings of this letter report could be used as part of a development rezoning application to the City of White Rock (the City).

Discussions with City staff were held and a Terms of Reference (ToR) for this TIS was developed and submitted on May 10, 2018 for review and approval. It was later updated based on the City's *Term of Reference for Traffic Study* (received on May 25, 2018) then resubmitted on May 28, 2018 (**Appendix A**). Previously, a four-storey multi-family residential building was proposed for this site, and ISL completed the TIS report (dated August 16, 2018) along with addendum letters and feedback reviews (prior to February 2020). The proposed housing type has been changed recently to a townhouse complex. It is expected that the 2018 ToR is still applicable to the updated site layout.

1.2 Study Objectives

The objectives of the traffic study are to estimate traffic generated by the proposed development, assess the performance of the nearby study intersections, evaluate potential traffic impacts to the surrounding road network, and recommend improvement measures, if required. Impacts on other transportation modes (transit commuters, pedestrians, and cyclists) as well as parking and loading requirements are discussed. All study findings (traffic surveys, intersection analyses, and potential recommendations) are summarized in this report.

1.3 Proposed Development

The proposed residential development will be located on the west side of Stayte Road between Russell Avenue and Thrift Avenue in White Rock. Based on the latest site plan (**Figure 1**) provided by Atelier Pacific Architect (dated September 10, 2020), the existing vacant lot will be developed into a 23-unit townhouse complex with outdoor common amenity space and three visitor parking stalls. Each unit will have three storeys, roof patio, and side-by-side garage. The development is expected to have approximately 31,700 square feet of residential area across 34,000 square feet of site area. The vehicular access to the townhouse complex will be on the north side off Stayte Road.

The development site is located in an urban neighbourhood, bounded by neighbourhood commercial building (north), duplex houses (west), a multi-family residential building (south), as well as single-family houses (east) on the City of Surrey side. According to the City's *2017 Official Community Plan (OCP)*, the land use area is intended for multi-family residential characteristics.



Figure 1 Proposed Development Preliminary Site Plan (dated on September 10, 2020)

1.4 Study Area

The development site is located along the municipal boundary with the City of Surrey, which refers to Stayte Road (White Rock) as 160 Street in Surrey. Upon agreement with the City, as shown in **Figure 2**, the following two intersections were identified with the existing intersection traffic control types shown in brackets:

- Stayte Road and Russell Avenue (STOP-controlled at the eastbound approach)
- Stayte Road and Thrift Avenue / 14 Avenue (signalized)

The proposed access roadway for the development site along Stayte Road was analyzed as a STOP-controlled (eastbound) T-intersection.

According to the City's 2014 *Strategic Transportation Plan (STP)*, Stayte Road is a north-south arterial and intersects the east-west streets of Russell Avenue (neighbourhood collector) and Thrift Avenue (primary collector). All roadways within the study area are two-lane (one-lane each direction) cross-section, and on-street parking is allowed along the east-west avenues. These roads provide accesses for single-family detached houses, multi-family residential buildings, as well as neighbourhood commercial area (mainly southwest quadrant of the Stayte Road and Russell Avenue intersection). Left-turn storage lanes are provided at the northbound and southbound approaches of the Stayte Road and Thrift Avenue / 14 Avenue intersection.

ISL staff conducted a site visit on May 16, 2018 to observe the traffic conditions and the surrounding neighbourhood. Photographs and illustration of the study area, intersections, and access are shown in **Figure 3**.

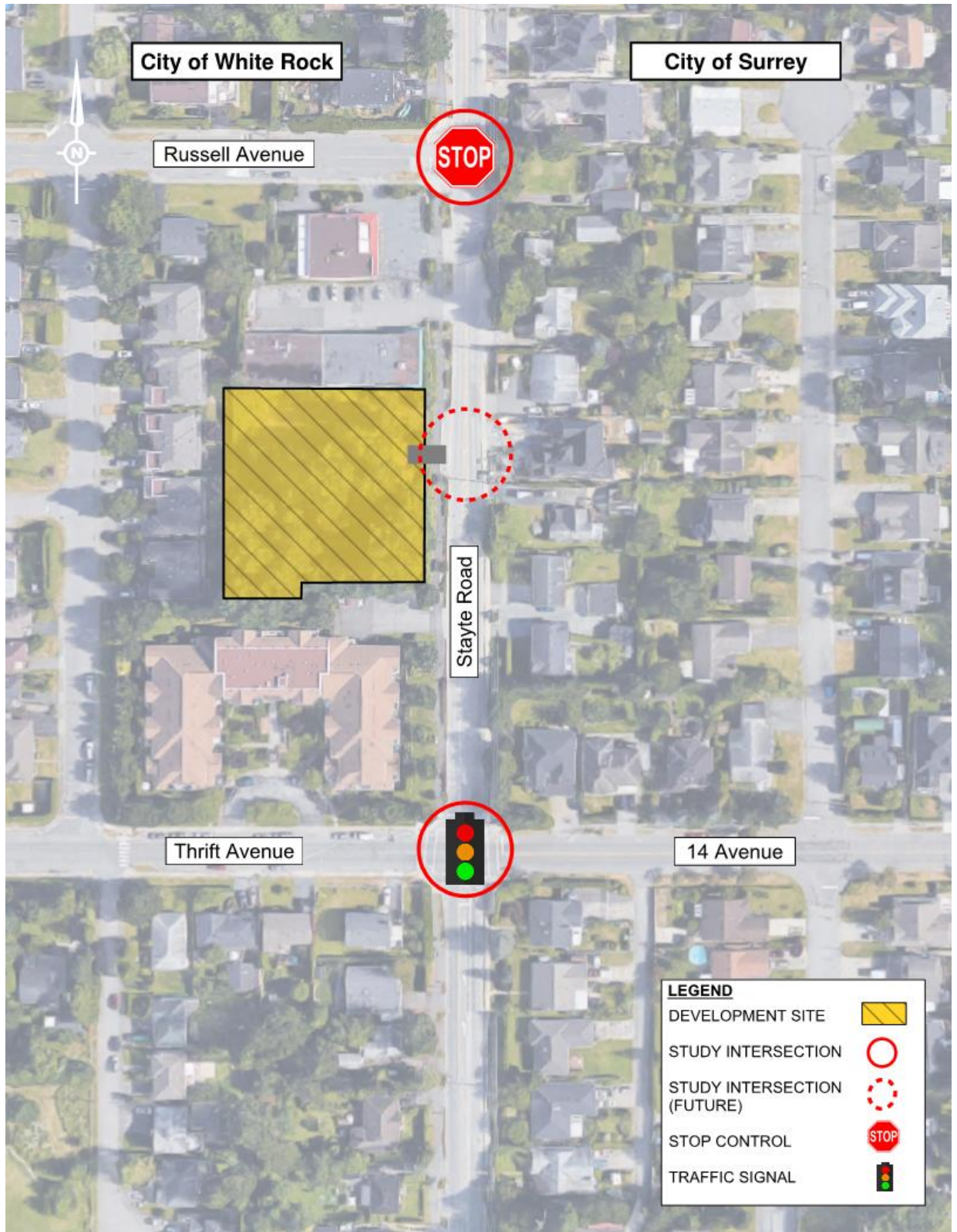


Figure 2 Study Area and Study Intersections



Figure 3 Site Visit Photographs

2.0 Background and Development Traffic

2.1 Background Traffic (2020)

Classified traffic count surveys (including cars, trucks, pedestrians, and bicycles) of two study intersections were conducted by ISL staff during a typical weekday (Wednesday, May 16, 2018). Peak periods of weekday AM (from 0730 to 0900 hours) and PM (from 1630 to 1800 hours) were collected at 15-minute intervals. The observed weekday AM and PM peak hours were found to be from 0800 to 0900 hours (8:00 to 9:00 AM) and from 1630 to 1730 hours (4:30 to 5:30 PM), respectively. The summary of traffic count survey results can be provided upon request.

