THE CORPORATION OF THE

CITY OF WHITE ROCK

CORPORATE REPORT

DATE: **July 25, 2022**

TO: **Mayor and Council**

FROM: **Anne Berry, Director, Planning and Development Services**

SUBJECT: **White Rock Zoning Bylaw, 2012, No. 2000, Amendment (CD-68 – 14937 Thrift Avenue and 1441, 1443-45, and 1465 Vidal Street) Bylaw, 2022, No. 2439**

RECOMMENDATIONS

THAT Council:

1. Give first and second readings to "White Rock Zoning Bylaw, 2012, No. 2000, Amendment (CD-68 – 14937 Thrift Avenue and 1441, 1443-45, 1465 Vidal Street) Bylaw, 2022, No. 2439" as presented.
2. Direct staff to schedule the public hearing for "White Rock Zoning Bylaw, 2012, No. 2000, Amendment (CD-68- 14937 Thrift Avenue and 1441, 1443-45, 1465 Vidal Street) Bylaw, 2022, No. 2439;" and
3. Direct staff to resolve the following issues before bringing "White Rock Zoning Bylaw, 2012, No. 2000, Amendment (CD-68- 14937 Thrift Avenue and 1441, 1443-45, 1465 Vidal Street) Bylaw, 2022, No. 2439" back for consideration of final adoption:
   a) Ensure that all engineering requirements and issues, including road dedication and the execution of a Works and Servicing Agreement, are addressed to the satisfaction of the Director of Engineering and Municipal Operations;
   b) Ensure that all matters about tree protection and retention are addressed to the satisfaction of the Director of Planning and Development Services;
   c) Confirm that a tree protection covenant, if and as required, is registered on title to ensure the recommendations of the final Arborist Report, approved by the Director of Planning and Development Services and, more specifically, the City's Arboricultural Technician, are implemented and maintained through future demolition and construction activities;
   d) Complete the demolition of the existing buildings to the satisfaction of the Director of Planning and Development Services; and
   e) A statutory-right-of-way be registered on title regarding the community urban park space.

EXECUTIVE SUMMARY

In July 2019, the city received applications for Zoning Bylaw Amendment and a Major Development Permit tied to the properties at 1441, 1443-45, 1465 Vidal Street, and 14937 Thrift

Avenue. The original proposal included a six-storey 129-unit apartment building intended to be rental in tenure.

The project has undergone a series of changes in response to city-initiated amendments to the Official Community Plan (OCP) and to address feedback from the Advisory Design Panel (ADP). The original proposal was presented to the Land Use and Planning Committee (LUPC) on October 19, 2020. At that time, the Committee was supportive of seeing the applications continue through the review process.

On November 22, 2021, Council passed a motion requesting the applicant to submit a new and revised proposal for the redevelopment of the subject property. This direction prompted the closure of the Major Development Permit Application (File No. 19-0111). At its meeting on January 10, 2022, Council resolved to reopen the file and bring it forward for full consideration, including a public hearing. At the February 7, 2022, meeting, an amending bylaw was presented for first and second reading and sought Council direction to schedule a public hearing. This motion was defeated.

The applicants have revised their proposal, which is being presented to Council for first reading and second reading, and staff is seeking Council direction to schedule a public hearing.

PREVIOUS COUNCIL DIRECTION

Motion # & Meeting Date	Motion Details
2020-LU/P-036 October 19, 2020	THAT the Land Use and Planning Committee recommends that Council resolve that the zoning amendment application at 1441 Vidal Street proceed to the next stage in the application review process.
2021 – LU/P-089 November 22, 2021	1. Direct staff to advance the Zoning Bylaw Amendment Application at 1441, 1443-45, and 1465 Vidal Street, and 14937 Thrift Avenue, to the next stage in the application review process; and 2. Update the on-site development signage to reflect the revised development proposal as described in the corporate report titled "Initial Review (Revised Submission) 1441, 1443-45, and 1465 Vidal Street, and 14937 Thrift Avenue, Zoning Bylaw Amendment and Major Development Permit (File No. 19-011)." DEFEATED
2021-456 November 22, 2021	THAT Council direct staff to inform the proponent that Council are looking for a new project with less density and less massing on the site at 1441, 1443-45 and 1465 Vidal Street and 14937 Thrift Avenue. (This motion was communicated to the applicant and the file was closed.)
2022-IC-008 January 10, 2022	THAT Council authorize staff to reopen City File No. 19-011: Revised Submission by Weststone Group at 1441-1465 Vidal Street and 14937 Thrift Avenue and bring the application forward for consideration at the next available open Council meeting

2022-044 February 7, 2022	That Council give first and second readings to "White Rock Zoning Bylaw, 2012, No. 2000, Amendment (CD-67 – 14937 Thrift Avenue and 1441, 1443-45, 1465 Vidal Street) Bylaw, 2022, No. 2418" as presented. DEFEATED

INTRODUCTION/BACKGROUND

The properties subject to these applications include 1441, 1443-45, 1465 Vidal Street, and 14937 Thrift Avenue ('Properties') (see Figure 1).

Figure 1- Subject Properties

The properties are situated within a block comprised mainly of multi-family dwellings. Immediately north of the site is the 12-storey "Beverley" building (1501 Vidal Street). To the east, there are several two and three-storey apartment buildings; to the west, there are several blocks of three-storey townhomes.

Official Community Plan

The Properties fall within the "Town Centre Transition" designation per the Official Community Plan (OCP). Within this designation, the plan permits multi-unit residential uses intended to support the commercial uses in the Town Centre. When the original proposal was made in 2019, the policies of the OCP enabled a maximum height of approximately 18 storeys along North Bluff Road, transitioning to four storeys along Thrift Avenue (see Figure 2). In the following section, staff will summarize the past proposals for the site.

2019 Proposal

The original proposal presented a six-storey building that stepped down as it approached Thrift Avenue (see Figure 2). The height of the project was compliant with the policies of the OCP; therefore, an OCP amendment was not required. The design had a floor area ratio (FAR) of 2.1, which was enabled by the policies of the plan. Specifically, the plan set a base density of 1.5 FAR, and policy 8.2.3 allowed for a 40 percent increase to 2.1 FAR, where at least half of the additional floor area was secured as rental units. The entire 129-unit project was proposed as rental in tenure and benefited from the density bonus.

Figure 2 - Original Proposal, July 2019 (File No. 19-011)

2021 Proposal

In 2021, the OCP was amended to limit height within the Town Centre Transition area. Regarding the properties, height was reduced to four storeys with the opportunity to support six storeys if an "affordable housing component" was included. Policy amendments were also made to lower the base density available within the area to 1.5 FAR, with the ability to increase this density to 2.5 FAR with an affordable housing component and 2.8 FAR with both an affordable housing component and replacement units. Although the amended OCP allows for consideration of a six-storey building, this iteration of the revised proposal was a four-storey building with 82 units, all of which would be rental in tenure (see Figure 3).

Figure 3- Revised Proposal, October 2021 (File No. 19-011)

This proposal included 17 three-bedroom units (20.7%), 17 two-bedroom units (20.7%), 38 one-bedroom units (46.4%) and 10 studio units (12.2%). The allocation of two and three-bedroom units support the City's "family-friendly housing" policy which seeks a minimum 10% supply.

Current Proposal

Figure 4- East perspective elevation

The current proposal is a 4-storey option with a rooftop amenity intended to soften the overall view from the Beverly and the Townhouses to the north. The design intends for residents living at higher levels to look at the trees and a landscaped rooftop amenity (see figure 7). In addition, the building has removed the tiered-down decks and have replaced them with a community green space to act as an urban park for all residents of White Rock (see figure 6). If approved staff will work with the applicant to put a statutory-right-of-way in place.

Figure 5- West perspective elevation

Figure 6 - Urban Park

Figure 7- Landscaped rooftop amenity

The total unit count for the building is 70, with a FAR of 1.5. This proposal included 20 three-bedroom units (28.6%), 25 two-bedroom units (35.7%), and 25 one-bedroom units (35.7%). The allocation of two and three-bedroom units supports the city's "family-friendly housing" policy which seeks a minimum 10% supply.

In the housing chapter of the OCP, the main goal is to ensure that the City of White Rock has a mix of housing choices that are appropriate and affordable for residents at various stages of their lives. The following objectives and policies apply to this project:

- Objective 11.1 - To expand housing choices for existing and future residents and increase the diversity of housing types for a variety of household sizes, incomes, tenures, needs, and preferences
- Policy 11.1.1 Family-Friendly Housing – Increase the attractiveness and affordability of housing in White Rock for families by:
    - Encouraging applicants to provide ground floor units with front door access to the street in all rezoning applications for residential developments greater than three storeys in height;
    - Providing a minimum of 10% of units with three bedrooms and a minimum of 35% with either two or three bedrooms in all rezoning applications for residential developments with more than 20 dwelling units
    - Establishing outdoor amenity space requirements for multi-unit residential developments
- Policy 11.1.3 Housing Choices Everywhere – Focus residential densities in the Town Centre but ensure that housing choices are distributed throughout the City in all neighbourhoods. Allow duplexes and triplexes throughout the Mature Neighbourhoods.
- Objective 11.2 - To support rental housing and a range of non-market housing options and needs along the housing spectrum.\

Purpose Built Rental

Low- and moderate-income families are challenged to afford the traditional single detached home in White Rock, given the disparity between median household incomes and benchmark sale prices. Many of these families are interested in ground-oriented rental and homeownership units, such as townhouses or apartments, but the availability of these units is limited. This project's design has several ground-oriented units along the street.

It is common for condos that may have enough bedrooms to accommodate all family members to be age-restricted, excluding families from accessing them. Engagement revealed that these circumstances are leading families to leave the city in search of options elsewhere. As a result, there is a need for two-, three- and four-bedroom units within multi-unit housing projects and for non-market rental, market rental and homeownership tenures. This development is proposing to include 20 three-bedroom units and 25 two-bedroom units.

White Rock currently has a mix of residential uses that characterize different areas of the city. For example, while single-family homes in the Mature Neighbourhood area account for the large majority of land area in White Rock, the most significant proportion of housing starts in the last decade have been apartments.

White Rock experiences housing affordability challenges along with the rest of the Lower Mainland, in which housing costs are well beyond a price-to-income ratio that justifies the price of housing. Regionally, 33.5% of households spent more than 30% of their income on housing in 2011. In White Rock, this value was slightly lower at 31.4%.

Supporting new Secure Market Rental (all rental buildings with rents at market rates) and Affordable Rental Housing (rent is subsidized) will help improve housing affordability in the city. Secure Market Rental units are designated for rental purposes only.

Secured rental housing is that portion of the rental stock that provides longer-term rental housing where tenants can reside without worry that their tenancy may be terminated by new owners who purchase the units. Rents are determined by market demand, subject to the *Residential Tenancy Act*.

Secured market rental housing means development or part of a development used only as market rental housing. A secure and robust stock of rental housing contributes to the city's social diversity, economic health, and community sustainability development. In addition, rental housing provides an option for those who cannot afford ownership housing and those who need flexible shorter-term housing options.

Also, particularly for households who are in the early stages of career development, renting provides the flexibility to respond to educational and employment opportunities that may require relocation. Finally, a good supply of rental housing includes housing options for the workforce, which is considered essential to attracting employers to locate in the city.

Strata Title Conversion

If this development is approved, these units will not be individually strata titled; they would be considered one titled strata unit. Therefore, they cannot be sold independently. The only way for this building to become strata is for the owner of the building to apply for a Strata Title Conversion (STC). With this proposed development, 100% of the residential floor space is unstratified rental housing.

When a multi-unit building is owned by one (or a group) of owners, and the owner(s) wish to create individual titles for each unit to allow for individual ownership, then a STC is required.

The *Condominium Act*, Zoning Bylaw, and Council policies control STCs in the City of White Rock. These Bylaws ensure that the proposed STC meets health, safety, and servicing requirements.

Strata Conversion is the creation of individual legal units in an existing multi-unit building with one (or a group) of owners. Strata conversion needs to be considered by Council when owners and/or tenants currently occupy the multi-unit building.

Examples of buildings that are converted from single legal units to strata-titled units include: duplexes, townhouses, apartments, multi-unit commercial and industrial buildings, and mixed-use residential/commercial buildings.

As outlined in Section 242 of the *Strata Property Act*, the province requires that a Local Government consider the following when a strata conversion request is submitted:

(a) the priority of rental accommodation over privately owned housing in the area;

(b) any proposals for the relocation of persons occupying a residential building;

(c) the life expectancy of the building;

(d) projected major increases in maintenance costs due to the condition of the building; and

(e) any other matters that, in its opinion, are relevant.

Housing Need Report – Metro Vancouver – Community and Housing Profile (October 2020)

In terms of rental housing, the following subsection outlines information regarding the primary and secondary rental market in White Rock. Figure 8 shows the number of purpose-built rental units in the primary rental market in White Rock over time. This includes both purpose-built rental apartments and row housing (townhouses). In 2019, there were a total of 1,392 units in the primary rental market. From 2010 to 2019, the number of purpose-built rental units decreased slightly by 0.7% (10 units).

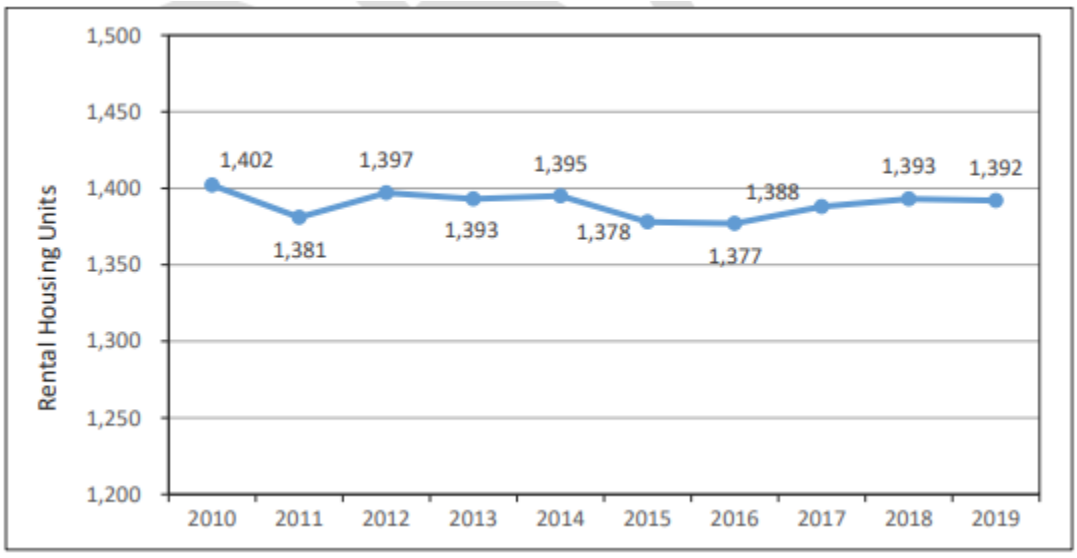


Figure 8- Total Number of Dwelling Units in the Primary Rental Market, White Rock (2010 to 2019)

Secondary suites and private condominium rentals represent a portion of the rental housing stock in the Metro Vancouver region. Data for private condominium rentals and secondary suites are challenging to obtain at the municipal level. According to the Metro Vancouver Housing Data

Book, there were an estimated 1,400-1,600 secondary suites in 2017 and an estimated 856 private rental condominium units in 2018 in the private rental market in White Rock.

Table 1 shows the rental vacancy rates in White Rock overall and by type of housing unit (i.e. number of bedrooms) since 2010. In 2019, the total vacancy rate in White Rock was at 1.7%, slightly higher than the 1.1% the previous year. The overall rental vacancy rate has varied significantly since 2010, reaching a high of 3.9% in 2013 and decreasing since then. In comparison, the overall vacancy rate in 2019 was 1.1% in Metro Vancouver and 1.5% in British Columbia.

Number of Bedrooms	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
0 bedrooms	0.0%	1.3%	2.6%	2.5%	4.1%	3.0%	0.0%	n/a	n/a	3.5%
1 bedroom	2.2%	0.7%	2.9%	4.4%	1.4%	0.8%	0.1%	0.3%	0.9%	2.2%
2 bedrooms	0.8%	0.3%	4.7%	2.8%	1.2%	0.3%	0.0%	0.6%	1.6%	0.3%
3+ bedrooms	10.6%	12.5%	0.0%	0.0%	n/a	0.0%	n/a	n/a	n/a	n/a
Total	**1.8%**	**0.7%**	**3.3%**	**3.9%**	**1.5%**	**0.8%**	**0.1%**	**0.6%**	**1.1%**	**1.7%**

Table 1- Vacancy Rate by Number of Bedrooms, White Rock (2010 to 2019)

Housing Needs Report (November 2021)

The purpose-built rental pool in White Rock has experienced stagnant growth over the past decade and has been surpassed by the growing number of rented condominiums. The secondary rental market, including secondary suites, are good options to offset the shortfall of purpose built rental housing; however, they are not secure, and tenants are subject to legal evictions for situations such as the owner wanting to move back into their unit. White Rock would benefit from securing more purpose-built rental units. In addition, special attention to design and configuration to allow for more accessible units for seniors, persons with disabilities, and family-sized units, would be appropriate.

Nearly one in three residents in White Rock are renters (32%). The rental vacancy rate has fluctuated in White Rock over the past decade, reaching a high of 3.9% in 2013. Since then, the rental vacancy rate has tightened and is currently less than 1% (see figure 9). The low vacancy creates pressure on the rental stock and can be considered an undersupply if sustained over a long period. In White Rock, there appears to be more pressure on two-bedroom rental units – which had a vacancy rate of 0.3% in 2020. Studio units had a vacancy rate of 1.3%. Although vacancy rates for three or more-bedroom units have not been reported for White Rock since 2015, the last three figures from 2012, 2013 and 2015 reported 0% vacancy for three-bedroom units in White Rock. Rental vacancy rates for studio units were 1.3%, and two-bedroom units were 0.3%. This data suggests that the demand and preference for larger rental units are on the rise in White Rock. This aligns with demographic data – studio units are typically too small and not appropriate for seniors; family households priced out of the homeownership market require enough bedrooms in a rental unit to accommodate all members of their household.

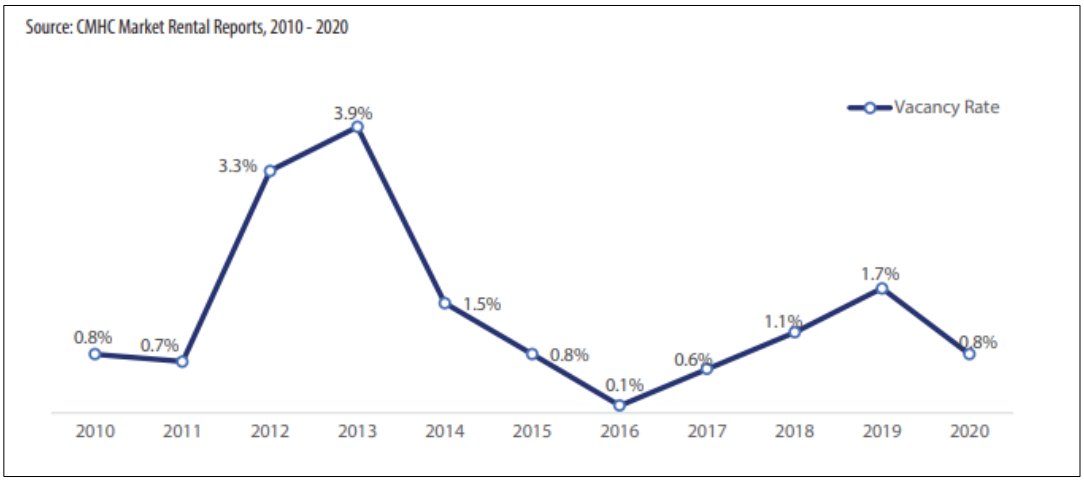


Figure 9 - Rental Vacancy Rate Over Time, White Rock

There has not been an increase in the number of purpose-built rental units in White Rock over the past decade (see figure 10). In 2010, there were 1,402 rental units compared to 1,394 in 2020. The fluctuation in the total number of rental units can result from several factors, such as new units coming online. At the same time, some sites are demolished and redeveloped, and possibly some rental conversions. The key takeaway is that despite new housing projects being built in White Rock, there has not been a net gain in available rental units. This gives fewer choices to renters and is likely a key contributor to the tightening rental vacancy rate in White Rock. It might also explain the incidence of overcrowding (affecting 10% of renters) when there are not enough bedrooms to accommodate everyone in a household.

The purpose-built rental stock is augmented by privately owned units in condos and basement suites that are rented. These are not purpose-built rental units and are less secure for tenants. However, these units provide an alternative. In 2017, approximately 888 condos and between 1,400 and 1,600 secondary suites were available for rent. However, concerns raised by the public and stakeholders during consultation on the Housing Needs Report suggest that several condo stratas are age-restricted (e.g., seniors-oriented), which means not all the secondary rental market is available to renters who need them.

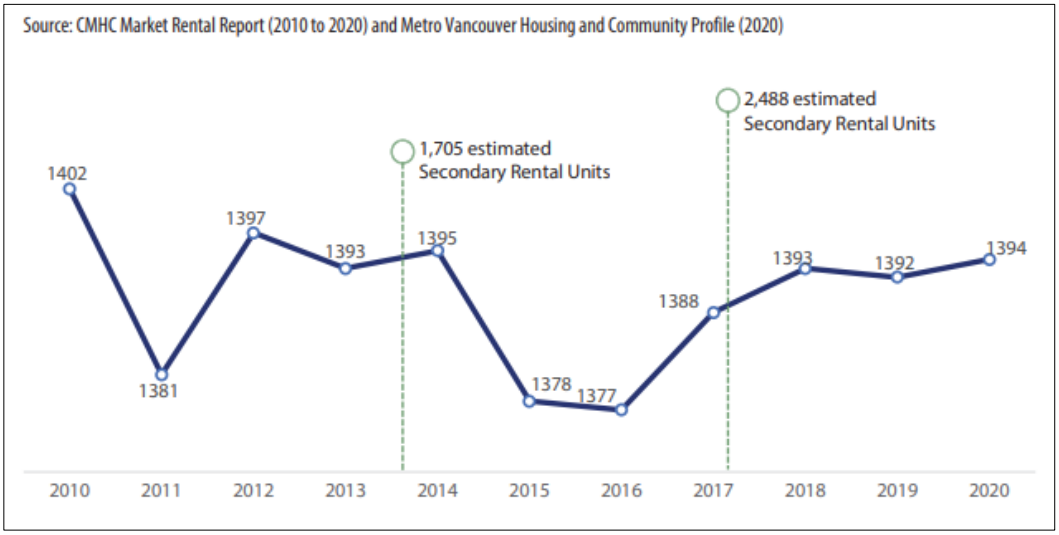


Figure 10- Purpose-Built Rental Units Over Time, White Rock

White Rock Zoning Bylaw

The properties subject to this rezoning application are currently zoned One-Unit Residential Zone (RS-1) (applicable to: 14937 Thrift Avenue & 1441 Vidal Street), Two-Unit (Duplex) Residential Zone (RT-1) (1443-45 Vidal Street), and CD-36 Comprehensive Development Zone (1465 Vidal Street) (see Figure 11).