To determine the background traffic volumes (2020), a 2% linear annual growth rate (agreed by the City) was applied to the 2018 surveyed traffic volumes. Due to such unprecedented times with COVID-19, some people shifted to a home-based workforce, so it is expected that the normal vehicle patterns might be affected. As shown in **Figure 4**, based on the estimated 2020 traffic volumes, through movements along Stayte Road were the major traffic flows in the study area. At the Thrift Avenue / 14 Avenue intersection, the eastbound and westbound through movements also experienced relatively high turning volumes during both peak hours. The overall heavy vehicle percentage was about 3% during the weekday AM and about 2% during the weekday PM peak hours.

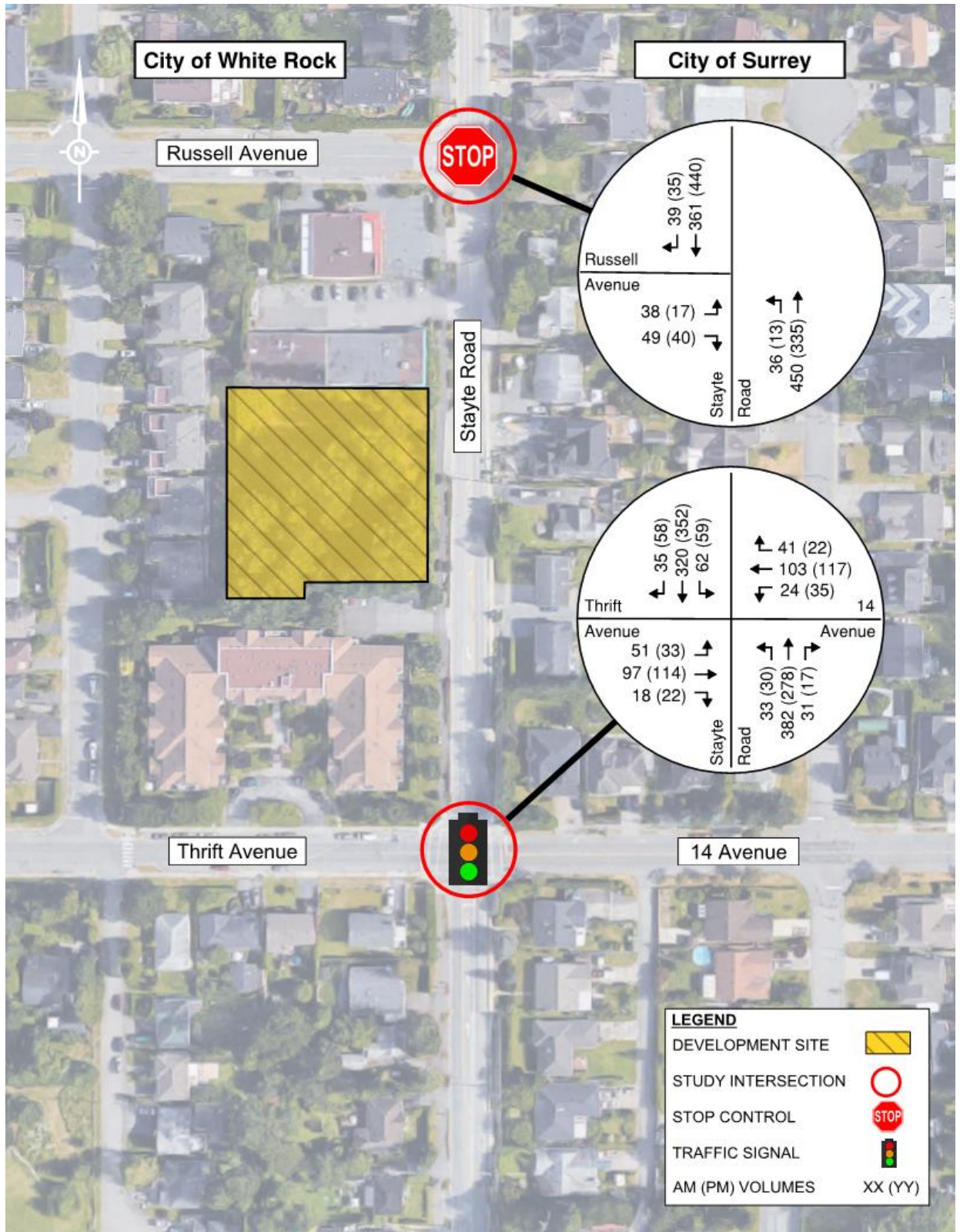


Figure 4 2020 Background Traffic Volumes

2.2 Proposed Development Traffic

As the proposed development is expected to be completed by 2022, three horizon years were considered in the traffic impact study, which were the opening year of 2022 (full build-out) and projected years of 2032 (10 years after full build-out) as well as 2045 (as requested to align with the City's OCP horizon year – *Imagine White Rock 2045*).

To forecast trips generated inbound and outbound from the proposed development during both peak hours, the *Institute of Transportation Engineers Trip Generation Manual – 10th Edition (ITE)* was used. Accordingly, mid-rise multifamily housing generally includes apartments, townhouses, and condominiums within the same building from three to ten levels (floors). However, due to the low dwelling units (23), higher *ITE* trips rates were established using Land Use Code 220 – Multifamily Housing (Low-Rise) to be considered as a conservative measure. The generated trips entering and exiting the proposed development during the weekday peak hours have been estimated in **Table 1**.

Table 1 Vehicular Trip Generations of the Proposed Development

Land Use	Classification [Land Use Code]	Unit	Extent	Peak Period	Trip Rate	Two-Way Trips	Directional Split		In	Out
							In	Out		
Residential	Multifamily Housing (Low-rise) [220]	DU	23	AM	0.46	11	23%	77%	3	8
				PM	0.56	13	63%	37%	8	5

Table 1 shows the summary of inbound and outbound generated traffic volumes during weekday AM and PM peak hours. It indicates that during the weekday AM peak hour, a total of 11 vehicle trips are expected to be generated – 3 inbound and 8 outbound; during the weekday PM peak hour, a total of 13 vehicle trips are expected to be generated – 8 inbound and 5 outbound. It is considered that the same trip generation is applied for all three horizon years.

Trips generated by the proposed development were distributed and assigned to the surrounding road network generally based on the latest traffic patterns (prior to the COVID-19 pandemic) and achievable traffic routes. It is expected that higher traffic volumes exit to the north in the AM peak and enter from the north in the PM peak. The trip assignment proportions and generated trip volumes are provided in **Figure 5** and **Figure 6**, respectively.

2.3 Combined Traffic (2022, 2032, and 2045)

Development traffic was added to background traffic to determine the combined traffic volumes at the study intersections for all horizon years (2022, 2032, and 2045). To consider other future background traffic growth within and outside (such as from the City of Surrey) of the study area that is not generated by the proposed development, a linear annual growth rate of 2% was agreed by the City in this study and applied – yielding 50% projection over 25 years (for 2045). The 2032 and 2045 combined traffic volumes for the weekday AM and PM peak hours are shown in **Figure 7** and **Figure 8**.

The percentage of development traffic denotes the percentage of traffic that is generated by the proposed development compared to the total expected traffic during the 2045 horizon year traffic. At the major study intersections, the development traffic is expected to constitute 0.2% to 0.5% of the total intersection entering traffic volumes in 2045 as shown in **Table 2**.

Table 2 Development Traffic as a Percentage of Total Intersection Entering Traffic Volume in 2045

Study Intersection (along Stayte Road)	Total Intersection Entering Traffic		Development Traffic		Development Traffic (Percent)	
	AM	PM	AM	PM	AM	PM
Russell Avenue	1,470	1,325	6	5	0.4%	0.3%
Thrift Avenue	1,820	1,720	5	8	0.2%	0.5%

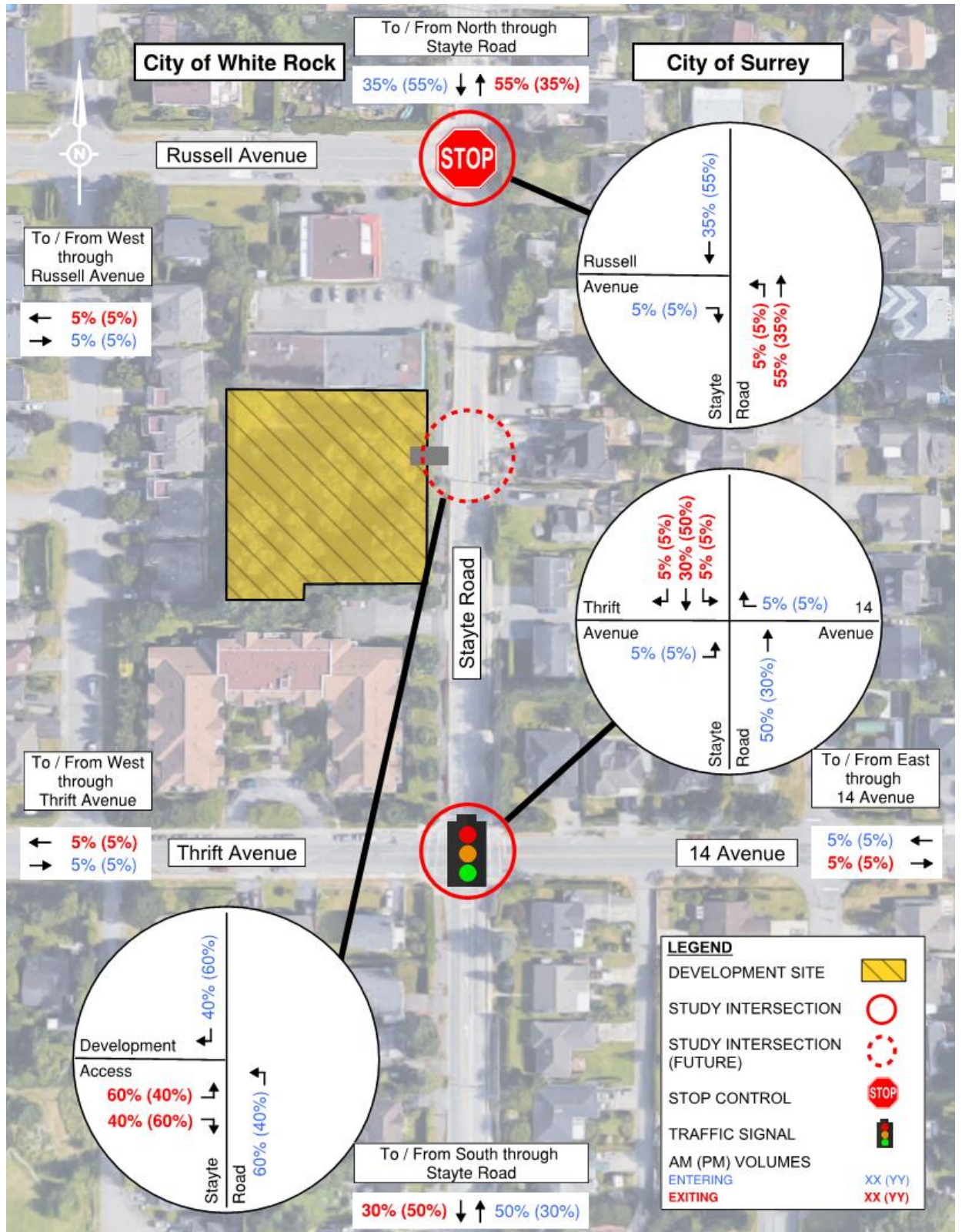


Figure 5 Generated Traffic Proportions

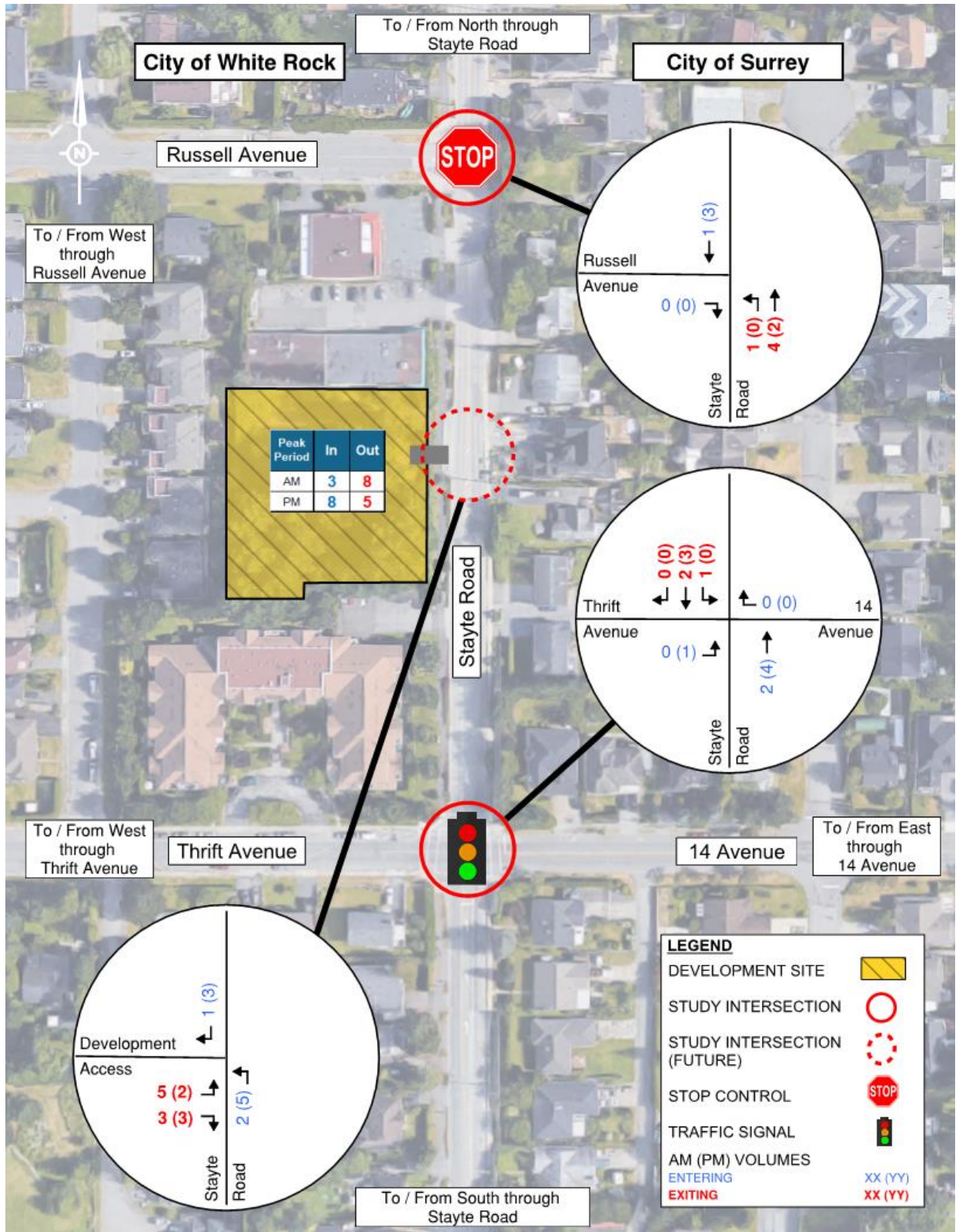


Figure 6 Generated Traffic Volumes

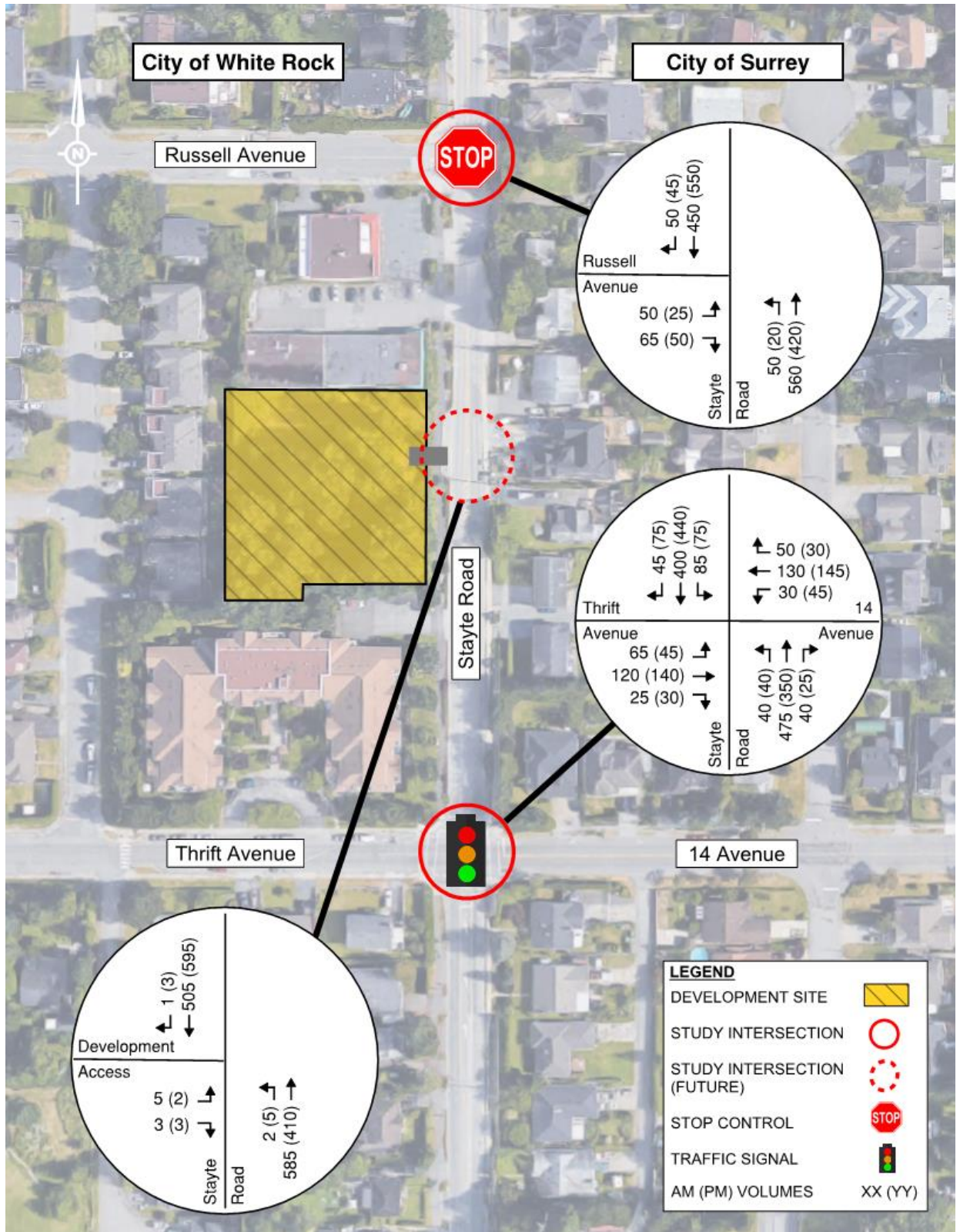


Figure 7 2032 Combined Traffic Volumes

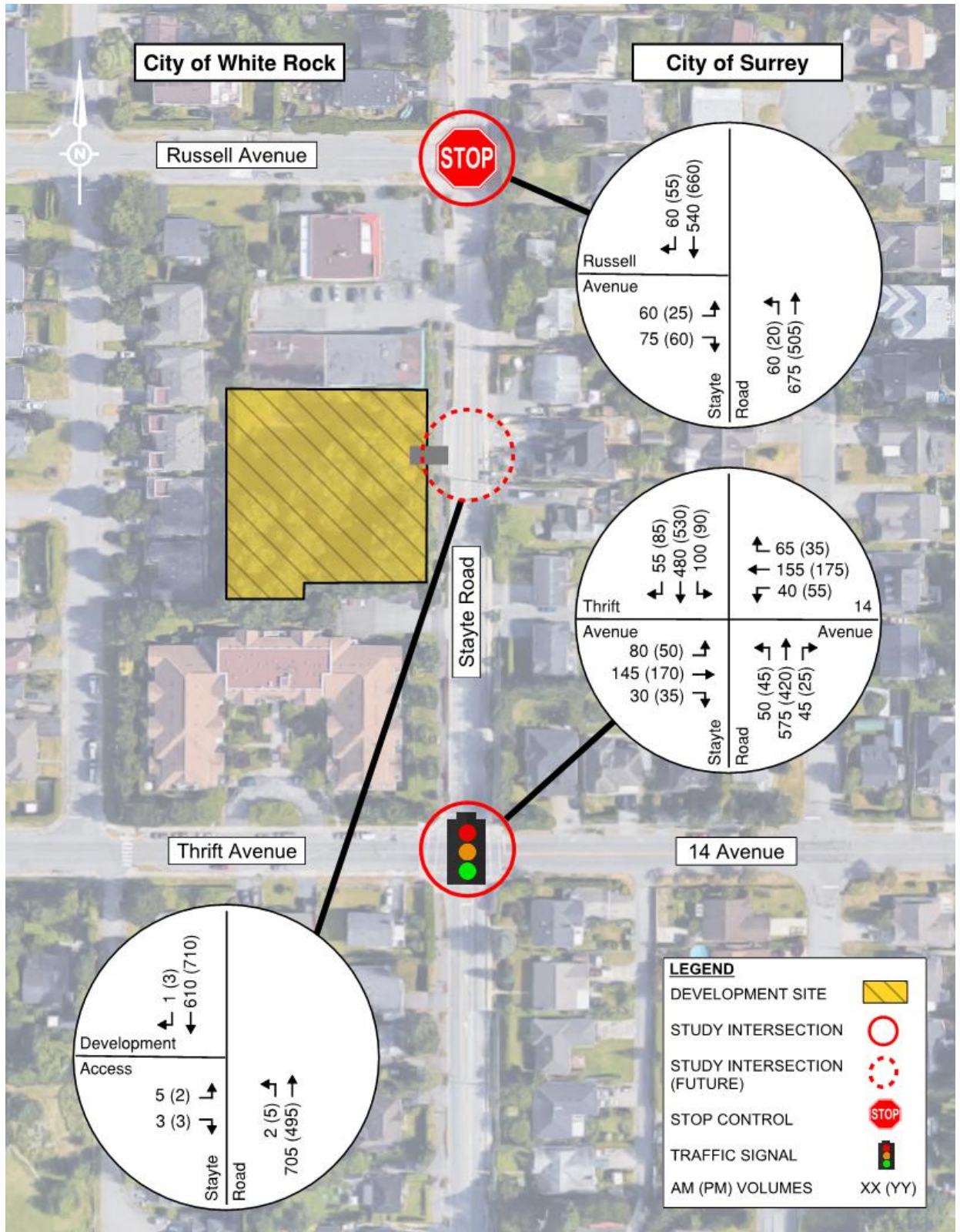


Figure 8 2045 Combined Traffic Volumes

3.0 Traffic Operations Analysis

Traffic operation performances for signalized and STOP-controlled intersections were analyzed using *Synchro Version 9 software*, which is based on the standard methods of the *Highway Capacity Manual (HCM)*. In *HCM*, measures of effectiveness were developed including control delay (seconds per vehicle) and Level of Service (LOS). LOS is defined based on the average control delay for different traffic controls (**Table 3**). In traffic operation analysis for an urban area, LOS D or better is generally considered as an acceptable performance for both signalized and STOP-controlled intersections. The Synchro results are summarized in the following sections and the output could be provided upon request.