Figure 11 - Zoning Context

The Figure illustrates the presence of RM-2 zoning east and several property-specific CD zones to the north and west. The maximum height in the RM-2 Zone is 10.7 metres or approximately three-storeys. The CD zones immediately west of the property enable townhome buildings of up to three storeys, with a pitched roof (~11-12 metres).

The proposal, if approved, would change the property's zoning to a site-specific Comprehensive Development (CD) Zone. The CD Zone would establish standards to realize the building massing, form and character as illustrated in Figures 4-7; Appendix B to this report includes several pages from the architectural design packages submitted with the revised proposal.

The current 70-unit proposal would be supported by 123 parking spaces provided within a three-storey below-grade parkade. The parking supply satisfies the zoning bylaw's requirements for residents and visitors and includes the required barrier-free parking. The zoning bylaw currently only requires 105 stalls for a development of this size. Therefore, the proposal exceeds the parking requirements. Ten percent (10%) of the stalls would be provided with charging infrastructure for an electric vehicle, and another ten percent (10%) would have a rough-in for future electric vehicle use.

Overall, this development is intended to have minimal traffic impacts. The estimated trip generation is not enough to require any intersection upgrades. The original traffic study was completed for 129 units (Appendix C) and this number has been reduced to 70 units. Because of the decrease in units staff did not request an updated traffic impact study. If Council would like further information this can be brought forward before third reading at the public hearing.

Advisory Design Panel (ADP)

This development has gone to ADP several times a summary of these meetings is in Appendix A - Corporate Report – November 22, 2021: Initial Review (Revised Submission) 1441, 1443-45,

and 1465 Vidal Street, and 14973 Thrift Avenue, Zoning Bylaw Amendment and Major Development Permit (File No. 19-01).

Staff have reviewed and compared the application changes to the previous plans and the ADP roles and mandate. In the review of development permits applications, the panel's mandate is to consider the following:

- *The alignment with applicable policies of the Official Community Plan and the Development Permit Area Guidelines:*
    - A local government may designate certain lands as Development Permit Areas (DPA) within an Official Community Plan (OCP). The Form and Character DPA controls the form and character objectives for commercial, industrial and residential development (e.g. landscaping, siting, exterior design).
    - The form, character, appearance and landscaping are important to make a place attractive and livable.
    - Staff have concluded through the review that the application still meets the intent of the guidelines, the density has been reduced, but the overall form and characteristics of the development have not changed. However, overall massing has changed in the following ways:
        - Building massing:
            - Reduced building massing significantly reduced from what is allowable under the OCP. The increase in height is now only proposed along the East side of Vidal street, where an additional dedication has been required for the future roadway widening. The façade of the building facing the adjacent townhouses to the west has not increased.
        - Corridor length:
            - Corridor length has been reduced by approximately 12' at the lower levels. Due to this the building length being reduced and greenspace being added to the southern portion of the site.
        - Views
            - The views of surrounding buildings are obstructed by trees, not the building, even with the height changes along the east side of Vidal.
            - The building's height is shorter than the existing old-growth trees surrounding the site. Therefore, no views will be obstructed by the building that isn't already obscured by the existing foliage.
            - Views have not been further obstructed on the west side of the site.
- *Form and character impacts that may arise out of a request for relief from a zoning bylaw standard(s) (e.g., reduction in yard setbacks, additional building height, etc.):*
    - There is no request for relief from zoning bylaw standards.
- *The intended function of the project and how the development fits within the neighbourhood context (e.g., urban design, site design, compatibility of built form, the potential for land use impacts such as shadowing, insufficient parking, negative impacts to traffic volumes, etc.):*

- Urban design has not changed significantly. The proposed parking meets the requirements of our zoning bylaw and has been verified by staff.
- The development meets the intent of the form and character guidelines.
- Traffic volumes will be reduced due to the reduction in units, and parking exceeds the zoning requirements.

- *The overall quality of building and site design considering:*
  - *the livability of the project for future occupants/site users, including specific regard for public safety (CPTED) and accessibility;*
    - The applicant included these features in their design. No significant changes have been made to the current submission that would affect this.
  - *the constructability of the design with regard to the potential impact on building longevity and cost (affordability for future owners/renters);*
    - No further changes are needed.
    - See the report section on Purpose Built Rental.
  - *the environmental sustainability of the design considering efforts for stormwater; retention, passive solar gain, electric vehicle use, and other measures;*
    - See the Climate Change Implications section of the report.
  - *the way in which the building design interacts with, and positively contributes to, the public realm (e.g., interface of the building with the street, landscaping treatment, pedestrian connections, variability in design and massing, etc.);*
    - The project focuses on providing open and engaging spaces for public life, enhancing the character of the built environment and public realm. The addition of an urban park for the community will benefit the City and its residents.
  - *the impact of the siting of buildings and structures, as well as other site features (e.g., driveways, impermeable amenity spaces, etc.) on protected trees, both private and public, and the ability to avoid tree removals and/or support tree plantings through the design of the building(s) and the layout of the site;*
    - The tree protection plan has not changed significantly. See the implications for Tree Preservation and Tree Canopy Enhancement section.
  - *the potential for conflicts with other municipal bylaws where such conflicts may affect the overall form and character of the development or the way in which the project upholds the policy objectives of the Official Community Plan.*
    - There are no known conflicts with City Bylaws. The development does align with the OCP, and no OCP amendment is needed.

Based on the above information and comments, staff concluded that the changes made to the current submission are not enough to be sent back to the ADP for further comments. The revised current submission meets the intent of the design guidelines, and it aligns with the mandate of the ADP. Council may choose to direct this application back to the ADP should Council deem a further review necessary.

FINANCIAL IMPLICATIONS

The following fees would be collected if approved for rezoning and subdivision (Table 2). Note these fees are subject to change:

Table 2: Applicable Development Costs

	Fee (per unit)	Units Subject to Fee	Sub-Total
City of White Rock Development Cost Charges (DCCs)	$11,253.3	70	**$787,731.00**
Metro Vancouver (Regional) DCCs	$4,269.00	70	**$298,830.00**
TransLink DCCs	$1,554.00	70	**$108,780.00**
Surrey School District School Site Acquisition Charges (SSAC)	$800.00	70	**$ 56,000.00**
Total			**$1,251,341.00**

This development does not meet the threshold for Community Amenity Contributions.

COMMUNICATION AND COMMUNITY ENGAGEMENT IMPLICATIONS

The original proposal was presented to the public through a Public Information Meeting (PIM) held on August 20, 2020. Approximately 40 people attended the PIM. Since this meeting, staff have maintained regular contact with several residents who have expressed an ongoing interest in the project. If the project proceeds to the next step in the approvals process, the public would have an opportunity to express their views direct to Council through a statutory public hearing.

INTERDEPARTMENTAL INVOLVEMENT/IMPLICATIONS

The application and revisions made to the project have been reviewed by city staff from several municipal departments. Before presenting the project to the City's Advisory Design Panel, the original design underwent several rounds of review and revision to ensure it satisfies municipal bylaw standards and the directions provided in the City's DPA Guidelines.

CLIMATE CHANGE IMPLICATIONS

The properties subject to this application are currently vacant. The lands sit immediately south of a 12-storey condominium building and fall within a neighbourhood predominantly comprised of three-storey apartments. The four-storey proposal is, in the opinion of staff, appropriately scaled to the context of development and will allow for the more intensive use of lands that are readily served by municipal infrastructure (e.g., roads, water, sewer, etc.). In addition, compatible development, through infill, lessens the need for sprawl into the periphery on lands which may be more appropriately left as undeveloped, naturalized spaces. Further, bringing residential use into areas within walking distance of commercial and recreational uses lessens the demand for private automobile use, a known contributor to climate change.

IMPLICATIONS FOR TREE PRESERVATION AND TREE CANOPY ENHANCEMENT

The Arborist Report prepared by Van Der Zalm (VDZ) and Associates has undergone several iterations of review and revision since the application was received in 2019. Staff have been working with the applicant to ensure the design of the building, specifically the parkade, allows

for the most significant level of tree retention. This is particularly important along the western and northern boundaries of the Subject Properties, where several mature trees exist.

In response to the City's comments, the applicant has created notches in the parkade to avoid the tree protection zones associated with several large off-site (OS) trees. Furthermore, the applicant has reduced the footprint of the building along its northern façade to provide greater accommodation to several off-site trees falling within the property tied to the Beverley development. Trees for which retention is proposed would require the posting of securities in accordance with the City's Tree Management Bylaw. Trees proposed for removal would be subject to replacement requirements. Where replacements are not feasible, cash-in-lieu of such may be considered by the City.

In summary, $117,000 in securities (held for tree retention) and 27 replacement trees ($40,500 value) would be required. The most recent Landscape Plan illustrates 24 replacement trees, plus 11 trees proposed for the fourth storey (rooftop amenity areas). If the project were to proceed, staff would work with the applicant and their Landscape Architect to ensure tree species and required spacing, amongst other matters, were addressed to the satisfaction of the city. If Council gives the first and second reading, the tree locations will be legally surveyed as per our bylaw, and any revision will be made before the third reading.

ALIGNMENT WITH STRATEGIC PRIORITIES

Council has expressed a desire to support a high quality of life in the city. The ability to support residential infill can help lessen the demand for sprawl while also making the best use of existing infrastructure.

OPTIONS / RISKS / ALTERNATIVES

The following options for Council's consideration are:

1. Give first and second readings to "White Rock Zoning Bylaw, 2012, No. 2000, Amendment (CD-68 – 14937 Thrift Avenue and 1441, 1443-45, 1465 Vidal Street) Bylaw, 2022, No. 2439"; or
2. Reject "White Rock Zoning Bylaw, 2012, No. 2000, Amendment (CD-68 – 14937 Thrift Avenue and 1441, 1443-45, 1465 Vidal Street) Bylaw, 2022, No. 2439".; or
3. Defer consideration of ""White Rock Zoning Bylaw, 2012, No. 2000, Amendment (CD-68 – 14937 Thrift Avenue and 1441, 1443-45, 1465 Vidal Street) Bylaw, 2022, No. 2439" pending further information to be identified.

Staff recommends Option 1, which is incorporated into the recommendations at the beginning of this corporate report.

CONCLUSION

This application proposes to rezone four properties from the "RS-1 One Unit Residential Zone" to the "Comprehensive Development Zone (CD) 68". If approved, it would enable the proposed multi-building residential project that consists of 70 purpose built rental apartments ranging from 1 to 3-bedroom units to be built. If Council supports this application staff will bring the

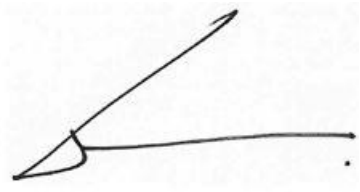
development permit forward at third reading. Overall, staff supports the proposal subject to the recommended conditions noted.

Respectfully submitted,

Anne Berry
Director, Planning and Development Services

Comments from the Chief Administrative Officer

I concur with the recommendations of this corporate report.



Guillermo Ferrero
Chief Administrative Officer

Appendix A: 1441 Vidal - Report to Council - November 22, 2021
Appendix B: Zoning Amendment Bylaw No. 2439
Appendix C: Traffic Impact Study
Appendix D: Arborist Report

THE CORPORATION OF THE

CITY OF WHITE ROCK

CORPORATE REPORT

DATE: **November 22, 2021**

TO: **Land Use and Planning Committee**

FROM: **Greg Newman, Acting Director, Planning and Development Services**

SUBJECT: **Initial Review (Revised Submission) 1441, 1443-45, and 1465 Vidal Street, and 14937 Thrift Avenue, Zoning Bylaw Amendment and Major Development Permit (File No. 19-011)**

RECOMMENDATIONS

THAT the Land Use and Planning Committee recommends that Council:

1. Direct staff to advance the Zoning Bylaw Amendment Application at 1441, 1443-45, and 1465 Vidal Street, and 14937 Thrift Avenue, to the next stage in the application review process; and
2. Update the on-site development signage to reflect the revised development proposal as described in the corporate report titled "Initial Review (Revised Submission) 1441, 1443-45, and 1465 Vidal Street, and 14937 Thrift Avenue, Zoning Bylaw Amendment and Major Development Permit (File No. 19-011)."

EXECUTIVE SUMMARY

In July, 2019, the City received applications for Zoning Bylaw Amendment and a Major Development Permit tied to the properties at 1441, 1443-45, and 1465 Vidal Street, and 14937 Thrift Avenue. The original proposal included a six-storey 129-unit apartment building which was intended to be rental in tenure. Over the past 24 months the project has undergone a series of changes in response to City-initiated amendments to the Official Community Plan and to address feedback received from the Advisory Design Panel. The project now presents a four-storey 82-unit rental apartment building. The original proposal was presented to the Land Use and Planning Committee (LUPC) on October 19, 2020. At that time, the Committee was supportive of seeing the applications continue through the normal review process. Staff are bringing this proposal back to LUPC to receive direction regarding the overall, revised, scope of the project.

PREVIOUS COUNCIL DIRECTION

Motion # & Meeting Date	Motion Details
Motion No. 2020-LU/P-036 October 19, 2020	THAT the Land Use and Planning Committee recommends that Council resolve that the zoning amendment application at 1441 Vidal Street proceed to the next stage in the application review process.

INTRODUCTION/BACKGROUND

Applications for Zoning Bylaw Amendment and a Major Development Permit were received by the City of White Rock in July, 2019. The properties subject to these applications include 1441, 1443-45, and 1465 Vidal Street, and 14937 Thrift Avenue ('Properties') (see Figure 1).

Figure 1: Subject Properties

The Properties are situated within a block largely comprised of multi-family dwellings. Immediately north of the site is the 12-storey "Beverley" building (1501 Vidal Street). To the east there are several two and three-storey apartment buildings and to the west there are several blocks of three-storey townhomes (see Site Photos in Appendix A).

Official Community Plan

The Properties fall within the "Town Centre Transition" designation per Schedule A to the Official Community Plan (OCP). Within this designation, the Plan permits multi-unit residential uses intended to support the commercial uses in the Town Centre. When the original proposal was made in 2019, the policies of the OCP enabled maximum height of approximately 18 storeys along North Bluff Road transitioning down to four storeys along Thrift Avenue (see Figure 2).

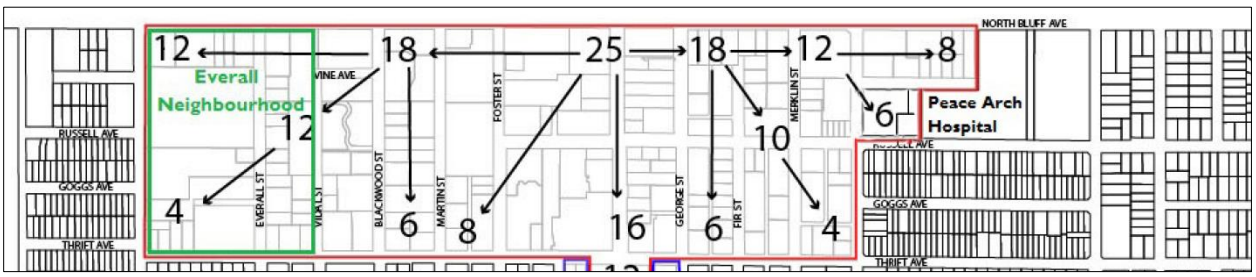


Figure 2: 2019 OCP (Figure 10 "Conceptual Height Transitions")

The original proposal presented a six-storey building that stepped down as it approached Thrift Avenue (see Figure 3). The height of the project was compliant with the policies of the OCP therefore an amendment was not required. The design had a floor area ratio (FAR) of 2.1 which was enabled by the policies of the Plan. Specifically, the Plan set a base density of 1.5 FAR and Policy 8.2.3 allowed for a 40 percent increase in density, to 2.1 FAR, where at least half of the additional floor area was secured as rental units. The entire 129 unit project was proposed as rental in tenure and therefore benefited from the density bonus.

Figure 3: Original Proposal, July, 2019 (File No. 19-011)

In 2021, the OCP was amended to limit height within the Town Centre Transition area. As it relates to the Properties, height was reduced to four storeys with the opportunity to support six storeys if an "affordable housing component" was included. Policy amendments were also made to lower the base density available within the area to 1.5 FAR, with the ability to increase this density to 2.5 FAR with an affordable housing component, and 2.8 FAR with both an affordable housing component and replacement units. Although the amended OCP allows for consideration of a six-storey building, the Applicant has held their revised proposal to a four-storey building with 82 units, all of which would be rental in tenure (see Figure 4).

Figure 4: Revised Proposal, October, 2021 (File No. 19-011)

The revised proposal includes 17 three-bedroom units (20.7%), 17 two-bedroom units (20.7%), 38 one-bedroom units (46.4%) and 10 studio units (12.2%). The allocation of two and three-bedroom units is supportive of the City's "family-friendly housing" policy which seeks a minimum 10% supply.

White Rock Zoning Bylaw

The properties subject to this rezoning application are currently zoned One-Unit Residential Zone (RS-1) (applicable to: 14937 Thrift Avenue & 1441 Vidal Street), Two-Unit (Duplex) Residential Zone (RT-1) (1443-45 Vidal Street), and CD-36 Comprehensive Development Zone (1465 Vidal Street) (see Figure 5). The CD-36 Zone allows for a ten-unit apartment use in addition to a retail service group 1 (commercial) use. The commercial use would be limited to the first and second storeys of a potential four storey building.

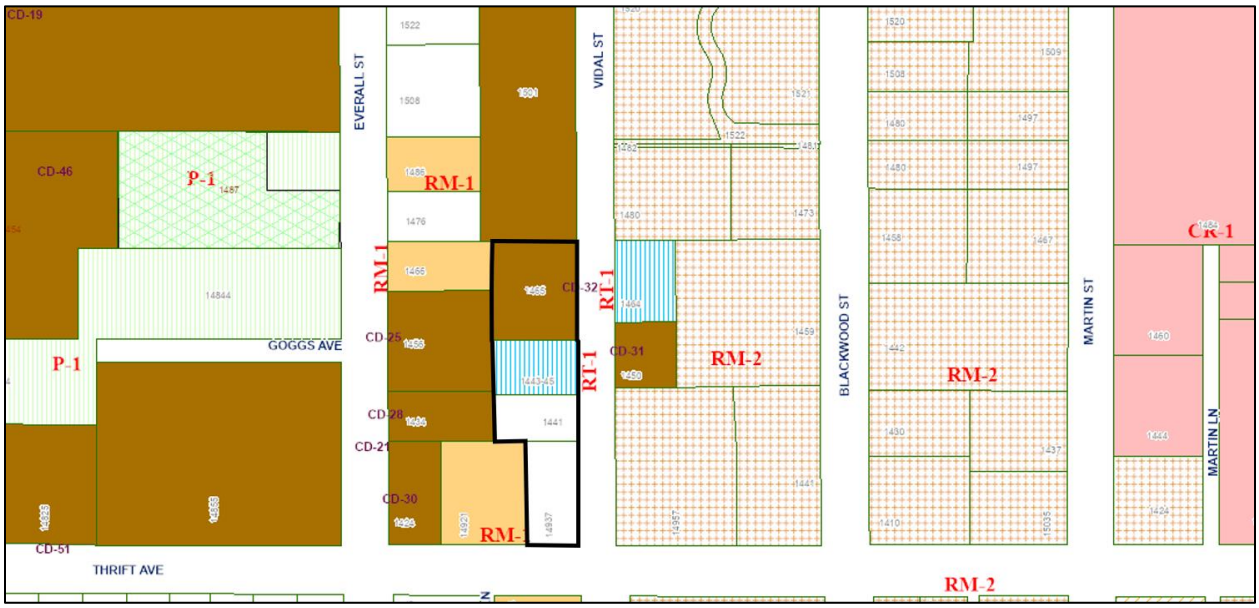


Figure 5: Zoning Context

The Figure illustrates the presence of RM-2 zoning to the east and several property-specific CD zones to the north and west. The maximum height in the RM-2 Zone is 10.7 metres or approximately three-storeys. The CD zones immediately west of the property enable townhome buildings of up to three storeys, with a pitched roof (~11-12 metres). The Beverley building north of the Properties permits maximum height of 37 metres or roughly 12 storeys.

The proposal, if approved, would change the zoning of the property to a site-specific Comprehensive Development (CD) Zone. The CD Zone would establish standards used to realize the building massing, form and character as illustrated in Figure 4; Appendix B to this report includes several pages from the architectural design packages submitted with the revised proposal. The current 82-unit proposal would be supported by 123 parking spaces, provided within a three-storey below-grade parkade. The supply of parking satisfies the requirements of the zoning bylaw for residents and visitors and includes the required barrier free parking. Ten percent (10%) of the stalls would be provided charging infrastructure for an electric vehicle and another ten percent (10%) would have a rough-in for future electric vehicle use.

Advisory Design Panel Review

The original six-storey project was presented to the Advisory Design Panel on October 20, 2020, and May 18, 2021. Table 1 that follows summarizes some of the main points raised during these two meetings and the Applicant's response to the points; more detail regarding the Panel's feedback can be found within the meeting minutes available on the City's webpage (direct link).

Table 1: Advisory Design Panel Comments from October 20, 2020 and May 18, 2021 Meetings

Comments from the Panel	Applicant's Response
Potential impacts to trees, particularly those immediately north of the Properties.	North face of the building moved south to lessen potential impacts to trees. Parkade "notched" to allow for tree retention along western limit of property.
Structural reliability of the design is unclear. Related concerns noted about the ability of the building to support rooftop plantings.	Architect referenced options (e.g., structural concrete columns, stone clad architectural columns, composite metal panel frames, etc.) to support design as presented.
Horizontal scale of the building (travel distances for tenants) too long.	Additional stepping of the building introduced along with introduction of architectural features that create visual breaks in massing (see Figure 6).
Need for higher number of electric vehicle charging stations.	Applicant committed to 100 percent rough-in with original proposal; since reduced to minimum required.
Amount of hardscaping may have negative impacts to stormwater management.	Applicant referenced inclusion of plantings and other landscaping elements to aid in stormwater retention.
Uncertainty about tenure of building.	Rental tenure to be secured through zoning controls.
Accessible design (units).	All units have wheelchair access. Fourteen (14) adaptable units with larger doorways / corridors.
Limited regard for rooftop storage (amenity materials) and mechanical units.	Introduction of storage spaces and spaces for mechanical units, the latter of which will be confirmed with the retention of a mechanical engineer at the building permit stage of design.