Table 3 LOS Definitions for Signalized and Unsignalized Intersections in HCM

Traffic Control	LOS	A	B	C	D	E	F
Signalized	Delay (seconds per vehicle)	0-10	10-20	20-35	35-55	55-80	>80
Unsignalized		0-10	10-15	15-25	25-35	35-50	>50

Base (without proposed development traffic) and Combined (with proposed development traffic) traffic operations were analyzed and the results were summarized by peak hours and horizon years. The signal timings are estimated for this study, but signal timing optimization was applied for all traffic analyses.

For study intersections, the overall intersection delay (seconds per vehicle) and LOS, as well as critical movements (LOS E or F) are listed. For the critical movements, EB, WB, NB, and SB correspond to eastbound, westbound, northbound and southbound, respectively. L, R, and T imply left-turn, right-turn, and through movements, respectively. Lanes with shared movements are also indicated; for example, NBTR denotes as northbound movements with shared through-right lanes.

3.1 Existing Traffic Operations (2020)

Synchro analysis results for the existing traffic condition (2020) are summarized in **Table 4** and illustrated in **Figure 9**. It is found that under the existing conditions, both study intersections are operating at LOS B or better overall and no critical movements (LOS E or F) are found during both peak hours.

Table 4 Synchro Results for 2020 Background Traffic Conditions

Study Intersection along Stayte Road	Peak Hour	Base		
		Delay (s)	LOS	Critical Movement
Russell Avenue (STOP-controlled)	AM	2.1	A	-
	PM	1.1	A	-
Thrift Avenue (signalized)	AM	10.3	B	-
	PM	10.4	B	-

3.2 Opening Year Traffic Operations (2022)

The 2022 traffic analyses were undertaken to determine and compare the traffic performances in the expected opening year without the proposed development (Base) and with the proposed development (Combined). A summary of the traffic performance at the study intersections is shown in **Table 5**. Analysis results indicate that, similar to the existing conditions, all study intersections and individual movements will operate under acceptable conditions (LOS B or better) during both peak hours.

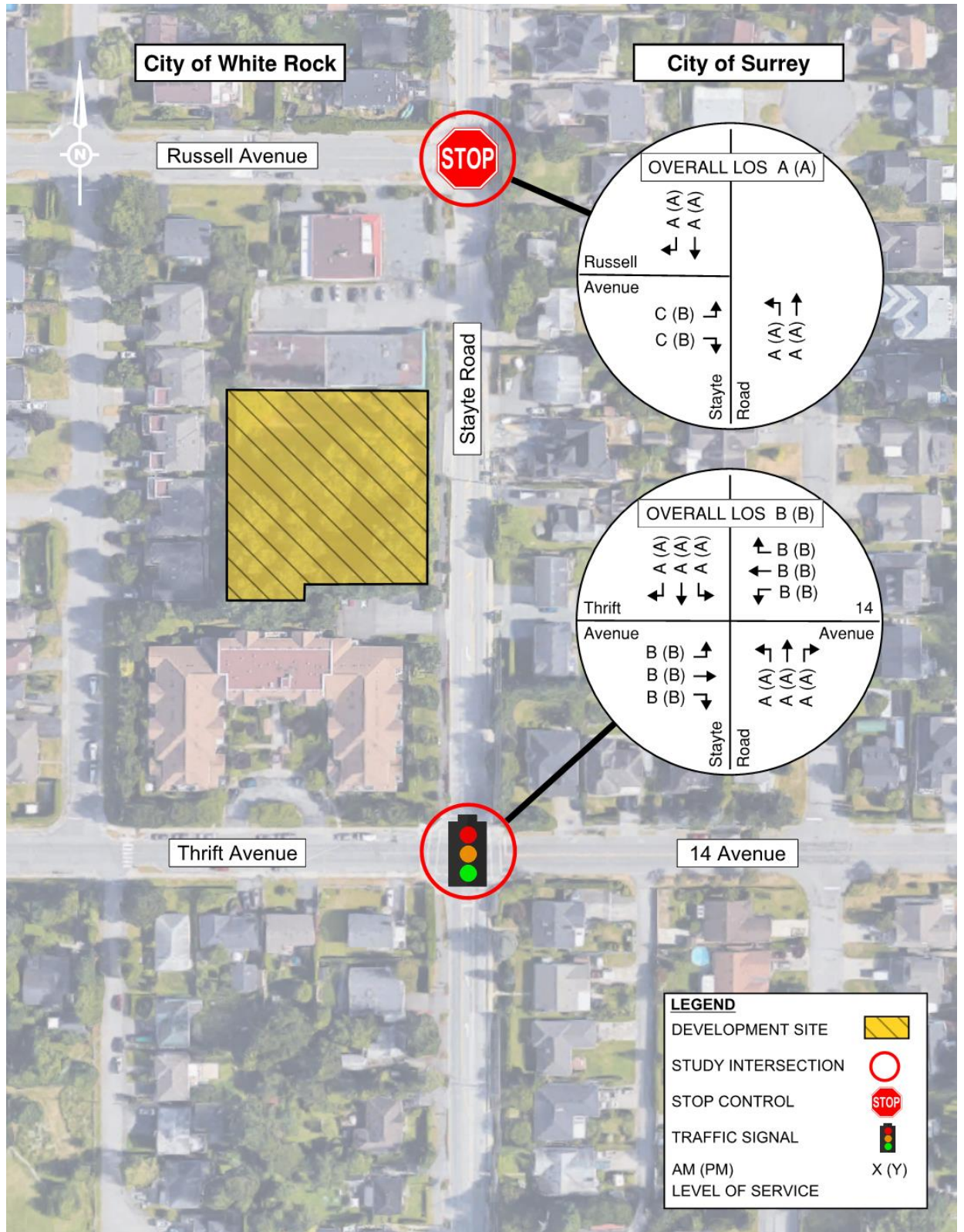


Figure 9 2020 Level of Service (Without Development)

Table 5 Synchro Results for 2022 Traffic Conditions

Study Intersection along Stayte Road	Peak Hour	Base			Combined		
		Delay (s)	LOS	Critical Movement	Delay (s)	LOS	Critical Movement
Russell Avenue (STOP-controlled)	AM	2.3	A	-	2.4	A	-
	PM	1.3	A	-	1.3	A	-
Thrift Avenue (signalized)	AM	10.7	B	-	10.7	B	-
	PM	10.8	B	-	10.9	B	-
Development Access	AM	-	-	-	0.2	A	-
	PM	-	-	-	0.1	A	-

3.3 Future Traffic Operations (2032)

The 2032 traffic analyses were undertaken to determine the traffic impacts of the proposed development 10 years after full build-out. Analysis results (similar to existing and opening years – LOS B or better overall and no critical movements) for the 2032 traffic condition are illustrated in **Figure 10** and summarized in **Table 6**.

Table 6 Synchro Results for 2032 Traffic Conditions

Study Intersection along Stayte Road	Peak Hour	Base			Combined		
		Delay (s)	LOS	Critical Movement	Delay (s)	LOS	Critical Movement
Russell Avenue (STOP-controlled)	AM	3.4	A	-	3.5	A	-
	PM	1.6	A	-	1.6	A	-
Thrift Avenue (signalized)	AM	12.1	B	-	12.2	B	-
	PM	12.2	B	-	13.2	B	-
Development Access	AM	-	-	-	0.2	A	-
	PM	-	-	-	0.1	A	-

3.4 Future Traffic Operations (2045)

Analysis results for the 2045 traffic analyses are illustrated in **Figure 11** and summarized in **Table 7**. Similar to previous traffic performances, they indicate that all study intersections will continue to operate at acceptable conditions (LOS B or better) during both peak hours. In both Base and Combined cases, critical movement (eastbound) was identified during the weekday AM peak hour for Russell Road, mainly due to relatively high eastbound left-turn volumes under STOP-controlled operations with limited crossing gaps on the north-south free flow of Stayte Road; however, this eastbound left-turn traffic will not be directly related to the development traffic.

Table 7 Synchro Results for 2045 Traffic Conditions

Study Intersection along Stayte Road	Peak Hour	Base			Combined		
		Delay (s)	LOS	Critical Movement	Delay (s)	LOS	Critical Movement
Russell Avenue (STOP-controlled)	AM	9.0	A	EBLR	9.9	A	EBLR
	PM	2.0	A	-	2.0	A	-
Thrift Avenue (signalized)	AM	17.1	B	-	17.1	B	-
	PM	16.4	B	-	16.8	B	-
Development Access	AM	-	-	-	0.2	A	-
	PM	-	-	-	0.1	A	-

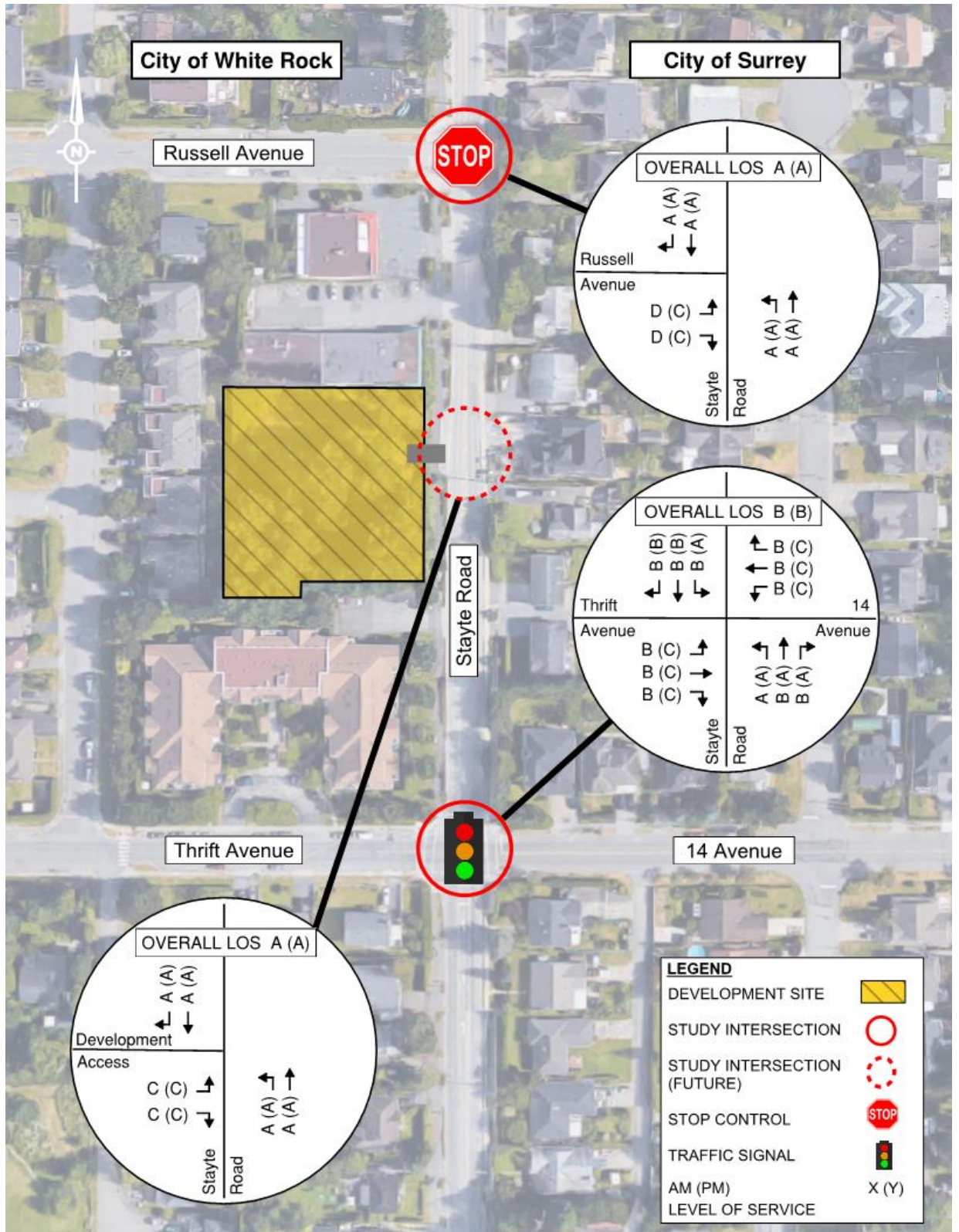


Figure 10 2032 Level of Service (With Proposed Development)