Figure 6: Rendering Illustrating Stepping in Building Design moving South towards Thrift Avenue

The motion carried by the Panel during their October 20, 2020 meeting was:

> "THAT the Advisory Design Panel recommends that staff work with the applicant to further the design of their project based on the comments received by the Panel and summarized in the October 20, 2020 meeting minutes and that it be brought back to the Panel for further review."

The motion carried by the Panel on May 18, 2020 was:

> "THAT the project be conditionally accepted subject to addressing the comments provided by the Panel during the meeting."

On March 29, 2021 the Land Use and Planning Committee passed Motion LU/P-038, being:

> "THAT the Land Use and Planning Committee endorse in relation to Town Centre Transition area Option C as noted in the March 8, 2021 corporate report, with an amendment noting four (4) to six (6) stories where it is defined that along North Bluff on the east or west side permit six (6) stories; and
>
> For the remaining sites it be noted as four (4) stories to six (6) stories with a notation that proposals over four (4) stores would be considered when there is an affordable housing component."

The motion above was followed by formal amendments to the OCP which were ultimately adopted by Council on June 28, 2021. The amendments had the effect of reducing maximum height permissions available to the Properties to four storeys, or six storeys with the inclusion of an "affordable housing component." In anticipation of the adoption of the OCP amendments, the Applicant revised their proposal to a four-storey rental building. This proposal was presented to the ADP on June 15, 2021 and September 21, 2021. Table 2 below outlines the main points raised during these two meetings and the Applicant's response.

Table 2: Advisory Design Panel Comments from June 15, 2021 and September 21, 2021 Meetings

Comments from the Panel	Applicant's Response
Incorporation of "west coast design" unclear; desire to see more natural materials (less hardy board and aluminum) incorporated into the project.	Natural materials including stone, heavy timber, wood accents and rich natural tones have been incorporated into the design (see Figure 7). Revised design includes stained lumber for the entry column, natural stone (Westcoast Ledgestone) at the base of the building, and stone (Hearthstone, Black Rundle) at the entry frame (see Appendix B for material summary).
Questions raised about access to the private rooftop amenity spaces and the programing of these spaces.	Private amenity spaces on fourth storey programmed with privacy screens and cedar partitions. Common amenity along the southern limit of the development with furniture and a children's play space.
Plantings proposed within the northwest corner of the property may suffer due to limited solar exposure.	Decking along north façade shifted to the east and west to allow more natural light to the north. Landscaping changes made to reduce the number, and size (at maturity) of the trees proposed. The trees are now concentrated on the mid-portion of the north elevation allowing solar exposure from the northeast and northwest (see Appendix C for landscape plan).
Central hallway too long. Creates a break between units on the fourth storey and private rooftop amenity, opposite the hallway from the unit entrance. Suggested relocation of the hallway to enable units on fourth storey to be tied directly to amenity.	Design elements proposed to break up the visual appearance of the hallway and to link the unit entrances to the private amenity access. Relocating the hallway itself would result in structural challenges. Looking into options to open up portions of the exterior wall to bring light / visibility to the hallway.
Clarification sought regarding proposed tenure of the building.	Original proposal was rental. Dropping to four storeys the revised project (when presented to the ADP) was proposed as a strata building; the building is now intended to be rental in tenure.

Comments from the Panel	Applicant's Response
Concern with the interface of the development (exposed blank parkade wall) with the dwellings to the southwest.	Revisions made to west façade cladding to break up the massing. Updated with planter boxes and alternating material patterns on the lower stone walls. Updates create visual interest and comfort for pedestrians in accordance with Development Permit Area Guideline (22.6.c). Introduction of evergreen plant materials and cable trellis system with climbing plants to soften transition between project and nearby dwellings.

Figure 7: Rendering Illustrating use of Natural Colours and Wood Element

The motion carried by the Panel during their June 15, 2021 meeting was:

> "THAT Panel defers making a recommendation on the project pending the resolution of issues to be listed by the Panel (being the issues raised during this meeting) following which the application be brought back to the Panel and the Applicant speak to how the issues have been addressed."

The motion carried by the Panel on September 21, 2021 was:

> "THAT the Panel deny the application, as presented."

The Advisory Design Panel's review of the original and revised proposals led to changes which have undoubtedly benefited the project. Although the Panel has recommended that the project be denied, staff are of the opinion that the design of the project is consistent with the broad policy objectives of the Official Community Plan and the more explicit design direction provided by the Multi-Family Development Permit Area Guidelines, found in Section 22.6 of the Plan. The project will bring much-needed rental tenure housing to the City and, at four-storeys, is considered compatible in scale to that of adjacent development. Technical matters relating to servicing, access,

tree retention, and building code compliance will be further vetted through subsequent permitting processes.

FINANCIAL IMPLICATIONS

Municipal Development Cost Charges (DCCs) in the amount of $922,770 would be required for the 82-unit rental apartment with the potential for credits to be applied for DCCs that may have been paid when the now-demolished single-family homes were constructed; this will be confirmed upon receipt of a building permit application. Community Amenity Contributions would not be applicable to the project as it does not meet the eligibility criteria (i.e., exceeding 1.5 FAR), per the City of White Rock Density Bonus / Amenity Contribution Policy (No. 511).

COMMUNICATION AND COMMUNITY ENGAGEMENT IMPLICATIONS

The original proposal was presented to the public through a Public Information Meeting (PIM) held August 20, 2020. Approximately 40 people attended the PIM. Since this meeting, staff have maintained regular contact with several residents who have expressed an on-going interest in the project. If the project proceeds to the next step in the approvals process, the public would have an opportunity to express their views direct to Council through a statutory public hearing.

INTERDEPARTMENTAL INVOLVEMENT/IMPLICATIONS

The application and revisions made to the project have been reviewed by City staff from several municipal departments. Prior to presenting the project to the City's Advisory Design Panel, the original design underwent several rounds of review and revision to ensure it satisfies municipal bylaw standards and the aforementioned direction provided in the City's DPA Guidelines.

CLIMATE CHANGE IMPLICATIONS

The Properties subject to this application are currently vacant. The lands sit immediately south of a 12-storey condominium building and fall within a neighbourhood predominantly comprised of three-storey apartments. The four-storey proposal is, in the opinion of staff, appropriately scaled to the context of development and will allow for the more intensive use of lands that are readily served by municipal infrastructure (e.g., roads, water, sewer, etc.). Compatible development, through infill, lessens the need for sprawl into the periphery, on lands which may be more appropriately left as undeveloped, naturalized spaces. Further, bringing residential use into areas that are within walking distance of commercial and recreational uses lessens the demand for private automobile use, which is a known contributor to climate change.

IMPLICATIONS FOR TREE PRESERVATION AND CANOPY ENHANCEMENT

The original application was supported with an Arborist Report prepared by Van Der Zalm (VDZ) and Associates. The Report has undergone several iterations of review, and revision, since the application was received in 2019. Staff have been working with the Applicant to ensure the design of building, and more specifically the parkade, allows for the greatest level of tree retention. This is particularly important along the western and northern boundaries of the Subject Properties, where several mature trees exist (see Page "L-02" in Appendix C).

In response to the City's comments the Applicant has created notches in the parkade to avoid the tree protection zones associated with several large off-site (OS) trees. Furthermore, the Applicant has reduced the footprint of the building along its northern façade to provide greater accommodation to several off-site trees falling within the property tied to the Beverley development. Appendix D includes

the tree assessment data (inventory) prepared by VDZ and Associates. Trees for which retention is proposed would require the posting of securities in accordance with the City's Tree Management Bylaw. Trees proposed for removal, would be subject to replacement requirements. Where replacements are not feasible, cash-in-lieu of such may be considered by the City. In summary, $117,000 in securities (held for tree retention) and a total of 27 replacement trees ($40,500 value) would be required. The most recent Landscape Plan, dated October 15, 2021, illustrates a total of 24 replacement trees, plus 11 trees proposed for the fourth storey (rooftop amenity areas). If the project were to proceed, staff would work with the Applicant and their Landscape Architect to ensure tree species and required spacing, amongst other matters, were addressed to the satisfaction of the City.

ALIGNMENT WITH STRATEGIC PRIORITIES

The proposal is generally aligned with the Corporate Vision established as part of Council's Strategic Priorities, particularly with respect to protecting the environment, and supporting a community where people can live, work and play in an enjoyable atmosphere.

OPTIONS / RISKS / ALTERNATIVES

The following options are available for Council's consideration:

1. LUPC may direct staff to obtain additional project-specific information prior to deciding whether to advance or deny the Application;
2. LUPC may deny the Application; or
3. LUPC may direct the Application to proceed to the next stage in the process and give additional direction on any additional focus or scrutiny during the review process.

CONCLUSION

Applications for zoning bylaw amendment and a major development permit were received in 2019 to support the development of a six-storey, now four-storey, rental apartment building at 1441, 1443-45, and 1465 Vidal Street, and 14937 Thrift Avenue. The project has undergone an iterative review by City staff and the Advisory Design Panel. Staff believe the revised, rental tenure, proposal warrants further consideration through the municipal review process and an opportunity for more formal review during a future public hearing.

Respectfully submitted,

Greg Newman, MCIP, RPP
Acting Director, Planning and Development Services

Comments from the Chief Administrative Officer

I concur with the recommendations of this corporate report.

Guillermo Ferrero
Chief Administrative Officer

Appendix A: Site Photos
Appendix B: Architectural Designs (select pages)
Appendix C: Landscape Designs (select pages)
Appendix D: Tree Inventory

The Corporation of the
CITY OF WHITE ROCK
BYLAW No. 2439

A Bylaw to amend the
"White Rock Zoning Bylaw, 2012, No. 2000" as amended

The CITY COUNCIL of the Corporation of the City of White Rock in open meeting assembled ENACTS as follows:

1. THAT Schedule C of the *White Rock Zoning Bylaw, 2012, No. 2000* as amended is further amended by rezoning the following lands:

   Lot 8 Section 10 Township 1 New Westminster District Plan NWP13684
   PID: 007-208-677
   (1441 Vidal Street)

   Lot 2 Section 10 Township 1 New Westminster District Plan NWS2236
   PID: 001-267-761
   (1443 Vidal Street)

   Lot 1 Section 9 Township 1 New Westminster District Plan NWS2236
   PID: 001-267-744
   (1445 Vidal Street)

   Lot 1 Section 10 Township 1 New Westminster District Plan EPP46879
   PID: 029-484-413
   (1465 Vidal Street)

   Lot 41 Section 10 Township 1 New Westminster District Plan NWP35379
   PID: 007-223-480
   (14937 Thrift Avenue)

   as shown on Schedule "1" attached hereto, from the 'RS-1 One Unit Residential Zone' and the 'RT-1 Two Unit (Duplex) Residential Zone' and the 'CD-32 Comprehensive Zone' to the 'CD-68 Comprehensive Development Zone (Thrift/Vidal Street).'

2. THAT *White Rock Zoning Bylaw, 2012, No. 2000* as amended is further amended:

   (1) by adding to the Table of Contents for 'Schedule B (Comprehensive Development Zones)', Section 7.68 CD-68 Comprehensive Development Zone', and

   (2) by adding the attached Schedule "2" to 'Schedule B (Comprehensive Development Zones)' Section 7.68 CD-68 Comprehensive Development Zone'.

3. This bylaw may be cited for all purposes as "*White Rock Zoning Bylaw, 2012, No. 2000, Amendment (CD-68 – 14937 Thrift Avenue and 1441, 1443-45, 1465 Vidal Street) Bylaw, 2022, No. 2439"*.

Public Information Meeting held this	20th day of	August, 2020
Read a first time this	day of	, 2022
Read a second time this	day of	, 2022
Considered at a Public Hearing this	day of	, 2022
Read a third time this	day of	, 2022
Adopted this	day of	, 2022

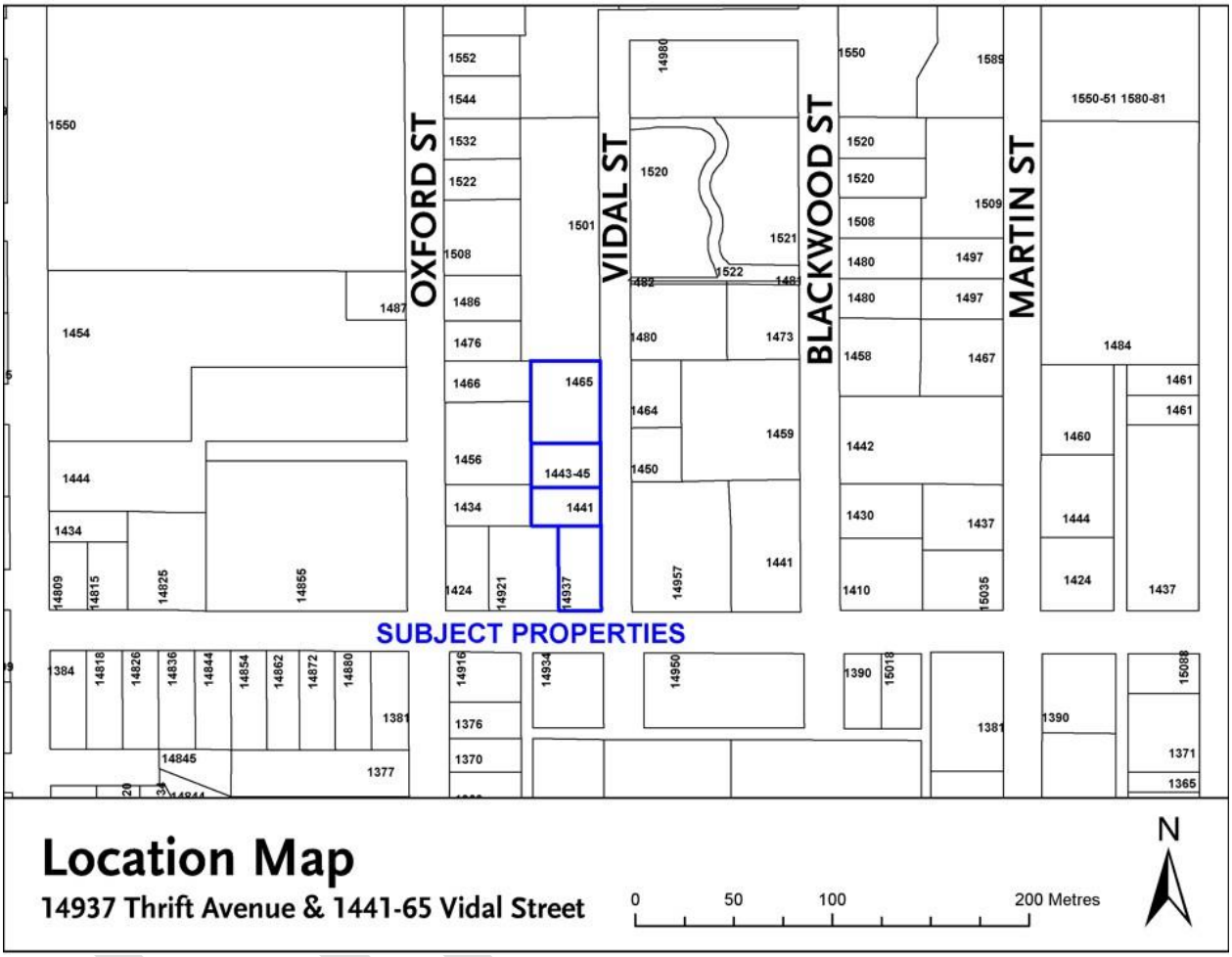
_____

Mayor

_____

Director of Corporate Administration

Schedule “1”


OXFORD ST
VIDAL ST
BLACKWOOD ST
MARTIN ST
SUBJECT PROPERTIES
Location Map
14937 Thrift Avenue & 1441-65 Vidal Street
0
50
100
200 Metres
N

7.68 CD-68 COMPREHENSIVE DEVELOPMENT ZONE

INTENT

The intent of this zone is to accommodate the development of a multi-unit rental residential building, being four storeys and with 70 dwelling units, on four consolidated sites of approximately 3,875.4 square meters (41,714 square feet or 0.958 acres).

1. Permitted Uses:

   (1) *multi-unit residential use*
   (2) *accessory home occupation* use in accordance with the provisions of section 5.3 and that does not involve clients directly accessing the *principal building.*

2. Lot Coverage:

   (1) The maximum *lot coverage* in the CD-68 zone is 39.6 %.

3. Gross Floor Area and Floor Area Ratio:

   (1) The gross floor area, including amenity areas, shall be no greater than 5,799 square metres (62,425 square feet).
   (2) The maximum density shall not exceed 1.5 times the lot area and the gross floor area ratio shall be no greater than 1.50 FAR

4. Regulations for Size, Shape and Siting of Building and Structures

   (a) The *principal building* for *multi-unit residential use*, inclusive of elevator shafts, stair housing, and all mechanical equipment, shall not exceed a *height* of 20.32 metres (66.66 feet)
   (b) The minimum setbacks for *multi-unit residential uses* are as follows:

(i)	Setback from interior (north) lot line	= 6.83 metres
(ii)	Setback from exterior (south) lot line	= 24.47 metres
(iii)	Setback from rear (west) lot line	= 7.87 metres
(iv)	Setback from front (east) lot line	= 5.27 metres
(v)	Setback from south interior side lot line	= 8.20 metres

5. Parking:

   Parking for *multi-unit residential use* shall be provided in accordance with Sections 4.14 and 4.17, with the minimum number of spaces required as follows:

   (a) A minimum of one hundred and twenty-three (123) spaces shall be provided for the *multi-unit residential use*
   (b) A minimum of twenty-one (21) spaces shall be provided for visitors and marked as "visitor"
   (c) A minimum of three (3) of the required one hundred and twenty-three (123) spaces shall be provided as accessible parking spaces and shall be clearly marked as such and shall have a minimum length of 5.5 metres. Of the five accessible parking spaces,

one space shall be provided as a van-accessible loading space with a minimum width of 2.8 metres, and the other four spaces shall have a minimum width of 2.5 metres, provided that the four parking spaces have a shared or non-shared access aisle with a minimum width of 1.5 metres.

(d) The minimum height clearance at the accessible parking spaces and along the vehicle access and egress routes from the accessible parking spaces must be at least 2.3 metres to accommodate over-height vehicles equipped with a wheelchair lift or ramp.
(e) A minimum of twelve (12) stalls must have electric charging capacity.
(f) A minimum of twelve (12) stalls must be roughed for electric charging capacity.

6. Bicycle Parking:

Bicycle parking shall be provided in accordance with Section 4.16, with the minimum number of spaces required as follows:

(a) A minimum of 70 Class I spaces shall be provided
(b) A minimum of 14 Class II spaces shall be provided

9. Loading:

(a) One loading space shall be provided for a *multi-unit residential use* in accordance with Section 4.15

10. General:

Development in this zone shall substantially conform to the Plans prepared by Keystone Architecture dated October 18, 2021, and titled DP Resubmission that are attached hereto and on file at the City of White Rock.


70 UNIT APARTMENT BUILDING
PROPOSED 1ST FLOOR ELEVATION = 99.00m
STRATA PLAN EPS1082
STRATA PLAN BCS4120
STRATA PLAN EPS859
STRATA PLAN BCS760
VIDAL STREET
PROPERTY LINE
SETBACK LINE

site section b

site section a

VIDAL PROJECT NAME

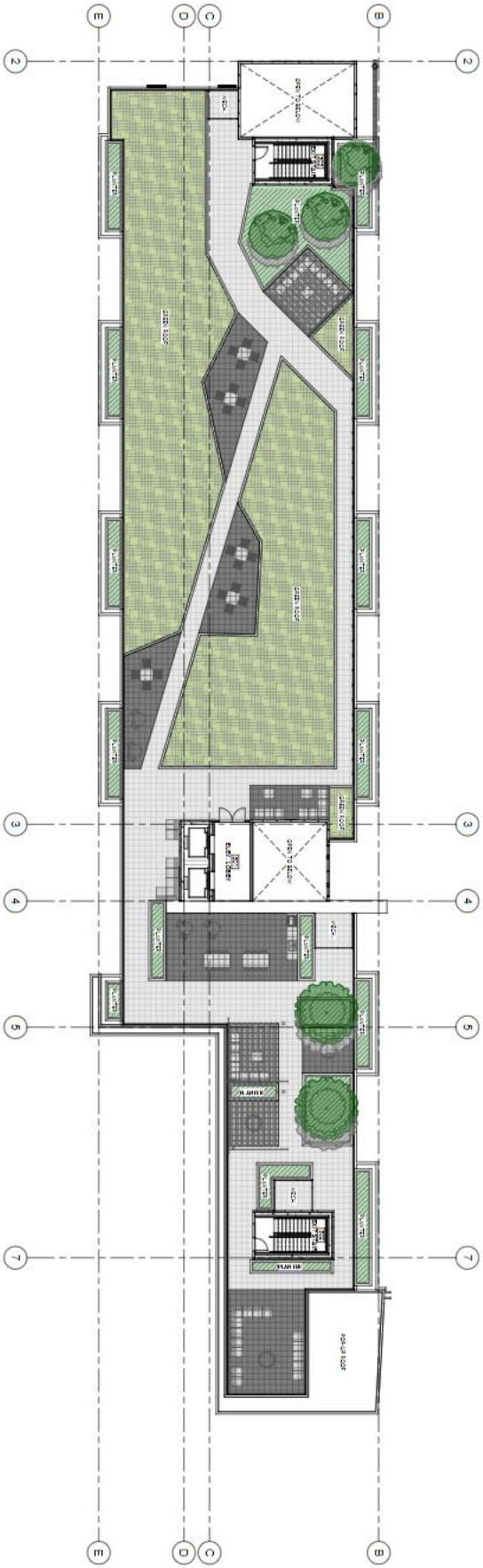
roof deck - plaza & elevator lobby

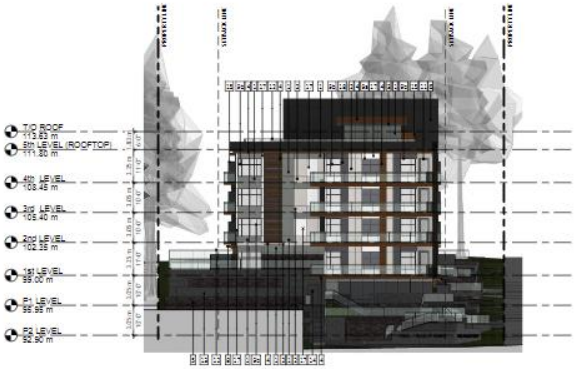
roof deck - trellis seating area & picnic area

roof deck - green roof & plaza

ground level greenspace - street view

ground level greenspace - aerial view





south elevation (facing Thrift Ave.)

1/16" = 1'-0"

east elevation (facing Vidal St.)

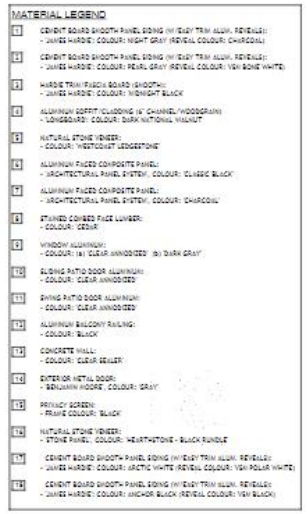
1/16" = 1'-0"

MATERIAL LEGEND

1. CEMENT BOARD SMOOTH PANEL SIDING (W/ EASY TRIM ALUM. REVEALS):
   - JAMES HARDIE - COLOUR: MIGHT GRAY (REVEAL COLOUR: CHARCOAL)
2. CEMENT BOARD SMOOTH PANEL SIDING (W/ EASY TRIM ALUM. REVEALS):
   - JAMES HARDIE - COLOUR: PEARL GRAY (REVEAL COLOUR: VEN BONE WHITE)
3. HARDIE TRIM FASCIA BOARD (SMOOTH):
   - JAMES HARDIE - COLOUR: MIDNIGHT BLACK
4. ALUMINUM SOFFIT (CLADDING W/ CHANNEL WOODGRAIN):
   - LONGBOARD - COLOUR: DARK NATIONAL WALNUT
5. NATURAL STONE VENEER:
   - COLOUR: 'WESTCOAST LEDGESTONE'
6. ALUMINUM FACED COMPOSITE PANEL:
   - 'ARCHITECTURAL PANEL SYSTEM', COLOUR: 'CLASSIC BLACK'
7. ALUMINUM FACED COMPOSITE PANEL:
   - 'ARCHITECTURAL PANEL SYSTEM', COLOUR: 'CHARCOAL'
8. STAINED CORBED FACE LUMBER:
   - COLOUR: CEDAR
9. WINDOW ALUMINUM:
   - COLOUR: (a) 'CLEAR ANNODIZED' (b) 'DARK GRAY'
10. SLIDING PATIO DOOR ALUMINUM:
    - COLOUR: CLEAR ANNODIZED
11. SWING PATIO DOOR ALUMINUM:
    - COLOUR: CLEAR ANNODIZED
12. ALUMINUM BALCONY RAILING:
    - COLOUR: BLACK
13. CONCRETE WALL:
    - COLOUR: CLEAR SEALER
14. EXTERIOR METAL DOOR:
    - 'BENJAMIN MOORE', COLOUR: 'GRAY'
15. PRIVACY SCREEN:
    - FRAME COLOUR: 'BLACK'
16. NATURAL STONE VENEER:
    - 'STONE PANEL', COLOUR: 'HEARTHSTONE - BLACK RUNDLE'
17. CEMENT BOARD SMOOTH PANEL SIDING (W/ EASY TRIM ALUM. REVEALS):
    - JAMES HARDIE - COLOUR: 'ARCTIC WHITE (REVEAL COLOUR: VEN POLAR WHITE)
18. CEMENT BOARD SMOOTH PANEL SIDING (W/ EASY TRIM ALUM. REVEALS):
    - JAMES HARDIE - COLOUR: 'ANCHOR BLACK (REVEAL COLOUR: VEN BLACK)

north elevation (facing highrise)

1/16" = 1'-0"



west elevation (facing townhouses)

1/16" = 1'-0"

east perspective elevation

west perspective elevation

south perspective elevation

north perspective elevation

Traffic Study FINAL - Rev.0

WS Vidal Properties LP

14937 Thrift Avenue Development

June 29, 2020

R.F. BINNIE & ASSOCIATES LTD.
300 - 4940 Canada Way,
Burnaby, BC V5G 4K6
Main: 604-420-1721

ENGINEERS & GEOSCIENTISTS BRITISH COLUMBIA OQM CERTIFIED

BINNIE

Prepared by: _____
Matthew Woo, EIT

Approved by: _____
Jonathan Ho, P.Eng., PTOE

PROJECT TEAM MEMBER LIST

Project Manager:	Jonathan Ho, P.Eng., PTOE
Technical Staff:	Matthew Woo, EIT
	James Craxton

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

1 INTRODUCTION

1.1 Background

R.F. Binnie & Associates Ltd. (Binnie) was retained by WestStone Group (the Developer) to prepare a traffic study for a proposed multi-family residential development in the City of White Rock (the City), BC. The proposed development is located at 14937 Thrift Avenue, as shown in **Figure 1-1**. The proposed site plan of the study development is provided in **Appendix A** and it is expected to provide a total of 129 residential units.

1.2 Study Objectives

The purpose of this study is to review the background conditions within the study area and analyze traffic and parking impacts generated by the proposed development. If any traffic issues are identified, this report will recommend improvements to mitigate them.

The objectives of this traffic study are to make considerations regarding the following items:

- Review the background information available for this study development and the surrounding area;
- Assess pedestrian, cyclist and transit connections and accessibility;
- Examine the City's parking requirements according to the Bylaw and review the on-site vehicle and bicycle parking supply;
- Estimate the site generated traffic volumes from the proposed development and the trip distribution;
- Analyze existing and forecast traffic operations on the study road network with and without site generated traffic volumes;
- Review existing development plan for pedestrian access, vehicle access, bicycle and storage access, and loading provisions;
- Assess the proposed access and internal traffic circulation within the proposed development; and
- Recommend necessary transportation improvements based on the traffic analysis findings.

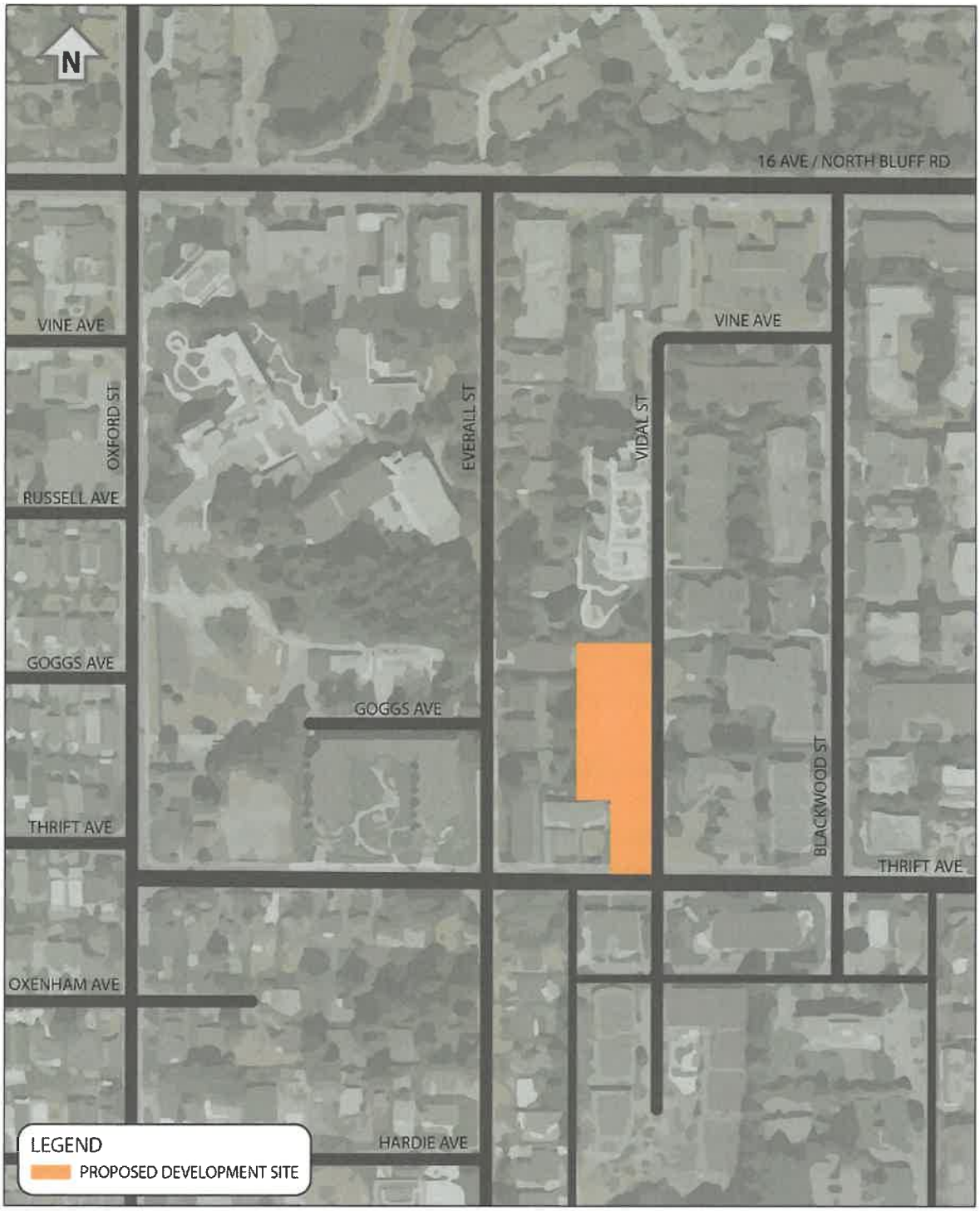


Figure 1-1: Proposed Development Location

2 EXISTING CONDITIONS

2.1 Site Location

The proposed development is located in White Rock at the northwest corner of the intersection of Thrift Avenue and Vidal Street. The land-use surrounding the development is medium density multi-unit residential (RM-2) to the east, and single-unit residential to the southwest (RS-1 and RS-2). There are also several comprehensive district developments such as "Beverly" at 1501 Vidal Street directly to the north, and "Royce" located to the east at 14855 Thrift Avenue.

Adjacent to the proposed development, Thrift Avenue, Oxford Street, and Martin Street are classified as primary collectors with two lanes and on-street parking. Vidal Street, Vine Avenue, and Blackwood Street are classified as local roads with two lanes and on-street parking. North Bluff Road to the north is classified as an arterial road with four lanes and on-street parking along portions of the south side of the street.

The study development is also located at approximately 900 m to the southwest of Semiahmoo Shopping Centre and White Rock Centre Transit Exchange.

2.2 Adjacent Road Network

2.2.1 Thrift Avenue

Thrift Avenue is a two-lane roadway classified as a primary collector that runs in the east-west direction within the study area. It begins just west of Oxford Street before becoming 14th Avenue at 160th Street. Within the study area, on-street parking is permitted on Thrift Avenue. Thrift Avenue also has a posted speed limit of 50 km/h.

2.2.2 Oxford Street

Oxford Street is a two-lane roadway classified as a primary collector that runs in the north-south direction within the study area. Oxford Street travels from Marine Drive to North Bluff Road, where it becomes 148th Street north of North Bluff Road. Oxford street has a posted speed limit of 50km/h and within the study area, on-street parking is permitted on either side of the road.

2.2.3 Everall Street

Everall Street is a two-lane roadway classified as a local road that runs in the north-south direction within the study area. Everall Street travels between North Bluff Road and Buena Vista Avenue. On-street parking is permitted on either side of the road.

2.2.4 Vidal Street

Vidal Street is a two-lane roadway classified as a local road that runs in the north-south direction within the study area. Vidal Street begins at Vine Avenue and ends just south of Thrift Avenue. On-street parking is permitted on either side of the road.

2.2.5 Blackwood Street

Blackwood Street is a two-lane roadway classified as a local road that runs in the north-south direction within the study area. Blackwood Street begins at North Bluff Road and ends just south of Thrift Avenue. On-street parking is permitted on either side of the road.

2.3 Study Intersections

2.3.1 Thrift Avenue and Oxford Street

The Thrift Avenue and Oxford Street intersection is currently an offset four-legged two-way stop-controlled intersection. The west approach is located slightly north of the east approach. Thrift Avenue is stop-controlled while traffic on Oxford Street is free-flowing. All approaches have a single lane with no dedicated lanes or storage lanes for vehicles turning left or right. Pedestrian crosswalks are currently provided on the north, east, and south approaches of this intersection.

2.3.2 Thrift Avenue and Everall Street

The Thrift Avenue and Everall Street intersection is currently a four-legged two-way stop-controlled intersection. Everall Street is stop-controlled while traffic on Thrift Avenue is free-flowing. All approaches have a single lane with no dedicated lanes or storage lanes for vehicles turning left or right. There is a pedestrian crosswalk with overhead flashing lights on the west approach of this intersection, and a standard pedestrian crosswalk on the north approach.

2.3.3 Thrift Avenue and Vidal Street

The Thrift Avenue and Vidal Street intersection is currently a four-legged two-way stop-controlled intersection. Vidal Street is stop-controlled while traffic on Thrift Avenue is free-flowing. All approaches have a single lane with no dedicated lanes or storage lanes for vehicles turning left or right.

2.3.4 Thrift Avenue and Blackwood Street

The Thrift Avenue and Blackwood Street intersection is currently a four-legged two-way stop-controlled intersection. Blackwood Street is stop-controlled while traffic on Thrift Avenue is free-flowing. All approaches have a single lane with no dedicated lanes or storage lanes for vehicles turning left or right.

The existing laning configurations and traffic controls at the study intersections are shown in **Figure 2-1**.

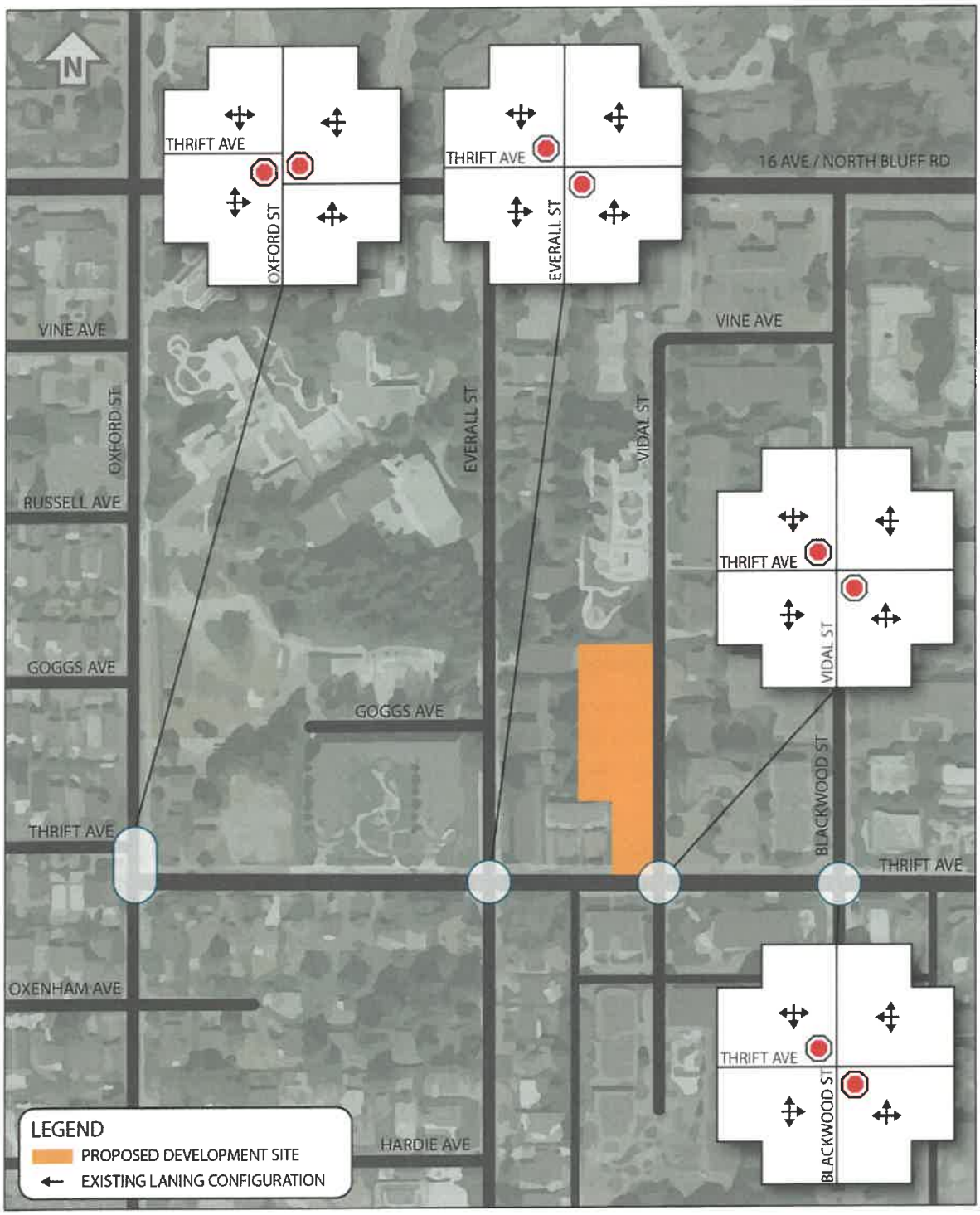


Figure 2-1: Existing Intersection Laning Configuration and Traffic Controls

2.4 Existing Traffic Volumes

Existing traffic volumes for the study intersections along Thrift Avenue were collected by Binnie on May 20, 2019. This included the intersections of Vidal Street at Thrift Avenue, Everall Street at Thrift Avenue, and Blackwood Street at Thrift Avenue. Traffic data for Oxford Street at Thrift Avenue was provided in the background documents from the City. The 2019 existing traffic volumes for the AM peak hour and PM peak hour are summarized in **Figure 2-2**.

2.4.1 Thrift Avenue and Oxford Street

During the AM peak hour, 98 vehicles were observed to be travelling northbound on Oxford Street and 207 were observed to be travelling in the southbound direction. 212 vehicles were observed to be travelling westbound along Thrift Avenue and ten vehicles were observed to be travelling eastbound along Thrift Avenue.

During the PM peak hour, 69 vehicles were observed to be travelling northbound on Oxford Street and 271 were observed to be travelling in the southbound direction. 232 vehicles were observed to be travelling westbound along Thrift Avenue and 14 vehicles were observed to be travelling eastbound along Thrift Avenue.

The predominant turning movements at this intersection were observed to be the southbound left-turn movement and the westbound right-turn movement during both the AM peak hour and PM peak hour.

2.4.2 Thrift Avenue and Everall Street

During the AM peak hour, nine vehicles were observed to be travelling northbound on Everall Street and 24 were observed to be travelling in the southbound direction. 226 vehicles were observed to be travelling westbound along Thrift Avenue and 174 vehicles were observed to be travelling eastbound along Thrift Avenue.

During the PM peak hour, six vehicles were observed to be travelling northbound on Everall Street and 16 were observed to be travelling in the southbound direction. 252 vehicles were observed to be travelling westbound along Thrift Avenue and 170 vehicles were observed to be travelling eastbound along Thrift Avenue.

2.4.3 Thrift Avenue and Vidal Street

During the AM peak hour, 22 vehicles were observed to be travelling northbound on Vidal Street and 24 were observed to be travelling in the southbound direction. 226 vehicles were observed to be travelling westbound along Thrift Avenue and 174 vehicles were observed to be travelling eastbound along Thrift Avenue.

During the PM peak hour, 14 vehicles were observed to be travelling northbound on Vidal Street and 22 were observed to be travelling in the southbound direction. 250 vehicles were observed to be travelling westbound along Thrift Avenue and 178 vehicles were observed to be travelling eastbound along Thrift Avenue.

2.4.4 Thrift Avenue and Blackwood Street

During the AM peak hour, 19 vehicles were observed to be travelling northbound on Blackwood Street and 21 were observed to be travelling in the southbound direction. 203 vehicles were observed to be travelling westbound along Thrift Avenue and 212 vehicles were observed to be travelling eastbound along Thrift Avenue.

During the PM peak hour, two vehicles were observed to be travelling northbound on Blackwood Street and 42 were observed to be travelling in the southbound direction. 252 vehicles were observed to be travelling westbound along Thrift Avenue and 182 vehicles were observed to be travelling eastbound along Thrift Avenue.

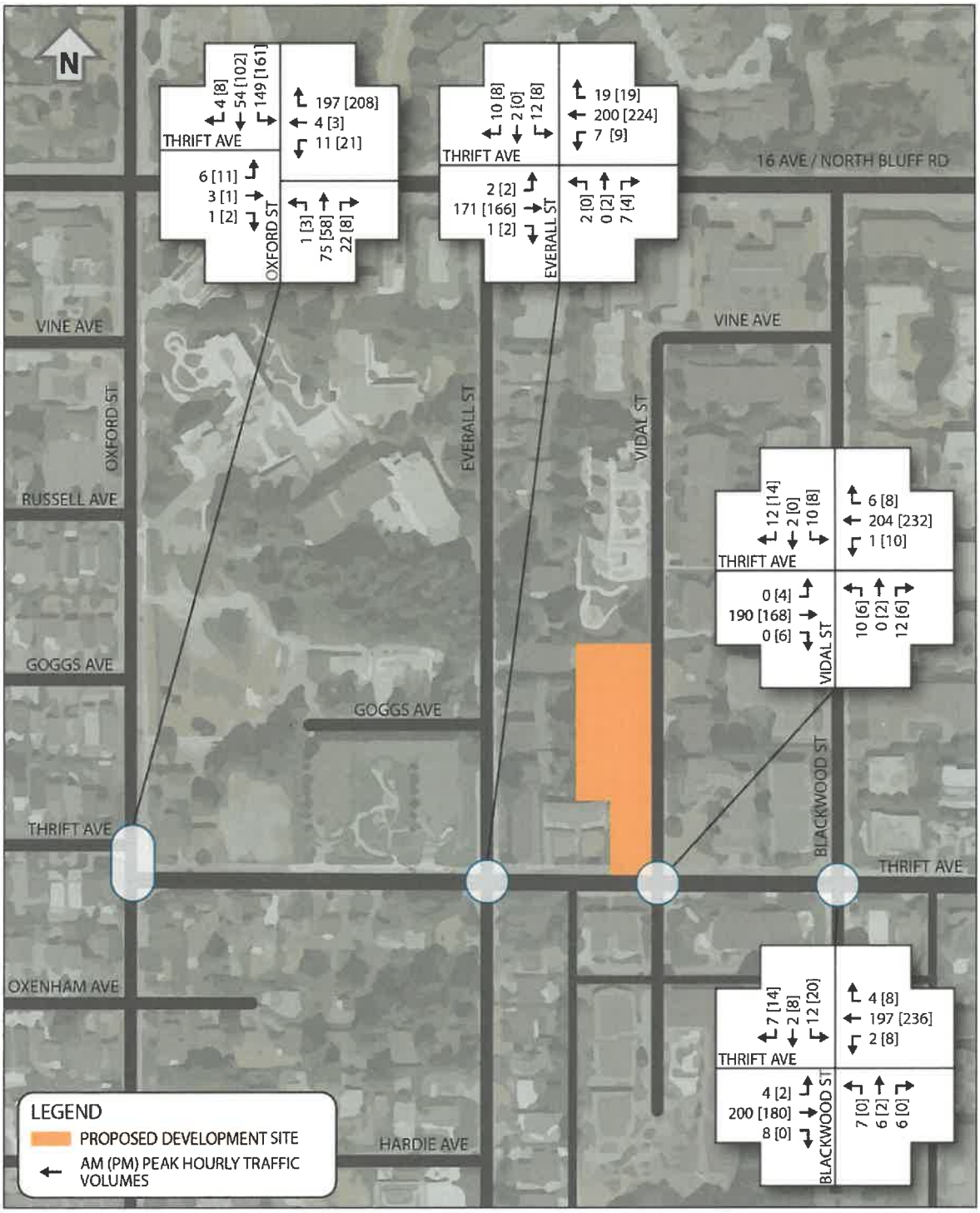


Figure 2-2: 2019 Existing Traffic Volumes

2.5 Pedestrian Accommodations

As described in **Section 2.1**, pedestrian facilities are currently provided on both the north side and south side of Thrift Avenue, and the east side and west side of Vidal Street immediately adjacent to the development. There are pedestrian crosswalks that facilitate crossing Everall Street and Thrift Avenue located approximately 100 m to the west. There is a painted crosswalk on the north approach at the intersection of Vidal Street and Thrift Avenue.