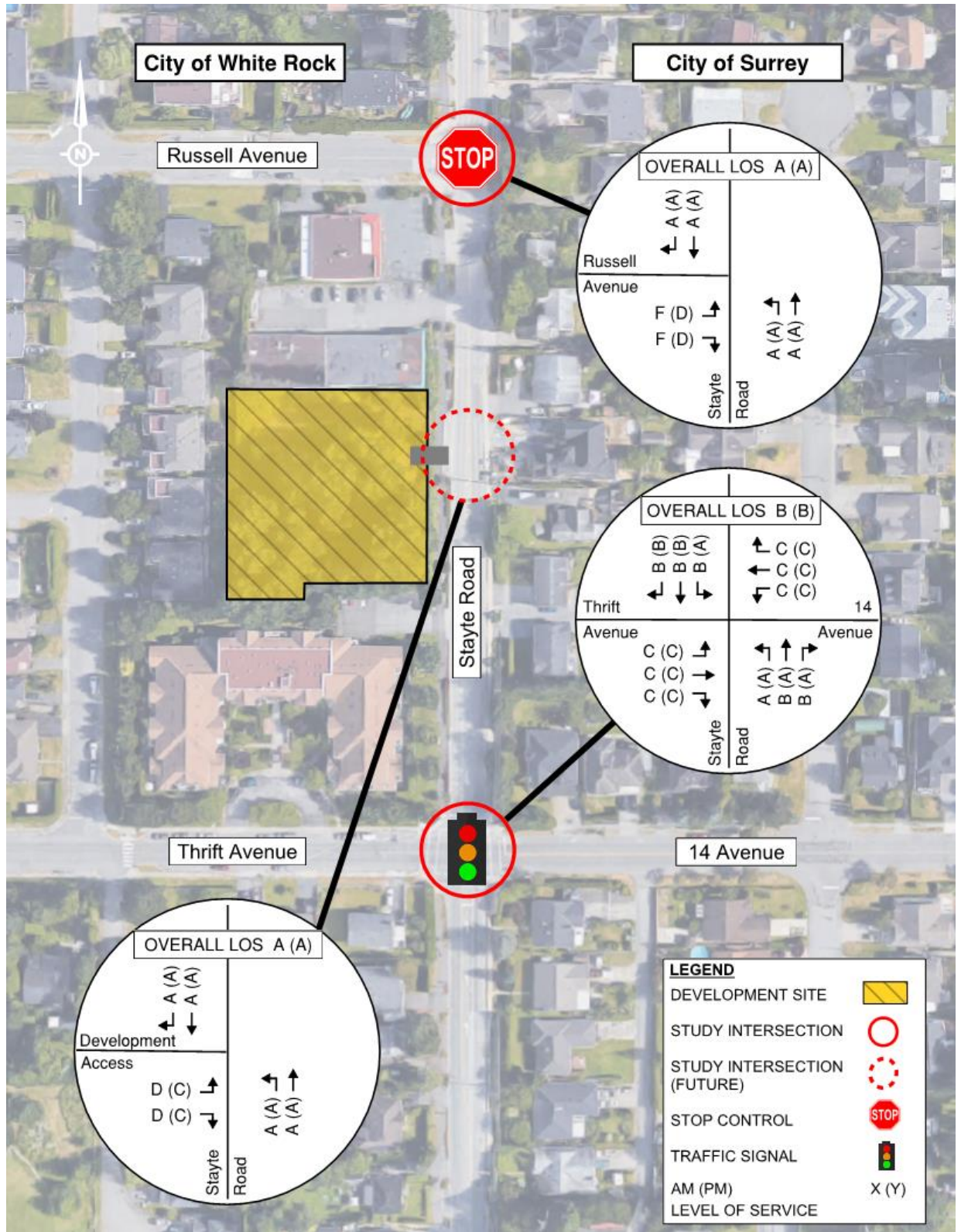


Figure 11 2045 Level of Service (With Proposed Development)

3.5 Development Access Roadway

As shown in **Table 5**, **Table 6**, and **Table 7**, the proposed development access with one lane each inbound and outbound direction off Stayte Road is expected to operate at LOS D or better for all scenarios (peak hours and horizon years). In 2045, the highest estimated vehicle delay was 29.9 seconds (half a minute) for outgoing vehicles (eastbound) during the AM peak hour. Estimated from SimTraffic (traffic microsimulation of Synchro), the maximum queue length (denotes the 95th percentile queue length) was 22.3 m (about five passenger cars) at the northbound approach, which is due to left-turn vehicles waiting for a crossing gap during the PM peak hour. The northbound and southbound queue lengths are within the spacing between the proposed development access and the adjacent building accesses. Therefore, no vehicle conflicts and traffic operation issues are expected accessing and egressing the proposed development access.

3.6 Traffic Operations Summary

All study intersections are expected to operate under LOS B or better during both peak hours in all horizon years. The only critical movement (eastbound) is expected during the AM peak hour in 2045 at the STOP-controlled intersection of Stayte Road and Russell Avenue. However, such traffic performance is expected even without development traffic. Furthermore, SimTraffic analysis results indicate the proposed development access will not generate any traffic operation issues to the adjacent buildings.

It should be noted that the development traffic makes up only less than 1% of the total entering traffic volumes at these major intersections during both peak hours in the future years of 2032 and 2045. These low percentages indicate that critical movement was mainly due to background traffic (annual growth) rather than the traffic generated by proposed development; noting 50% traffic growth from 2020 to 2045. Therefore, no intersection improvements are proposed for the traffic impact study.

4.0 Pedestrian, Cyclist, and Transit Review

It is understood that the overall Stayte Road will be constructed to the assigned road standards to become a Complete Street – *vibrant and amenable corridor supporting local trips by sustainable modes* – as per the City's *STP*.

PEDESTRIAN – All City's roads within the study area are provided with raised sidewalks. The raised sidewalk is used as a multi-use pathway on the frontage of the development site. With continuous sidewalks along streets fronting the proposed development and direct access close to the bus stops, walking will be encouraged for commuters to reduce short-distance vehicular trips. Marked pedestrian crosswalks are provided at both study intersections with pedestrian phases at the signalized intersection at Thrift Avenue / 14 Avenue. In the future, it is noted that the signalized intersection at Stayte Road and Thrift Avenue is to be upgraded with curb extension according to the City's *STP*, which will further improve the safety of crossing pedestrians with shorter crossing distance.

CYCLIST – It is clear that a safe, continuous, and convenient cycling network can encourage more people to bike more often, especially to school, work, communities, etc. According to the *OCP*, there are no bike lanes (existing and proposed) at the other roads within the study area. However, it is understood that there are currently plans by the City to provide bike lane connections to Stayte Road. Currently, a multi-use pathway is provided along the west side of Stayte Road and will be extended and connected to the south side of White Rock.

TRANSIT – Three major bus routes (Route 354, 361, and 363) are in the vicinity of the proposed development. Nearby bus stops are found along Stayte Road at Thrift Avenue / 14 Avenue (two north-south far-sided) and Russell Avenue (one westbound near-sided) for local community shuttles and peak period buses. It is expected some residents will take the public transit to their destinations; therefore, the actual traffic generated by the proposed development could be reduced. Based on the City's *STP*, local transit services on Russell Avenue is to be enhanced in terms of facility and frequency, routing to and from the community centre, hospital, etc.

5.0 Parking and Loading Requirements

OFF-STREET PARKING – The parking requirement for the development was verified using the City’s *Zoning Bylaw No. 2000 (Bylaw)*. For townhouses, 2.0 parking spaces per dwelling unit for residents are required. In addition, one parking space for persons with disabilities is to be provided. The latest site plan indicates the proposed development will fulfil the City’s *Bylaw* requirements. Moreover, three visitor parking stalls including one parking space for persons with disabilities are proposed. No parking reduction (Transportation Demand Management measures or Cash-in-lieu) are required and proposed. Passenger car turning path analysis was conducted using *AutoTURN software* for the internal vehicle circulation and accessing the visitor parking spaces. It was determined that the drive aisle configuration and the proposed visitor parking stall dimensions are adequate to accommodate mid-size passenger cars. Turning path drawings are provided in **Appendix B**.

OFF-STREET LOADING – For townhouse developments, no loading space is required as per the City’s *Bylaw*. It is understood that the strata will engage a private waste disposal company to manage waste collection operations. Low profile compactors will move garbage/recycling/organic bins from each unit to the complex entrance for pickup.

BICYCLE PARKING – The City’s *Bylaw* specifies a bicycle parking requirement of 1.0 spaces per dwelling unit for long-term secured (Class I) and 0.2 spaces per building for short-term (Class II). Thus, 23 Class I and 5 Class II bicycle parking spaces should be provided. Given the characteristic of the proposed housing type, it is expected that each townhouse can accommodate bicycle parking within their garage.

5.0 Conclusions

This letter report summarizes the study findings for the proposed development at 1453 Stayte Road in White Rock, British Columbia. At the full build-out (2022), the proposed residential development will consist of 23 townhouse units.

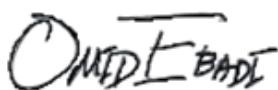
Traffic conditions for weekday AM and PM peak hours were analyzed for four horizon years – 2020 (existing), 2022 (full build-out), 2032 (10 years after full build-out), and 2045 (the City’s *OCP* horizon year). Trip generation analysis indicates that a total of 11 and 13 two-way vehicle trips will be generated during the AM and PM peak, respectively.