2.6 Cyclist Accommodations

Within the study area, there are several cyclist facilities in close proximity to the proposed development, which are shown in **Figure 2-3**. Thrift Avenue is classified as a Major Street Shared Lane which provides an east-west cycling connection through White Rock and south Surrey. Nearby, Martin Street is also classified as a Major Street Shared Lane which provides cycling access to the north.

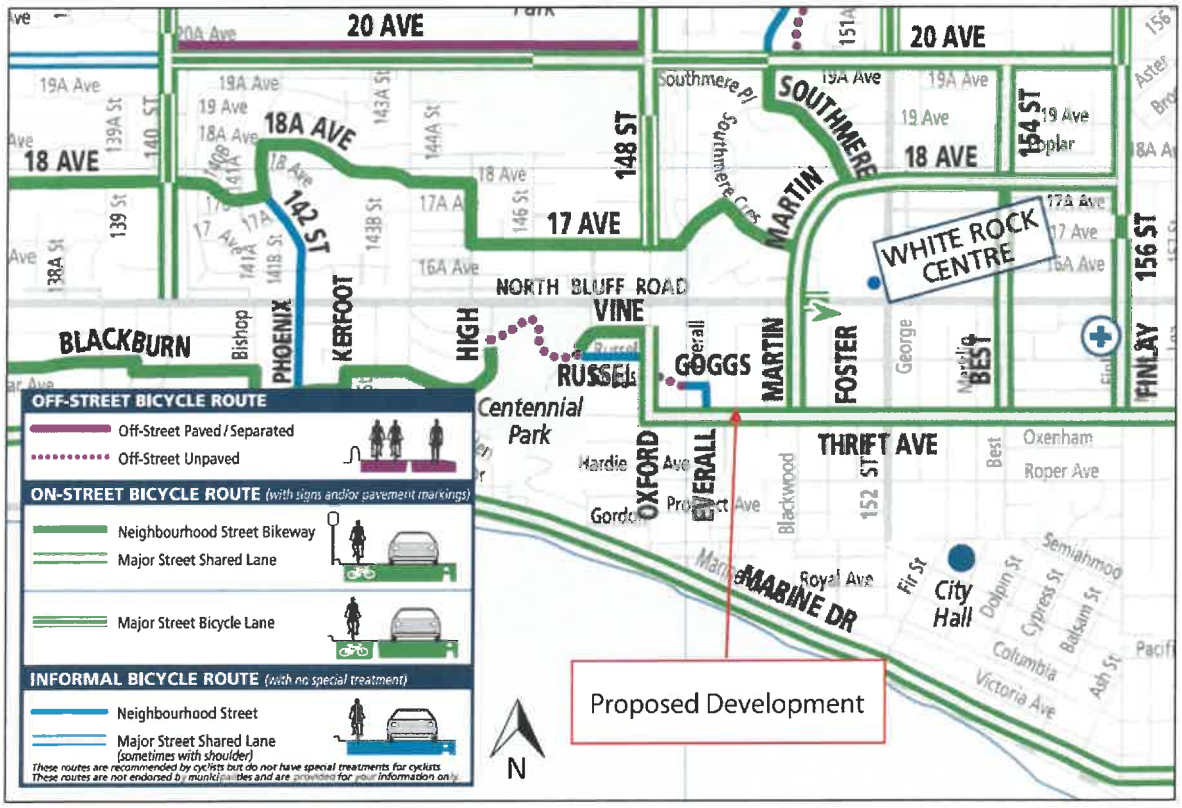


Figure 2-3: White Rock Cycling Map (TransLink, December 2016)

2.7 Transit Services

The public transit service within the City are currently provided by TransLink with three bus routes located along Thrift Avenue with stops within one block of the development:

- Route #351 Bridgeport Station/Crescent Beach – This bus route operates between Bridgeport Station in Richmond and Crescent Beach in Surrey, travelling along Highway 99, King George

Highway and White Rock Centre. There is a westbound bus stop located one block east of the proposed development and an eastbound bus stop located directly across the street from the development.

- Route #345 King George Station/White Rock Centre – This bus route operates between King George Station Surrey and White Rock Centre, travelling along 152 Street and Fraser Highway. There is a westbound bus stop located one block east of the proposed development.
- Route #321 Surrey Central Station/Newton Exchange / White Rock Centre – This bus route operates between Surrey Centre Station, Newton Exchange, and White Rock Centre, travelling along King George Boulevard. There is a westbound bus stop located one block east of the proposed development.

The existing transit routes are shown in **Figure 2-4**.

Figure 2-4: Existing Transit Routes in White Rock (TransLink, 2018)

3 FUTURE CONDITIONS

3.1 Proposed Development Concept

The proposed development is located at the northwest corner of the intersection of Thrift Avenue and Vidal Street. Based on the information received from the Developer on May 1, 2019, the proposed development is expected to provide 129 rental residential units when it is completed.

The study development is proposing a two-way access on the east side of the property which will allow vehicles to enter and exit the underground parking levels from Vidal Street. This driveway will be located to the north of the intersection of Vidal Street and Thrift Avenue.

3.2 Phasing and Timing

The proposed opening day of the study development is expected to be in the 2022 horizon year. It is expected that all 129 rental residential units will be built out in one phase.

3.3 Pedestrian Accommodations

The proposed entrance of the development is expected to be located on Vidal Street. Pedestrians will be able to access proposed development using the existing crosswalk at the north approach of the intersection of Vidal Street and Thrift Avenue. As previously mentioned in **Section 2.5**, there are also pedestrian facilities provided as part of the proposed development along the south and east sides of the property.

3.4 Cycling Accommodations

There are also a number of bicycle routes in the vicinity of the proposed development. As mentioned in **Section 2.5** and shown in **Figure 2-3**, Thrift Avenue is classified as a Major Street Shared Lane which provides an east-west cycling connection through White Rock and south Surrey. Nearby, Martin Street is also classified as a Major Street Shared Lane which provides cycling access to the north.

As part of the proposed development, a total of 129 Class 1 long-term secure bicycle parking spaces will be provided and they will be accessed from Vidal Street. A total of 27 Class 2 short-term bicycle parking spaces will be provided and they will be accessed at ground level from Vidal Street.

3.5 Transit Services

Based on the information provided by the TransLink website, there are currently no planned changes to the transit routes nearby to the development. The three bus routes summarized in **Section 2.7** are expected to continue operating on Thrift Avenue in front of the proposed development.

3.6 Road Network Upgrades

It is assumed that there will be no major changes to the existing road network at the study intersections for the opening day or horizon year scenarios. According to the City's Strategic Transportation Plan, published 2014, Thrift Avenue is identified as a potential complete street. This would include the

possible installation of protected bicycle lanes along the corridor while the existing two travel lanes appear to be maintained for the foreseeable future.

3.7 Trip Generation and Distribution

The forecast trip generation for the proposed study and adjacent developments was estimated based on the rates published in the Institute of Transportation Engineers' (ITE) *Trip Generation, 10th Edition*. The trip generation rates for the developments are assumed to be consistent with the following land use category outlined in the ITE guidelines:

- Residential Mid-Rise Multifamily Housing (ITE Ref. 221)

This land use is for multi-unit residential buildings between three and ten floors, including rental and non-rental units with recent data collected from 35 locations across North America. The ITE parking rates include both resident and visitor parking demands. Further details on ITE Ref. 221 are provided in Appendix C.

The forecast site generated traffic volumes for the proposed study developments are summarized in **Table 3-1**.

Table 3-1: Forecast Study Development Site Generated Traffic

Description	Size	Unit	ITE Ref.	Avg. Trip Ends / Unit	Trip Gen.	% Entering	% Exiting	Vehicle Entering	Vehicle Exiting
AM Peak Hour									
Apartments	129	Units	221	0.36	47	26	74	12	35
							Total:	**12**	**35**
PM Peak Hour									
Apartments	129	Units	221	0.44	57	61	39	35	22
							Total:	**35**	**22**

The forecast trip distribution for the site generated traffic volumes was estimated based on the existing travel patterns as identified by the turning movement counts. The forecast trip distribution and site generated traffic volumes are shown in **Figure 3-1** and **Figure 3-2**, respectively.

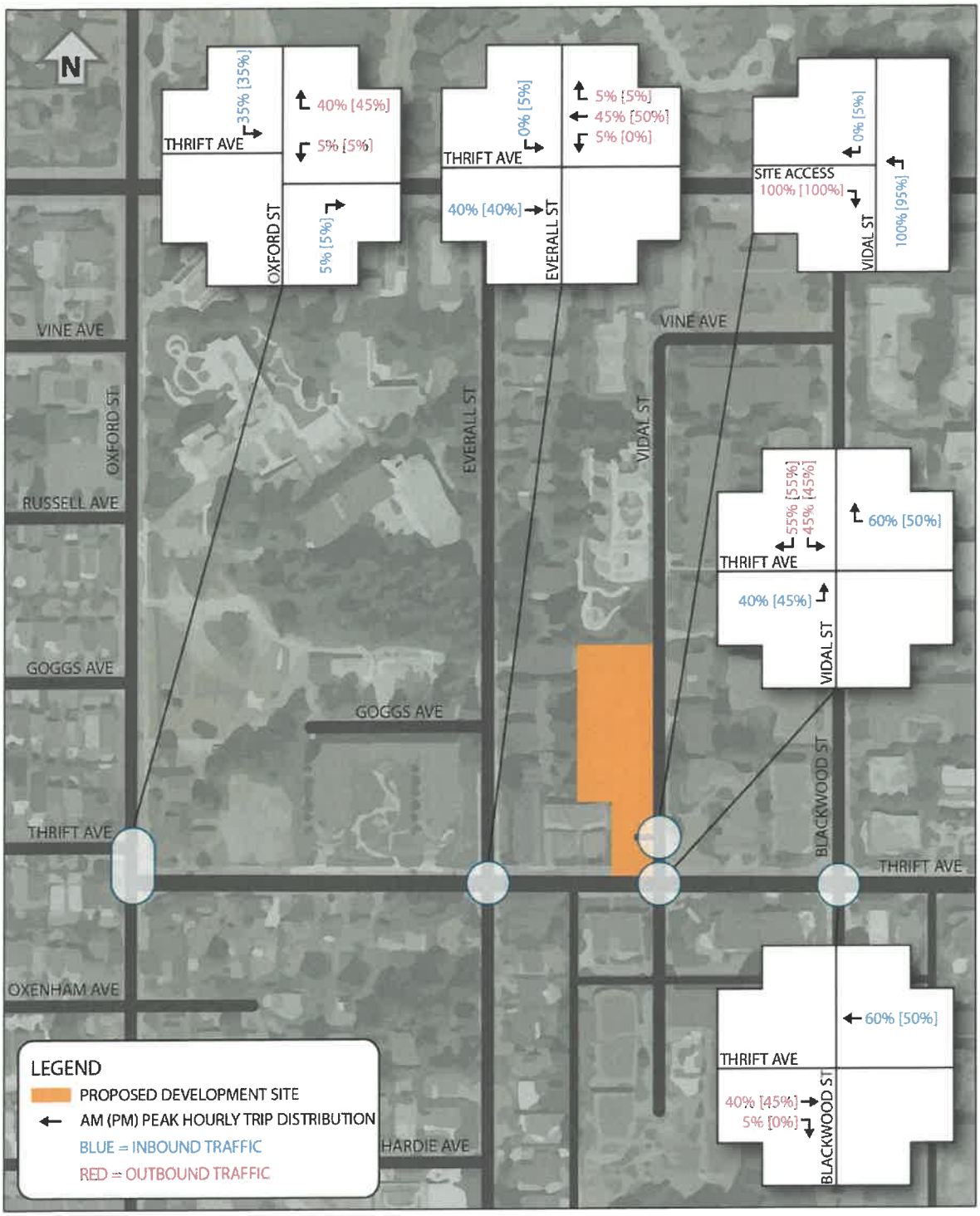


Figure 3-1: Forecast Trip Distribution

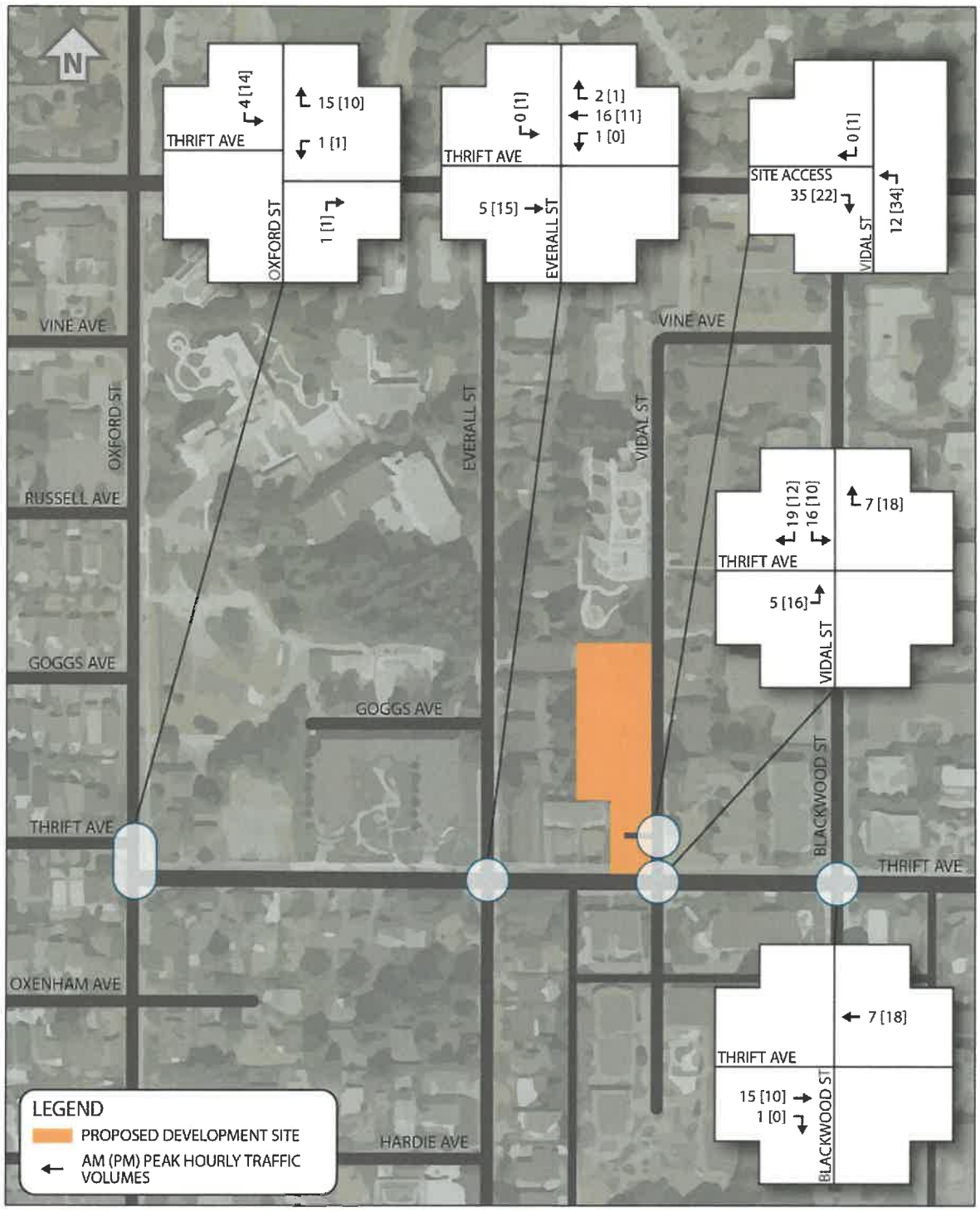


Figure 3-2: Forecast Site Generated Traffic Volumes

4 TRAFFIC OPERATIONS ANALYSIS

4.1 Methodologies

The traffic operations analysis in this report was performed using the Synchro 10 software suite for unsignalized intersections, which is generally based on the Highway Capacity Manual (HCM) methodologies. The traffic operations for each scenario were evaluated to estimate the volume-to-capacity (v/c) ratio, delay, level-of-service (LOS), and 95th percentile queue length at the study intersections.

When reviewing the traffic analysis results, a v/c ratio at or above 1.0 typically indicates that traffic volumes exceed the intersection capacity. Delay, in terms of seconds, represents the average wait time experienced by a driver on the approach to the intersection. LOS is a grading system on intersection operation based on the calculated delay as shown in **Table 4-1** for a signalized intersection and **Table 4-2** for an unsignalized intersection. LOS A means that the intersection experiences little to no delay whereas a LOS F indicates significant delay is present.

Table 4-1: HCM LOS Criteria for Signalized Intersection

Level of Service	Average Control Delay (s/veh)
A	0 - 10
B	> 10 - 20
C	> 20 - 35
D	> 35 - 55
E	> 55 - 80
F	> 80

Table 4-2: HCM LOS Criteria for Unsignalized Intersection

Level of Service	Average Control Delay (s/veh)
A	0 - 10
B	> 10 - 15
C	> 15 - 25
D	> 25 - 35
E	> 35 - 50
F	> 50

The traffic operation analysis is conducted based on the following study thresholds:

- Overall intersection and individual movement of LOS D or better
- Individual movement v/c ratio of 0.85 or less
- Delay less than 35 s (unsignalized)
- Delay less than 55 s (signalized)
- 95th percentile queue lengths impacting adjacent intersections or accesses

The detailed traffic analysis results from Synchro will be provided for the final report in **Appendix D**.

4.2 Existing Traffic Operations

The existing traffic operations analysis on the study road network was completed using the 2019 existing traffic volumes summarized in **Figure 2-2.** The analysis was performed based on the existing intersection configurations and controls shown in **Figure 2-1**.

4.2.1 AM Peak Hour

During the AM peak hour, all the target intersections were found to be operating within the study thresholds. The maximum v/c ratio was found to be 0.25 for the westbound movements at the intersection of Thrift Avenue and Oxford Street.

4.2.2 PM Peak Hour

During the PM peak hour, all the target intersections were found to be operating within the study thresholds. The maximum v/c ratio was found to be 0.28 for the westbound movements at the intersection of Thrift Avenue and Oxford Street.

The traffic operations analysis results based on the 2019 existing traffic volumes are summarized in **Table 4-3**.

Table 4-3: 2019 Existing Traffic Operations

Intersection	Turning Movement	AM Peak Hour				PM Peak Hour			
		LOS	Delay (s)	V/C Ratio	95% Q (m)	LOS	Delay (s)	V/C Ratio	95% Q (m)
Thrift Avenue at Oxford Street South (Unsignalized)	WBL/R	B	10.3	0.25	7.6	B	10.6	0.28	8.8
	NBT/R	A	-	0.06	-	A	-	0.04	-
	SBL/T	A	5.9	0.11	2.8	A	5.0	0.12	3.0
	Int. LOS	A				A			
Thrift Avenue at Oxford Street North (Unsignalized)	EBL/R	B	11.8	0.03	0.7	B	12.4	0.03	0.7
	NBL/T	A	0.2	0.00	0.1	A	0.2	0.01	0.1
	SBT/R	A	-	0.13	-	A	-	0.17	-
	Int. LOS	A				A			
Thrift Avenue at Everall Street (TWSC)	EBL/T/R	A	0.1	0.00	-	A	0.1	0.00	-
	WBL/T/R	A	0.3	0.01	0.1	A	0.3	0.01	0.2
	NBL/T/R	A	9.8	0.01	0.3	B	10.3	0.01	0.2
	SBL/T/R	B	11.2	0.04	1.0	B	11.1	0.03	0.7
	Int. LOS	A				A			
Thrift Avenue at Vidal Street (TWSC)	EBL/T/R	A	-	0.00	-	A	0.2	0.00	0.1
	WBL/T/R	A	-	0.00	-	A	0.4	0.01	0.2
	NBL/T/R	B	10.8	0.04	0.9	B	11.2	0.03	0.6
	SBL/T/R	B	11.0	0.04	1.0	B	10.9	0.04	0.9
	Int. LOS	A				A			
Thrift Avenue at Blackwood Street (TWSC)	EBL/T/R	A	0.2	0.00	0.1	A	0.1	0.00	-
	WBL/T/R	A	0.1	0.00	-	A	0.3	0.01	0.2
	NBL/T/R	B	11.5	0.04	0.9	B	12.6	0.00	0.1
	SBL/T/R	B	11.5	0.04	0.9	B	12.1	0.08	2.0
	Int. LOS	A				A			

4.3 Background Traffic Operation Analysis

The forecast background traffic volumes were projected based on an annual growth rate of 2%. The background traffic analysis notes that the following developments are built-out as of the writing of this report. These include developments and facility improvements at the following locations:

- Evergreen Baptist of Care Facility Expansion;
- 14855 Thrift Avenue; and
- 1501 Vidal Street.

Additionally, several proposed developments were identified through documents provided by the City. These locations were noted yet to be completed and are assumed to be fully built out in the future background traffic volumes. The Institute of Transportation Engineers' (ITE) *Trip Generation, 10th Edition* trip generation rates were used when required and their site-generated traffic was assumed to be inclusive in the background traffic volumes without being subject to the annual growth:

- 1454 Oxford Street;
- 1434 Oxford Street, 14809 Thrift Avenue, 14815 Thrift Avenue; and
- 14825 Thrift Avenue, 14835 Thrift Avenue.

4.3.1 2022 Opening Day Background Traffic Operations

The 2022 opening day background traffic operations analysis assumes the existing intersection and laning configurations. The 2022 opening day background traffic volumes are shown in **Figure 4-1**.

AM Peak Hour
During the AM peak hour, all of the study intersections are expected to operate within the study thresholds. The maximum v/c ratio is expected to be 0.28 for the westbound movements at the intersection of Thrift Avenue and Oxford Street.

PM Peak Hour
During the PM peak hour, all of the study intersections are expected to operate within the study thresholds. The maximum v/c ratio is expected to be 0.31 for the westbound movements at the intersection of Thrift Avenue and Oxford Street.

The 2022 opening day background traffic analysis results are summarized in **Table 4-4**.

Table 4-4: 2022 Opening Day Background Traffic Operations

Intersection	Turning Movement	AM Peak Hour				PM Peak Hour			
		LOS	Delay (s)	V/C Ratio	95% Q (m)	LOS	Delay (s)	V/C Ratio	95% Q (m)
Thrift Avenue at Oxford Street South (Unsignalized)	WBL/R	B	10.5	0.28	8.7	B	10.9	0.31	10.2
	NBT/R	A	-	0.07	-	A	-	0.05	-
	SBL/T	A	6.0	0.12	3.2	A	5.2	0.13	3.4
	Int. LOS	A				A			
Thrift Avenue at Oxford Street North (Unsignalized)	EBL/R	B	11.6	0.02	0.5	B	12.9	0.03	0.8
	NBL/T	A	0.2	0.00	0.1	A	0.2	0.01	0.1
	SBT/R	A	-	0.14	-	A	-	0.19	-
	Int. LOS	A				A			
Thrift Avenue at Everall Street (TWSC)	EBL/T/R	A	0.1	0.00	-	A	0.1	0.00	-
	WBL/T/R	A	0.3	0.01	0.1	A	0.4	0.01	0.2
	NBL/T/R	B	10.0	0.01	0.3	B	10.5	0.01	0.2
	SBL/T/R	B	11.5	0.05	1.1	B	11.4	0.03	0.7
	Int. LOS	A				A			
Thrift Avenue at Vidal Street (TWSC)	EBL/T/R	A	-	0.00	-	A	0.2	0.00	0.1
	WBL/T/R	A	-	0.00	-	A	0.4	0.01	0.2
	NBL/T/R	B	11.1	0.04	1.0	B	11.6	0.03	0.7
	SBL/T/R	B	11.3	0.05	1.1	B	11.2	0.04	1.0
	Int. LOS	A				A			
Thrift Avenue at Blackwood Street (TWSC)	EBL/T/R	A	0.1	0.00	0.1	A	0.1	0.00	-
	WBL/T/R	A	0.1	0.00	-	A	0.3	0.01	0.2
	NBL/T/R	B	11.9	0.04	1.0	B	13.0	0.00	0.1
	SBL/T/R	B	11.9	0.04	1.0	B	12.5	0.09	2.3
	Int. LOS	A				A			

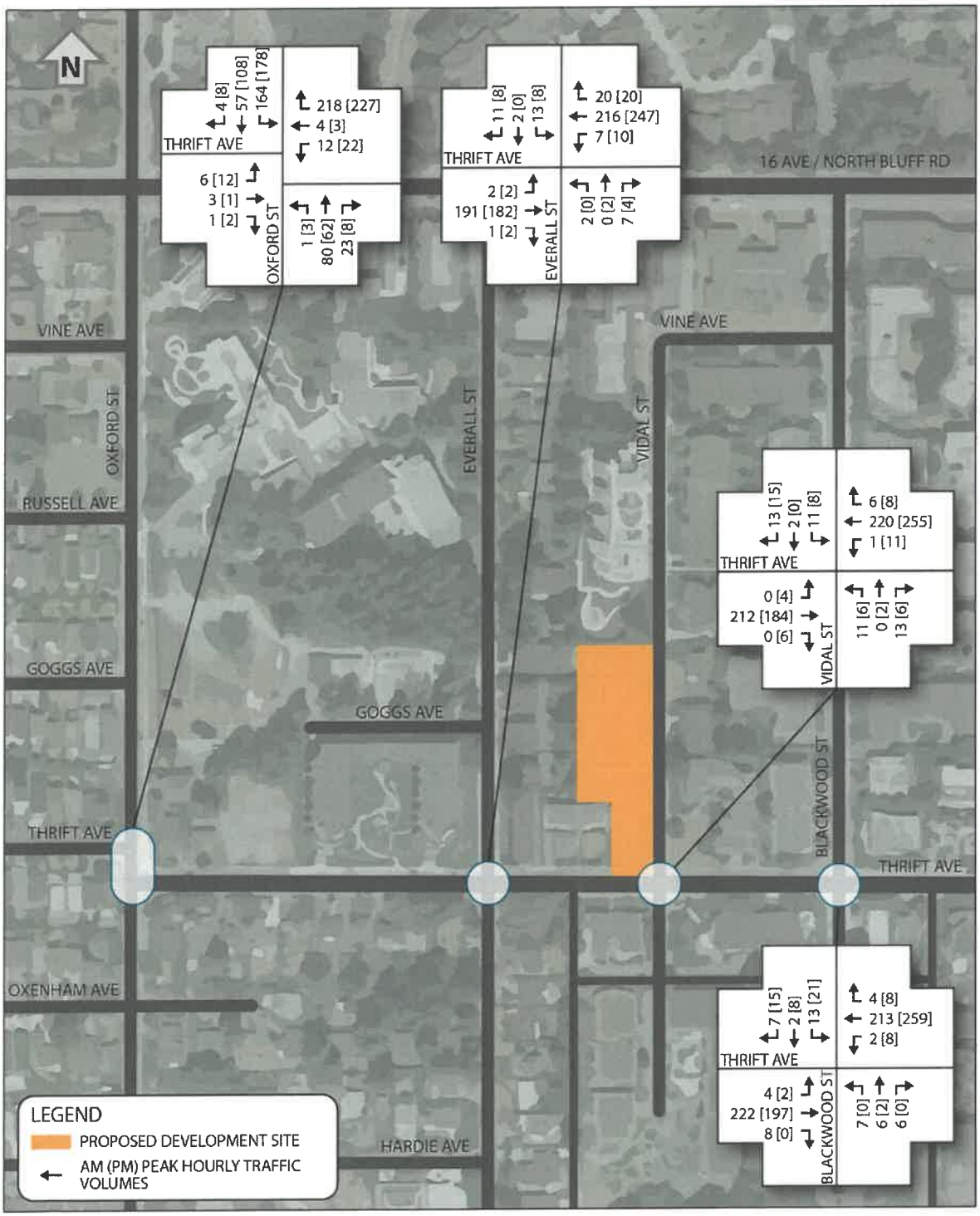


Figure 4-1: 2022 Opening Day Background Traffic Volumes

4.3.2 2032 Opening Day +10 Years Background Traffic Operations

The 2032 opening day plus 10 years background traffic operations analysis assumes the existing intersection and laning configurations. The 2032 background traffic volumes were determined by applying a growth factor of 2% per year to the existing traffic volumes. These are shown in **Figure 4-2**.

AM Peak Hour

During the AM peak hour, all of the study intersections are expected to operate within the study thresholds. The maximum v/c ratio is expected to be 0.37 for the westbound movements at the intersection of Thrift Avenue and Oxford Street.

PM Peak Hour

During the PM peak hour, all of the study intersections are expected to operate within the study thresholds. The maximum v/c ratio is expected to be 0.40 for the westbound movements at the intersection of Thrift Avenue and Oxford Street.

The 2032 background traffic analysis results are summarized in **Table 4-5**.

Table 4-5: 2032 Opening Day +10 Years Background Traffic Operations

Intersection	Turning Movement	AM Peak Hour				PM Peak Hour			
		LOS	Delay (s)	V/C Ratio	95% Q (m)	LOS	Delay (s)	V/C Ratio	95% Q (m)
Thrift Avenue at Oxford Street South (Unsignalized)	WBL/R	B	11.7	0.37	12.9	B	12.2	0.40	14.7
	NBT/R	A	-	0.08	-	A	-	0.06	-
	SBL/T	A	6.2	0.15	4.1	A	5.4	0.16	4.2
	Int. LOS	A				A			
Thrift Avenue at Oxford Street North (Unsignalized)	EBL/R	B	11.6	0.03	0.6	B	14.5	0.05	1.1
	NBL/T	A	0.2	0.01	0.1	A	0.3	0.01	0.2
	SBT/R	A	-	0.11	-	A	-	0.23	-
	Int. LOS	A				A			
Thrift Avenue at Everall Street (TWSC)	EBL/T/R	A	0.1	0.00	0.1	A	0.1	0.00	0.1
	WBL/T/R	A	0.3	0.01	0.2	A	0.4	0.01	0.2
	NBL/T/R	B	10.7	0.02	0.5	B	11.3	0.01	0.3
	SBL/T/R	B	12.6	0.07	1.6	B	12.5	0.04	1.0
	Int. LOS	A				A			
Thrift Avenue at Vidal Street (TWSC)	EBL/T/R	A	-	0.00	-	A	0.2	0.00	0.1
	WBL/T/R	A	-	0.00	-	A	0.4	0.01	0.2
	NBL/T/R	B	12.0	0.06	1.4	B	12.8	0.04	1.0
	SBL/T/R	B	12.3	0.06	1.6	B	12.1	0.06	1.4
	Int. LOS	A				A			
Thrift Avenue at Blackwood Street (TWSC)	EBL/T/R	A	0.2	0.00	0.1	A	0.1	0.00	0.1
	WBL/T/R	A	0.1	0.00	0.1	A	0.3	0.01	0.2
	NBL/T/R	B	13.1	0.06	1.4	B	14.3	0.01	0.2
	SBL/T/R	B	13.2	0.06	1.6	B	14.1	0.13	3.4
	Int. LOS	A				A			

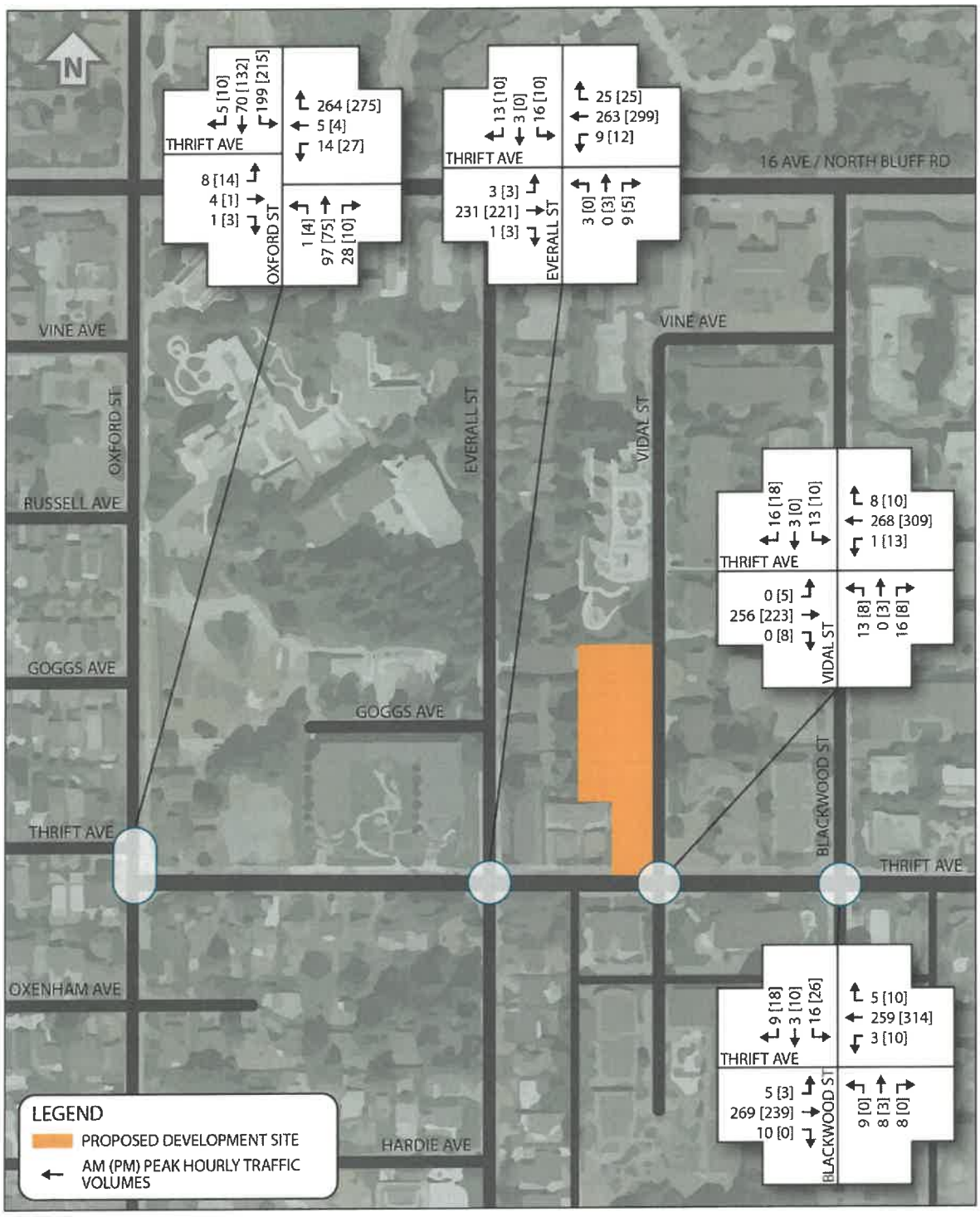


Figure 4-2: 2032 Opening Day +10 Years Background Traffic Volumes

4.3.3 2045 Horizon Year Background Traffic Operations

The 2045 horizon year background traffic operations analysis assumes the existing intersection and laning configurations. The 2045 horizon year background traffic volumes were determined by applying a growth factor of 2% per year to the existing traffic volumes. These are shown in **Figure 4-3**.

AM Peak Hour

During the AM peak hour, all of the study intersections are expected to operate within the study thresholds. The maximum v/c ratio is expected to be 0.50 for the westbound movements at the intersection of Thrift Avenue and Oxford Street.

PM Peak Hour

During the PM peak hour, all of the study intersections are expected to operate within the study thresholds. The maximum v/c ratio is expected to be 0.57 for the westbound movements at the intersection of Thrift Avenue and Oxford Street.

The 2045 horizon year background traffic analysis results are summarized in **Table 4-6**.

Table 4-6: 2045 Horizon Year Background Traffic Operations

Intersection	Turning Movement	AM Peak Hour				PM Peak Hour			
		LOS	Delay (s)	V/C Ratio	95% Q (m)	LOS	Delay (s)	V/C Ratio	95% Q (m)
Thrift Avenue at Oxford Street South (Unsignalized)	WBL/R	B	13.9	0.50	21.4	C	15.9	0.57	27.8
	NBT/R	A	-	0.11	-	A	-	0.07	-
	SBL/T	A	6.6	0.20	5.8	A	5.7	0.20	5.8
	Int. LOS	A				A			
Thrift Avenue at Oxford Street North (Unsignalized)	EBL/R	B	14.7	0.05	1.2	C	18.5	0.09	2.1
	NBL/T	A	0.3	0.01	0.2	A	0.3	0.01	0.2
	SBT/R	A	-	0.23	-	A	-	0.29	-
	Int. LOS	A				A			
Thrift Avenue at Everall Street (TWSC)	EBL/T/R	A	0.1	0.00	0.1	A	0.1	0.00	0.1
	WBL/T/R	A	0.4	0.01	0.2	A	0.4	0.01	0.3
	NBL/T/R	B	11.4	0.03	0.7	B	13.2	0.03	0.7
	SBL/T/R	B	14.9	0.11	2.7	B	14.6	0.07	1.7
	Int. LOS	A				A			
Thrift Avenue at Vidal Street (TWSC)	EBL/T/R	A	-	0.00	-	A	0.3	0.01	0.2
	WBL/T/R	A	0.1	0.00	-	A	0.5	0.01	0.3
	NBL/T/R	B	14.0	0.09	2.3	C	15.1	0.07	1.6
	SBL/T/R	B	14.3	0.10	2.5	B	14.1	0.09	2.2
	Int. LOS	A				A			
Thrift Avenue at Blackwood Street (TWSC)	EBL/T/R	A	0.2	0.01	0.2	A	0.1	0.00	0.1
	WBL/T/R	A	0.1	0.00	0.1	A	0.4	0.01	0.3
	NBL/T/R	C	15.6	0.09	2.3	C	16.9	0.01	0.2
	SBL/T/R	C	15.9	0.10	2.6	C	17.7	0.21	5.9
	Int. LOS	A				A			

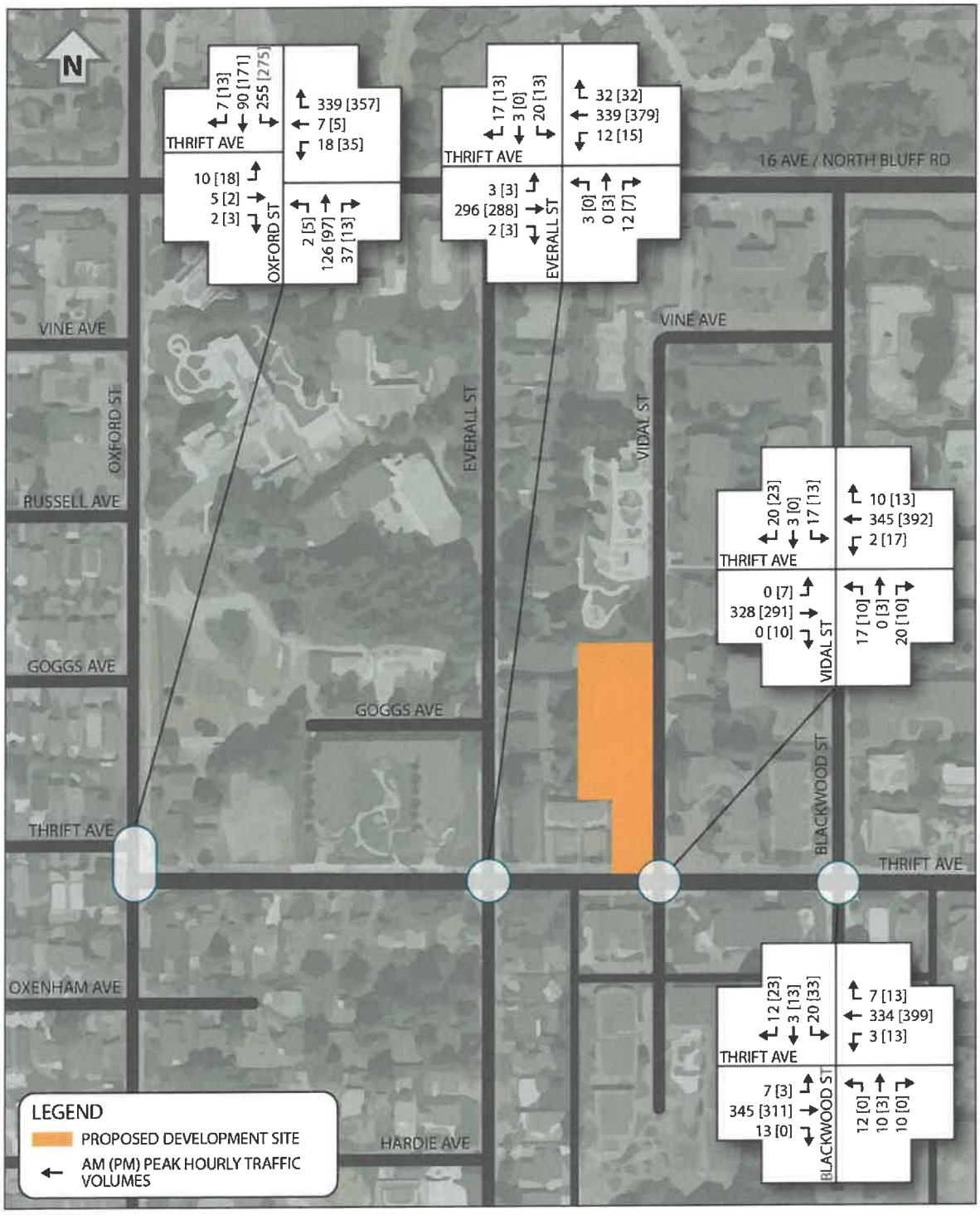


Figure 4-3: 2045 Horizon Year Background Traffic Volumes

4.4 Combined Traffic Operation Analysis

The combined traffic operation analysis considers both the background traffic growth as well as the site generated traffic volumes. The study development is expected to have one stop-controlled access on Vidal Street where free-flow traffic will be maintained on the local roadway. The proposed laning for the 2022 horizon year combined traffic operations analysis is shown in **Figure 4-4**.

4.4.1 2022 Opening Day Combined Traffic Conditions

The opening day 2022 horizon year combined traffic operation analysis is performed based on the forecast traffic volumes shown in **Figure 4-5**.

AM Peak Hour

During the AM peak hour, all of the study intersections are expected to operate within the study thresholds. The maximum v/c ratio is expected to be 0.30 for the westbound movements at the intersection of Thrift Avenue and Oxford Street.

PM Peak Hour

During the PM peak hour, all of the study intersections are expected to operate within the study thresholds. The maximum v/c ratio is expected to be 0.33 for the westbound movements at the intersection of Thrift Avenue and Oxford Street.

The combined traffic analysis for the 2022 horizon year is shown in **Table 4-7**.