All study intersections are expected to operate at LOS B or better during both peak hours in all horizon years. Critical movement (eastbound) was noticed at the STOP-controlled intersection of Stayte Road and Russell Avenue during the 2045 AM peak hour. Such performance is due to background traffic as the development traffic contributes less than 1% of the total entering traffic volumes at the nearby intersections. Major traffic issues are not expected along the stretch of Stayte Road as well as at intersections and accesses. Therefore, no intersection improvement measures are proposed from the results of this letter report.

Based on the City’s *Zoning Bylaw*, the proposed development will fulfil the City’s off-street parking requirements. Using *AutoTURN* software, the turning paths for passenger cars entering and exiting the complex were reviewed and anticipated to be satisfactory. No loading space is required as per the City’s *Bylaw*, and a private waste disposal company with low profile compactors will manage the collection operations. It is also expected that each townhouse will accommodate bicycle parking within their garage.

If there are any questions or further information is required, please do not hesitate to contact the undersigned.

Yours truly,



Omid Ebadi, M.Sc., E.I.T.
Transportation Engineer



Alvin Tse, P.Eng.
Traffic / Road Safety Engineer

CC: Atelier Pacific Architect – Ms. Gloria Song, Intern Architect AIBC, RAIC (gloria@atelierpacific.com)

#201, 8506 – 200th Street Langley BC, V2Y 0M1 T: 604.371.0091 F: 604.371.0098

Terms of Reference

May 28, 2018

Our Reference: 32096

Attention: Carl Isaak, Manager of Planning, City of White Rock (cisaak@whiterockcity.ca)
Rosaline Choy, Manager of Engineering, City of White Rock (rchoy@whiterockcity.ca)

Dear Sir/Madam:

Reference: Traffic Engineering Services at 1453 Stayte Road Development, White Rock, BC

Background

A proposed residential development is located on the west side of Stayte Road between Russell Avenue and Thrift Avenue in White Rock. It will be consisted of a four-storey multi-family residential building (about 55 dwelling units) with an outdoor common area. An underground parking level is proposed for the building and vehicular access to the parkade will be on the south side of the proposed development through Stayte Road. The development site is bounded by neighbourhood commercial area (north) and multi-/single-family residential buildings (other sides).

Within the study area, the road network consists of arterials (Stayte Road – Major Road Network) and collectors (Thrift Avenue and Russell Avenue). It is understood that Stayte Road will be constructed to the latest road standards to become a Complete Street – vibrant and amenable corridor supporting local trips by sustainable modes – in accordance with the City’s Strategic Transportation Plan (STP). Currently, an off-street pathway is provided along the frontage of the development site. Bus stops are found along Stayte Road, Russell Avenue, and North Bluff Road. In the future, it is noted that the signalized intersection at Stayte Road and Thrift Avenue is to be upgraded with curb extension according to the City’s STP. Local transit services along Russell Avenue is to be enhanced in terms of facility and frequency, which routes to/from community centre, hospital, etc.

Proposed Tasks

Existing Conditions:

- Collect weekday AM and PM peak hour turning volumes at study intersections:
 - Stayte Road at Thrift Avenue (4-legged signal)
 - Stayte Road at Russel Avenue (3-legged Stop-controlled)

Trip Generation:

- Appropriate trip rates based on Institute of Transportation Engineers Trip Generation Manual (10th Edition)
- Trip distribution / assignment based on reasonable assumptions and achievable traffic routes

Traffic Conditions:

- Intersection performance at 2018 (existing), 2021 (expected opening year), 2031 (ten years after the expected opening year), and 2045 (matching the City’s Official Community Plan)
- Use 2% annual linear growth rate to estimate the future background traffic volumes – yielding 54% over 27 years (greater than 30%, which should be sufficient to take into consideration of approved and in progress developments in the City of Surrey side)

Design Criteria:

- Parking/loading requirements and arrangements
- Analyze access/egress operations
- Internal circulation on-site

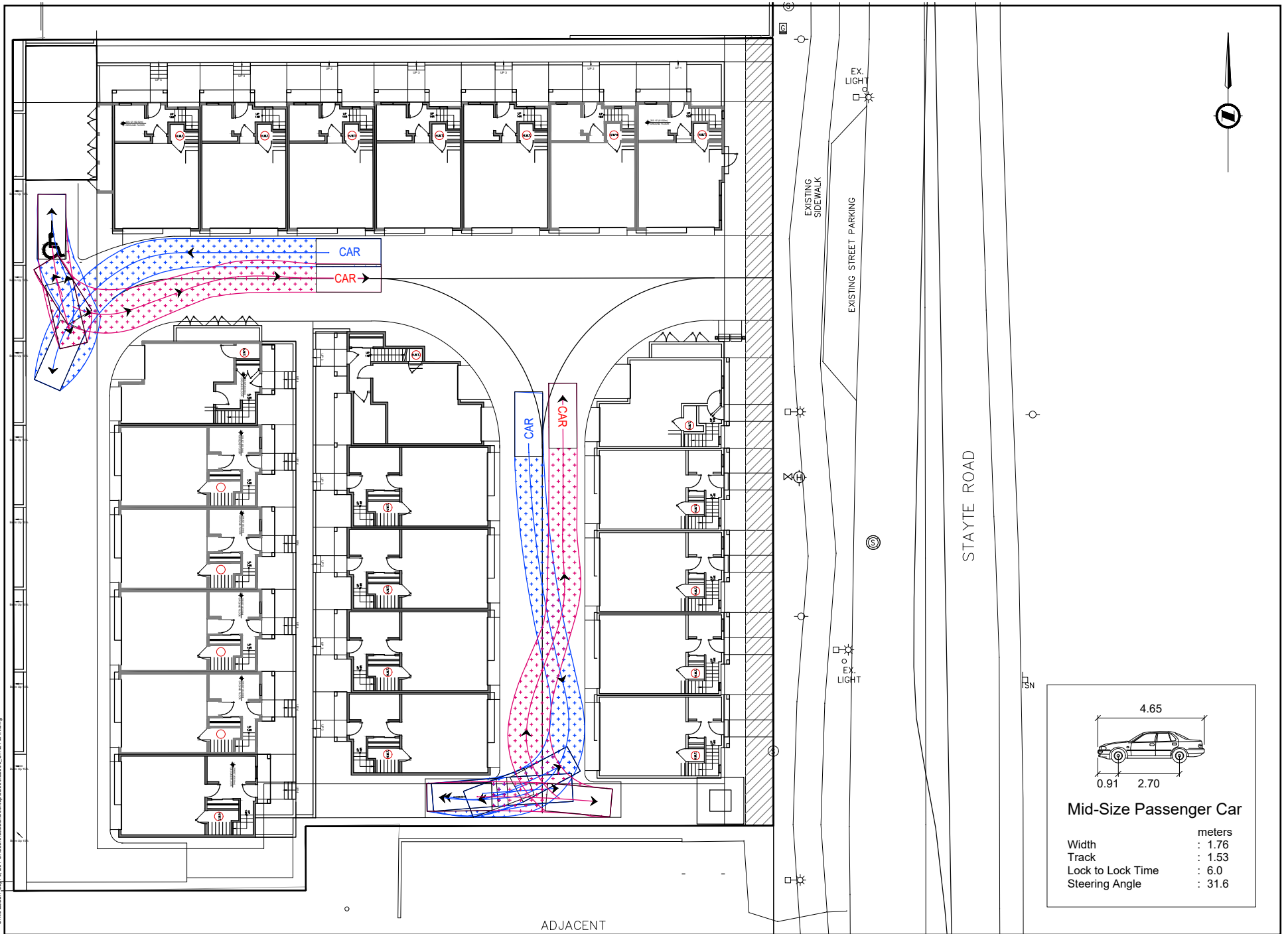
Other Users/Facilities:

- Pedestrians
- Cyclists
- Transit

Prepared by: Alvin Tse

Reviewed by: Borg Chan





ADJACENT