Table 4-7: 2022 Opening Day Combined Traffic Operations

Intersection	Turning Movement	AM Peak Hour				PM Peak Hour			
		LOS	Delay (s)	V/C Ratio	95% Q (m)	LOS	Delay (s)	V/C Ratio	95% Q (m)
Thrift Avenue at Oxford Street South (Unsignalized)	WBL/R	B	10.7	0.30	9.7	B	11.2	0.33	11.0
	NBT/R	A	-	0.07	-	A	-	0.05	-
	SBL/T	A	6.1	0.13	3.3	A	5.4	0.14	3.7
	Int. LOS	A				A			
Thrift Avenue at Oxford Street North (Unsignalized)	EBL/R	B	11.7	0.02	0.5	B	13.2	0.04	0.8
	NBL/T	A	0.1	0.00	0.1	A	0.2	0.01	0.1
	SBT/R	A	-	0.15	-	A	-	0.20	-
	Int. LOS	A				A			
Thrift Avenue at Everall Street (TWSC)	EBL/T/R	A	0.1	0.00	-	A	0.1	0.00	-
	WBL/T/R	A	0.3	0.01	0.2	A	0.3	0.01	0.2
	NBL/T/R	B	10.1	0.01	0.3	B	10.7	0.01	0.2
	SBL/T/R	B	11.7	0.05	1.2	B	11.7	0.03	0.8
	Int. LOS	A				A			
Thrift Avenue at Vidal Street (TWSC)	EBL/T/R	A	0.2	0.00	5.3	A	0.9	0.02	0.4
	WBL/T/R	A	-	0.00	-	A	0.4	0.01	0.2
	NBL/T/R	B	11.5	0.04	2.2	B	12.2	0.03	0.7
	SBL/T/R	B	11.7	0.11	2.5	B	12.0	0.09	2.2
	Int. LOS	A				A			
Thrift Avenue at Blackwood Street (TWSC)	EBL/T/R	A	0.1	0.00	0.1	A	0.1	0.00	-
	WBL/T/R	A	0.1	0.00	-	A	0.3	0.01	0.2
	NBL/T/R	B	12.1	0.04	1.0	B	13.3	0.00	0.1
	SBL/T/R	B	12.1	0.05	1.1	B	12.8	0.09	2.4
	Int. LOS	A				A			
Vidal Street at Development Access (Unsignalized)	EBL/R	A	8.6	0.04	0.9	A	8.5	0.02	0.5
	NBL/T	A	4.8	0.01	0.2	A	5.3	0.02	0.5
	SBT/R	A	-	0.02	-	A	-	0.02	-
	Int. LOS	A				A			

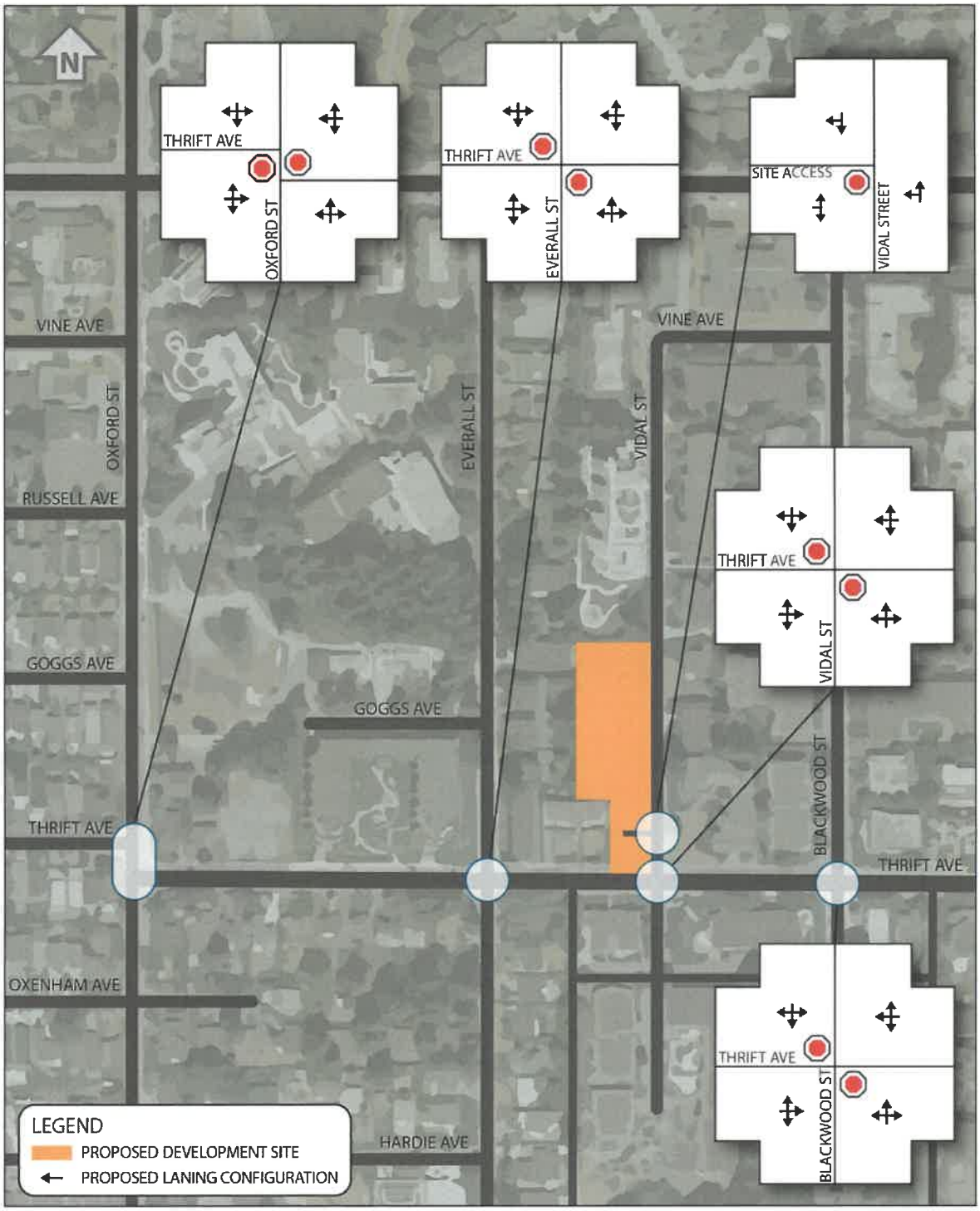


Figure 4-4: 2022 Opening Day Laning Configuration and Traffic Controls

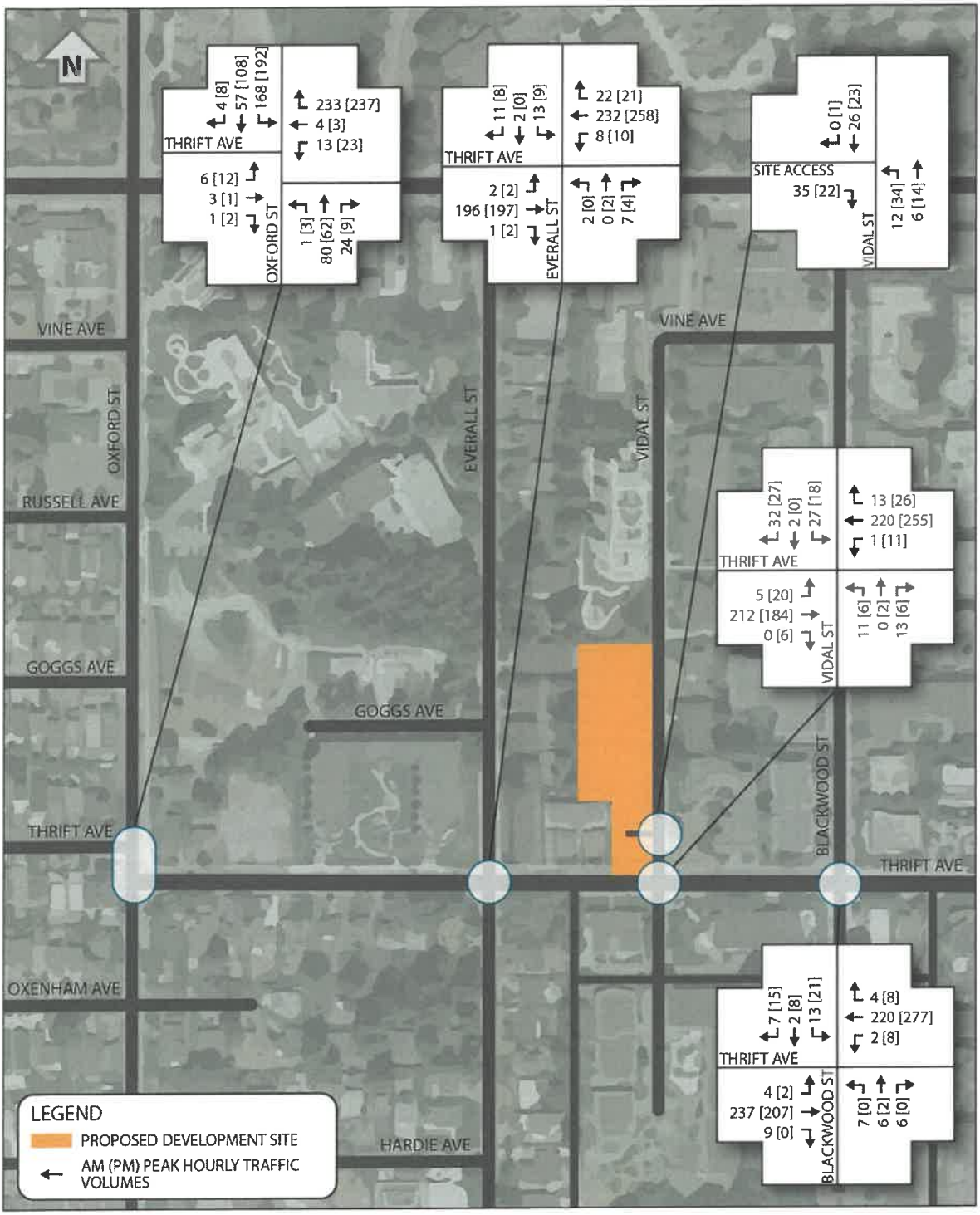


Figure 4-5: 2022 Opening Day Combined Traffic Volumes

4.4.2 2032 Opening Day +10 Years Combined Traffic Operations

The 2032 horizon year background traffic operations analysis assumes the existing intersection and laning configurations. The 2032 horizon year combined traffic volumes are shown in **Figure 4-6**.

AM Peak Hour

During the AM peak hour, all of the study intersections are expected to operate within the study thresholds. The maximum v/c ratio is expected to be 0.38 for the westbound movements at the intersection of Thrift Avenue and Oxford Street.

PM Peak Hour

During the PM peak hour, all of the study intersections are expected to operate within the study thresholds. The maximum v/c ratio is expected to be 0.48 for the westbound movements at the intersection of Thrift Avenue and Oxford Street.

The 2032 horizon year background traffic analysis results are summarized in **Table 4-8**.

Table 4-8: 2032 Opening Day +10 Years Combined Traffic Operations

Intersection	Turning Movement	AM Peak Hour				PM Peak Hour			
		LOS	Delay (s)	V/C Ratio	95% Q (m)	LOS	Delay (s)	V/C Ratio	95% Q (m)
Thrift Avenue at Oxford Street South (Unsignalized)	WBL/R	B	11.7	0.38	13.4	B	12.9	0.48	20.4
	NBT/R	A	-	0.08	-	A	-	0.06	-
	SBL/T	A	6.3	0.16	4.2	A	5.5	0.17	4.6
	Int. LOS	A				A			
Thrift Avenue at Oxford Street North (Unsignalized)	EBL/R	B	13.0	0.03	0.7	B	14.8	0.05	1.2
	NBL/T	A	0.3	0.01	0.2	A	0.3	0.01	0.2
	SBT/R	A	-	0.18	-	A	-	0.24	-
	Int. LOS	A				A			
Thrift Avenue at Everall Street (TWSC)	EBL/T/R	A	0.1	0.00	0.1	A	0.1	0.00	0.1
	WBL/T/R	A	0.3	0.01	0.2	A	0.4	0.01	0.2
	NBL/T/R	B	11.2	0.02	0.5	B	11.5	0.01	0.3
	SBL/T/R	B	14.4	0.08	2.0	B	12.9	0.05	1.1
	Int. LOS	A				A			
Thrift Avenue at Vidal Street (TWSC)	EBL/T/R	A	0.2	0.00	0.1	A	0.8	0.02	0.4
	WBL/T/R	A	-	0.00	-	A	0.4	0.01	0.2
	NBL/T/R	B	12.4	0.06	1.5	B	13.5	0.05	1.1
	SBL/T/R	B	12.9	0.14	3.6	B	13.1	0.11	2.8
	Int. LOS	A				A			
Thrift Avenue at Blackwood Street (TWSC)	EBL/T/R	A	0.2	0.00	0.1	A	0.1	0.00	0.1
	WBL/T/R	A	0.1	0.00	0.1	A	0.3	0.01	0.2
	NBL/T/R	B	13.4	0.06	1.5	B	14.7	0.01	0.2
	SBL/T/R	B	13.5	0.07	1.6	B	14.5	0.14	3.5
	Int. LOS	A				A			
Vidal Street at Development Access (Unsignalized)	EBL/R	A	8.6	0.04	0.9	A	8.5	0.02	0.5
	NBL/T	A	4.3	0.01	0.2	A	4.8	0.02	0.5
	SBT/R	A	-	0.02	-	A	-	0.02	-
	Int. LOS	A				A			

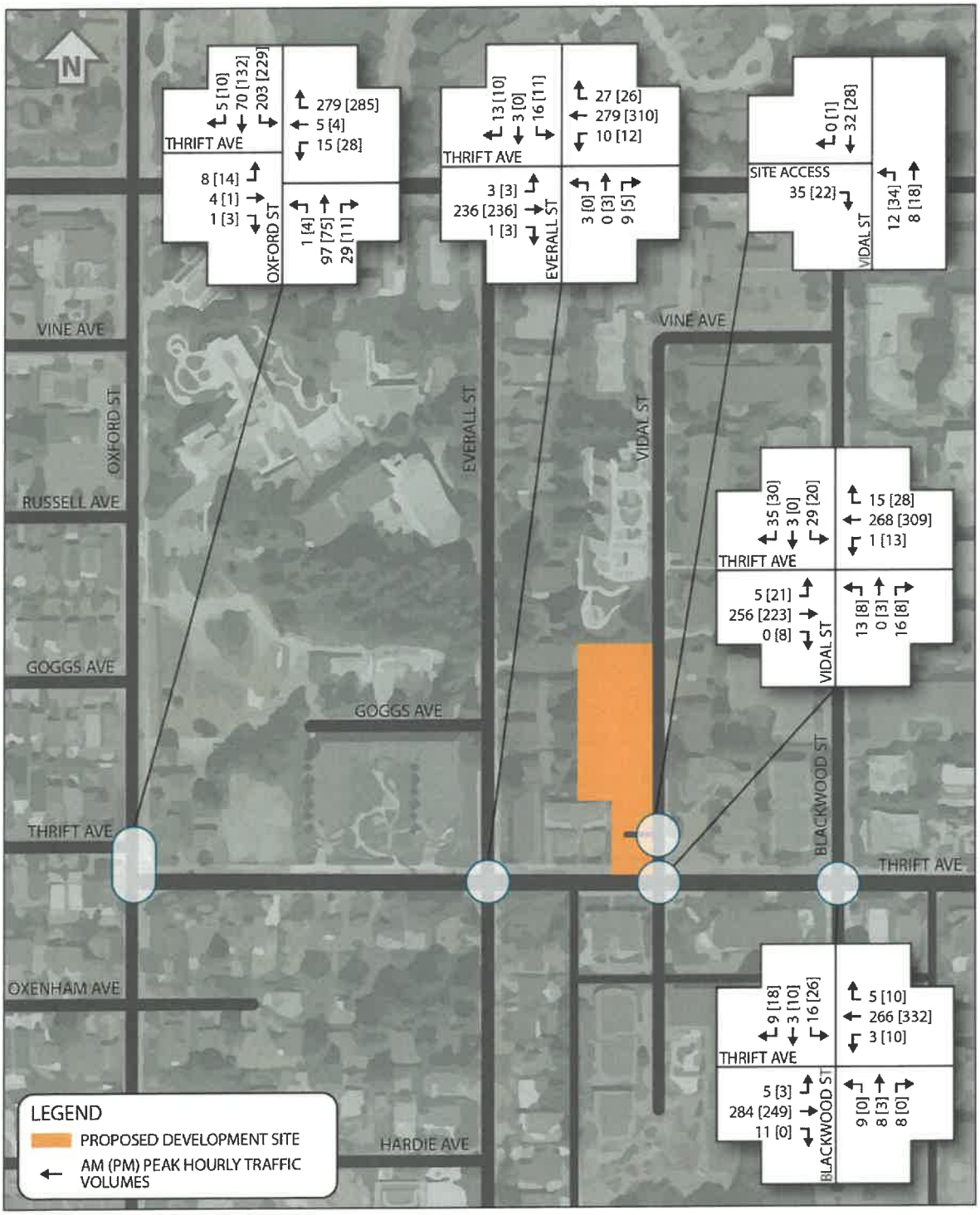


Figure 4-6: 2032 Opening Day +10 Years Combined Traffic Volumes

4.4.3 2045 Horizon Year Combined Traffic Operations

The 2045 horizon year background traffic operations analysis assumes the existing intersection and laning configurations. The 2045 horizon year combined traffic volumes are shown in **Figure 4-7**.

AM Peak Hour

During the AM peak hour, all of the study intersections are expected to operate within the study thresholds. The maximum v/c ratio is expected to be 0.52 for the westbound movements at the intersection of Thrift Avenue and Oxford Street.

PM Peak Hour

During the PM peak hour, all the target intersections are expected to operate within the study thresholds. The maximum v/c ratio is expected to be 0.52 for the westbound movements at the intersection of Thrift Avenue and Oxford Street.

The 2045 horizon year background traffic analysis results are summarized in **Table 4-9**.

Table 4-9: 2045 Horizon Year Combined Traffic Operations

Intersection	Turning Movement	AM Peak Hour				PM Peak Hour			
		LOS	Delay (s)	V/C Ratio	95% Q (m)	LOS	Delay (s)	V/C Ratio	95% Q (m)
Thrift Avenue at Oxford Street South (Unsignalized)	WBL/R	B	14.4	0.52	23.3	B	14.2	0.52	23.6
	NBT/R	A	-	0.11	-	A	-	0.07	-
	SBL/T	A	6.6	0.21	5.9	A	5.8	0.22	6.3
	Int. LOS	A				A			
Thrift Avenue at Oxford Street North (Unsignalized)	EBL/R	B	14.8	0.05	1.2	C	16.5	0.06	1.4
	NBL/T	A	0.3	0.01	0.2	A	0.3	0.01	0.2
	SBT/R	A	-	0.23	-	A	-	0.30	-
	Int. LOS	A				A			
Thrift Avenue at Everall Street (TWSC)	EBL/T/R	A	0.1	0.00	0.1	A	0.1	0.00	0.1
	WBL/T/R	A	0.4	0.01	0.3	A	0.4	0.01	0.3
	NBL/T/R	B	11.6	0.03	0.7	B	12.1	0.02	0.5
	SBL/T/R	C	15.3	0.11	2.8	C	15.1	0.08	1.8
	Int. LOS	A				A			
Thrift Avenue at Vidal Street (TWSC)	EBL/T/R	A	0.2	0.00	0.1	A	0.8	0.02	0.5
	WBL/T/R	A	0.1	0.00	-	A	0.5	0.01	0.3
	NBL/T/R	B	14.6	0.10	2.4	C	16.1	0.07	1.8
	SBL/T/R	C	15.5	0.19	5.3	C	15.7	0.16	4.2
	Int. LOS	A				A			
Thrift Avenue at Blackwood Street (TWSC)	EBL/T/R	A	0.2	0.01	0.2	A	0.1	0.00	0.1
	WBL/T/R	A	0.1	0.00	0.1	A	0.4	0.01	0.3
	NBL/T/R	C	16.0	0.10	2.4	C	17.4	0.01	0.2
	SBL/T/R	C	16.3	0.11	2.7	C	18.4	0.22	6.2
	Int. LOS	A				A			
Vidal Street at Development Access (Unsignalized)	EBL/R	A	8.6	0.04	0.9	A	8.6	0.02	0.5
	NBL/T	A	4.0	0.01	0.2	A	4.5	0.02	0.6
	SBT/R	A	-	0.03	-	A	-	0.02	-
	Int. LOS	A				A			

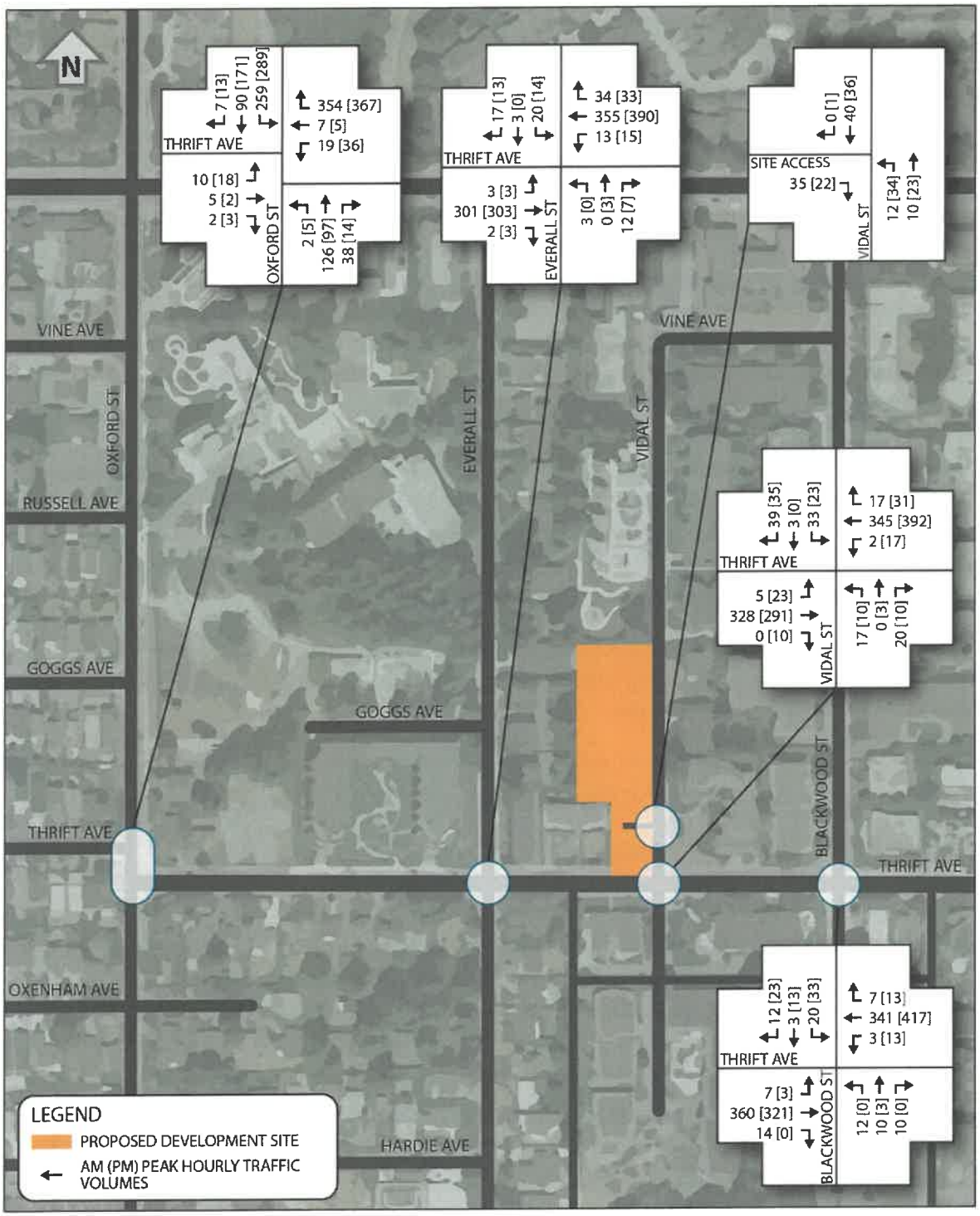


Figure 4-7: 2045 Horizon Year Combined Traffic Volumes

5 TRAFFIC CIRCULATION AND OFF-STREET PARKING

5.1 Site Access Review

The study development is expected to have one access on Vidal Street. All ingress and egress movements for the underground parkade are expected to be made from this single entrance.

The driveway spacing was reviewed according to the Transportation Association of Canada's (TAC) *Geometric Design Guide for Canadian Roads* Chapter 8 – Section 8.9.7. Within residential land uses adjacent to a minor intersection, a minimum distance of 2.0 m is suggested between the driveway and the back of the curb corner. The proposed driveway location for the study development is expected to exceed the minimum TAC guidelines. In order to provide adequate sightlines for the site traffic to safely enter Vidal Street, a no-stopping zone should be established on either side of the driveway.

5.2 AutoTURN Review

An AutoTURN analysis was conducted for the ingress and egress movements of a standard passenger vehicle at each of the parkade levels based on design guidelines published by TAC. The AutoTURN analysis found that this design vehicle is able to perform the ingress and egress movements without issues at the proposed access. It is also expected to manoeuvre without issues within the study development's parkade as per the current site plan.

It is noted that solid waste collection bins are located near the parkade entrance within the building. It is anticipated these will be moved to Vidal Street for collection and that solid waste collection vehicles are not expected to enter the parkade.

The analysis also reviewed the critical parking manoeuvres within the parkade, typically parking spaces that are against walls, and found that they could be accessed by the design vehicle without issues.

The AutoTURN analysis for the study development is provided in **Appendix B**.

5.3 Off-Street Parking

The off-street parking requirements for the proposed development were calculated based on the City's Bylaw No. 2000 (2019). Based on Section 4.14, a total of 194 parking spaces are required with 155 spaces for resident parking and 39 spaces for visitor parking, which is presented in **Table 5-1** below.

Table 5-1: Bylaw Parking Requirements

Description	Bylaw Ref.	Size	Unit	Demand Per Unit	Stalls Required
Required Parking Spaces - Apartment	2000 - 4.14	129	Units	1.20	155
Visitor Parking Spaces - Apartment	2000 - 4.14	129	Units	0.30	39
				Total:	**194**

Based on the January 9, 2020 site plan, there are 179 parking spaces for the proposed development with 39 spaces for visitor parking and 140 spaces for resident parking. As there is a 15 stall shortfall and that a variance from the Bylaw is required, the forecast parking demand for the proposed development was

reviewed based on the rate published in the Institute of Transportation Engineers' (ITE) *Parking Generation Manual, 5th Edition.* The parking generation rate for the development is assumed to be consistent with the following land use category outlined in the ITE guidelines:

- Residential Mid-Rise Multifamily Housing (ITE Ref. 221)

The forecast site generated traffic volumes for the proposed study development are summarized in **Table 5-2**.

Table 5-2: Forecast Study Development Generated Parking Demand

Description	Size	Unit	ITE Ref.	Avg. Parking Gen Per Unit	Generated Parking Demand
Weekday Peak Period	129	Units	221	1.31	169

During the peak parking period, which is likely overnight within the development, there is an estimated parking demand for 169 parking spaces, inclusive of the visitor parking, which is less than the proposed 179 parking spaces in the proposed development. Although the proposed 179 parking spaces do not meet the Bylaw requirements, they were found to exceed the projected parking demand for similar residential sites based on ITE parking generation rates. The ITE parking demand rate is generally based on market residential developments; therefore, the study rental development is anticipated to generate less parking demand than the projection using ITE's parking generation rate. Further, with existing bus routes operating on Thrift Avenue that are directly adjacent to the proposed development, the dependency on using personal vehicles for local trips are expected to be reduced.

Based on the review performed in this section, the provided on-site parking supply would be sufficient for this proposed development.

5.4 Bicycle Parking

Based on section 4.16 of the City's Bylaw No. 2000 (2019), a total of 155 bicycle parking spaces are required with 129 spaces for Class 1 secure long-term parking and 26 spaces for Class 2 short-term parking. Based on the January 9, 2020 site plan, there are 156 bicycle parking spaces provided in the proposed development, which meet the Bylaw requirements presented in **Table 5-3**.

Table 5-3: Bicycle Parking Requirements

Description	Bylaw Ref.	Size	Unit	Demand Per Unit	Stalls Required
Bicycle Parking Stall Class 1	2000 - 4.16	129	Units	1.00	129
Bicycle Parking Stall Class 2	2000 - 4.16	129	Units	0.20	26
				Total:	**155**

5.5 Loading

According to section 4.15 of the City's Bylaw No. 2000 (2019), an off-street loading space is required if there are greater than ten units in an apartment complex. Based on the site plan, a single off-street loading space is located perpendicular to the parkade driveway on the east side of the building. An

AutoTURN analysis found that an MSU (medium single unit) truck design vehicle is able to reverse into this loading space from Vidal Street without issues. A Building Manager is expected to be on-site at all times to help plan and facilitate access to the loading bay to minimize impacts to on-street parking.

In order to accommodate the MSU turning movements into the loading bay, a variance will be required to permit the driveway to widen in excess of 7 metres at the new property line. This is considered to be acceptable as the widest point of the driveway is near the building where conflicts with pedestrians would be low.

To provide waste collection services on-site, the study development is expected to accommodate that completely on-site with low-profile compactors. Waste collection would then be performed by small trucks that could manoeuvre through the parkade.

6 CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study is to evaluate the transportation effects of the proposed multi-family residential development and its traffic impacts on the adjacent transportation network. The proposed development is expected to provide a total of 129 residential units at its full build-out.

A summary of the study findings are as follows:

- The study area is located in close proximity to existing transit routes and regional cycling routes. There are existing pedestrian facilities provided on the study roadways as well.
- A new pedestrian sidewalk is proposed along Vidal Street and Thrift Avenue adjacent to the proposed development.
- The development is expected to provide a total of 129 'Class 1' bicycle parking spaces and 27 'Class 2' bicycle parking spaces which meet the City's Bylaw requirements.
- At full build-out, the proposed development is expected to generate 47 vehicle trips onto the study road network during the AM peak hour, with 12 inbound trips, and 35 outbound trips.
- The proposed development is expected to generate 57 vehicle trips onto the study road network during the PM peak hour, with 35 inbound trips and 22 outbound trips.
- The proposed development is expected to provide one access point on Vidal Street north of Thrift Avenue with free-flow traffic maintained on Vidal Street. The proposed driveway distance from Thrift Avenue is expected to meet and exceed the minimum TAC requirement.
- The existing study intersections along Thrift Avenue are currently operating within the study thresholds during both the AM and PM peak hours. During the 2022 opening day, 2032 horizon year, and 2045 horizon year scenarios, the existing intersections and the study development access are expected to continue operating within study thresholds.
- The study development is required to provide 155 residential parking spaces and 39 visitor parking spaces for a total of 194 parking spaces based on the City's Bylaw; however, the proposed parking supply is expected to be sufficient in accommodating the parking demand based on the ITE's parking generation rate.
- Solid waste collection will be performed fully within the site.
- A variance will be required to permit the driveway to widen in excess of 7 metres at the new property line in order to accommodate loading activities. The area where the driveway would exceed 7 metres is away from the pedestrian sidewalk so safety is not expected to be impacted.

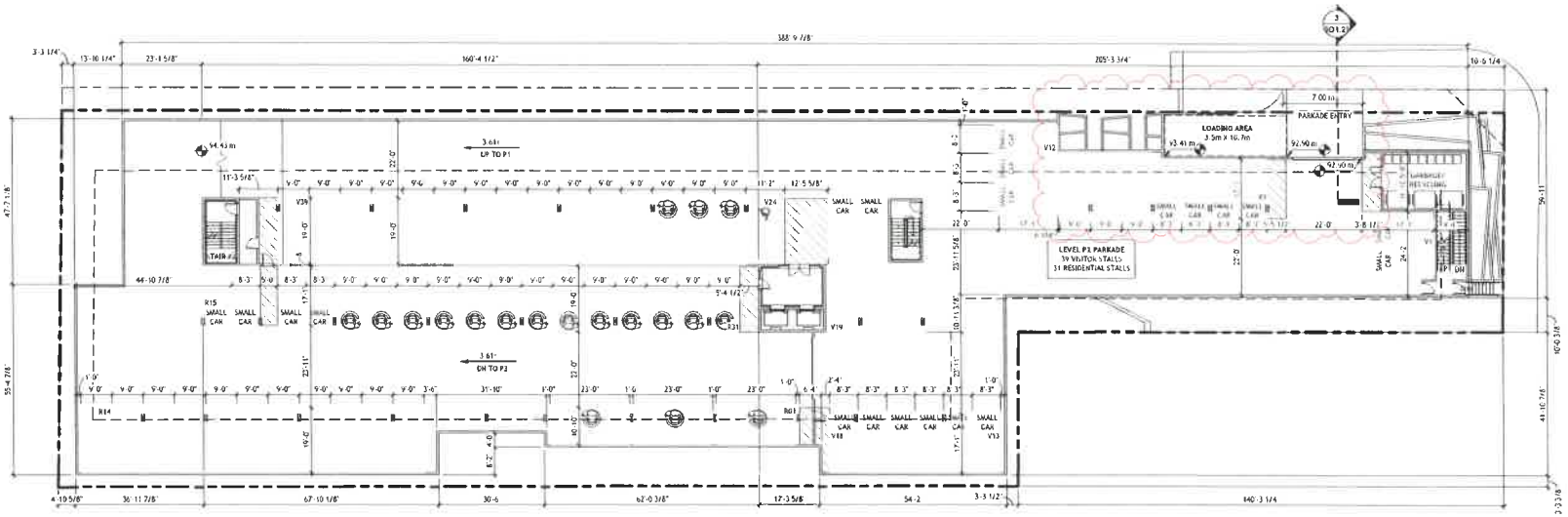
Based on the study findings, all of the intersections within the study area are expected to operate acceptably; thus, no transportation improvements are expected to be required to accommodate the traffic demand generated by the proposed development.

An on-site Building Manager is recommended to monitor and facilitate access to the loading bay in order to coordinate its used by future residents and to reduce impacts to on-street parking.

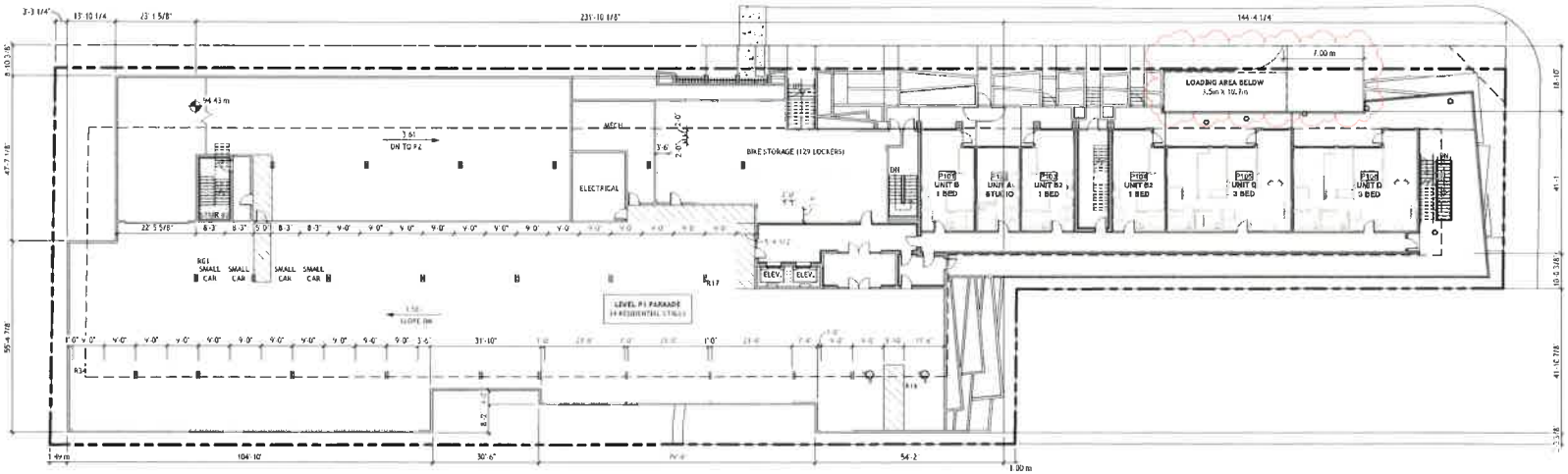
APPENDIX A

PROPOSED SITE PLAN

	VIDAL STREET DEVELOPMENT	**SITE PLAN**		**ISSUED FOR DEVELOPMENT PERMIT**	WESTSTONE GROUP	**SD1.20**



	VIDAL STREET DEVELOPMENT	**P2 LEVEL PLAN**		**ISSUED FOR DEVELOPMENT PERMIT**	WESTSTONE GROUP	**SD3.02**



keystonearch.ca

VIDAL STREET DEVELOPMENT

VIDAL STREET, WHITE ROCK, BC

P1 LEVEL PLAN

SCALE: 1/16" = 1'-0"

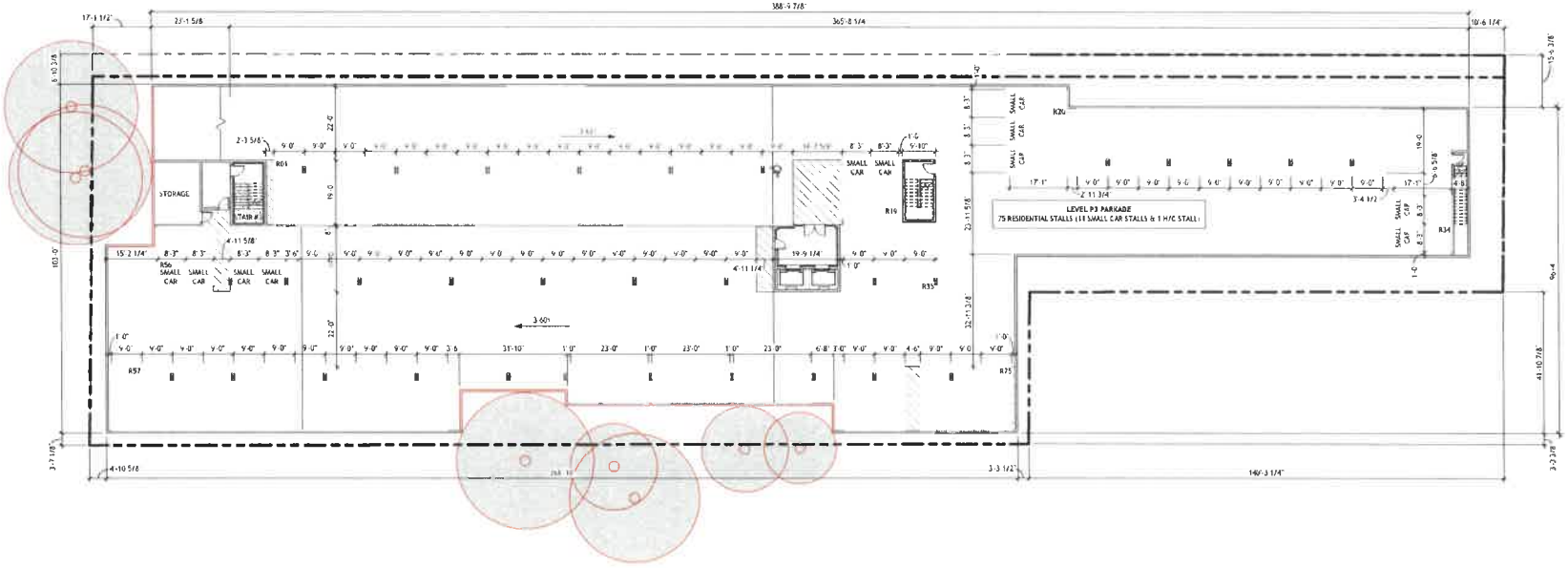
ISSUED FOR DEVELOPMENT PERMIT

DATE: 2020/05/20 REVISION #:

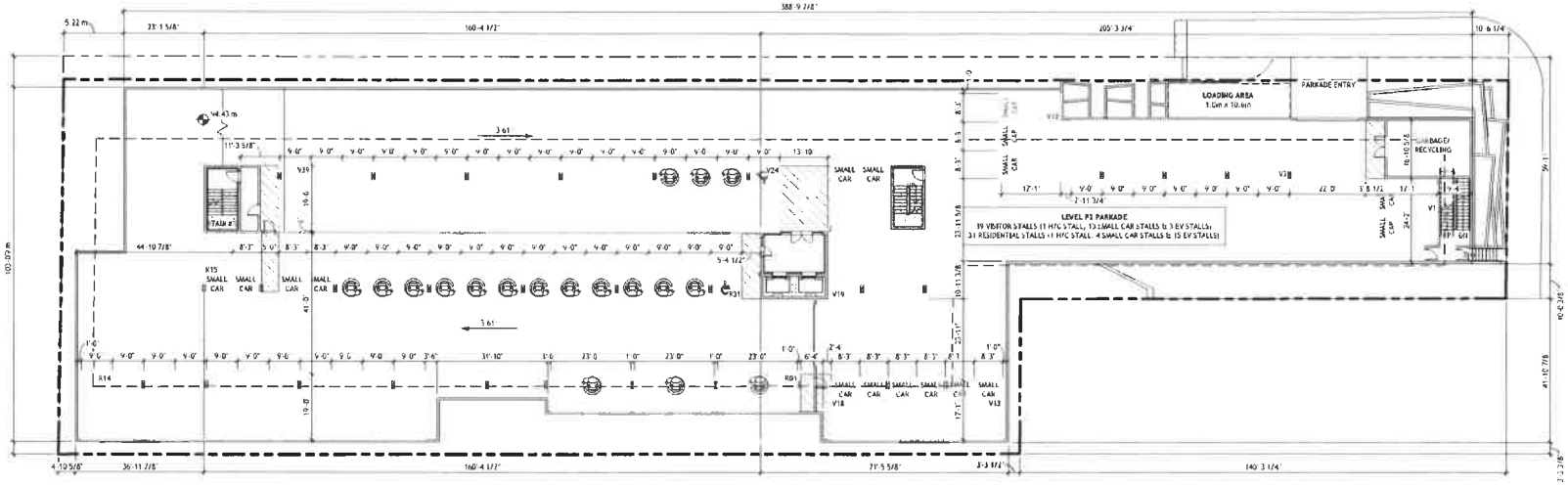
PROJECT NUMBER: 18-170

WESTSTONE GROUP

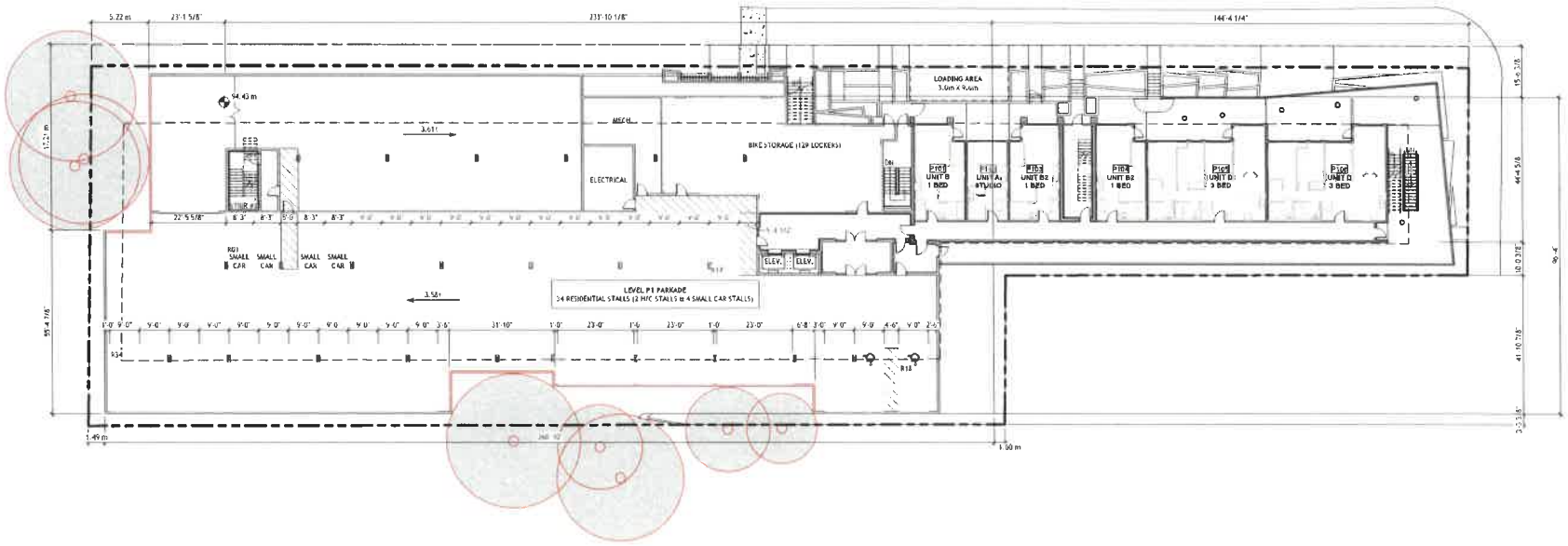
SD3.03



	VIDAL STREET DEVELOPMENT	**P3 LEVEL PLAN**		**ISSUED FOR DEVELOPMENT PERMIT**	WESTSTONE GROUP	**SD3.01**



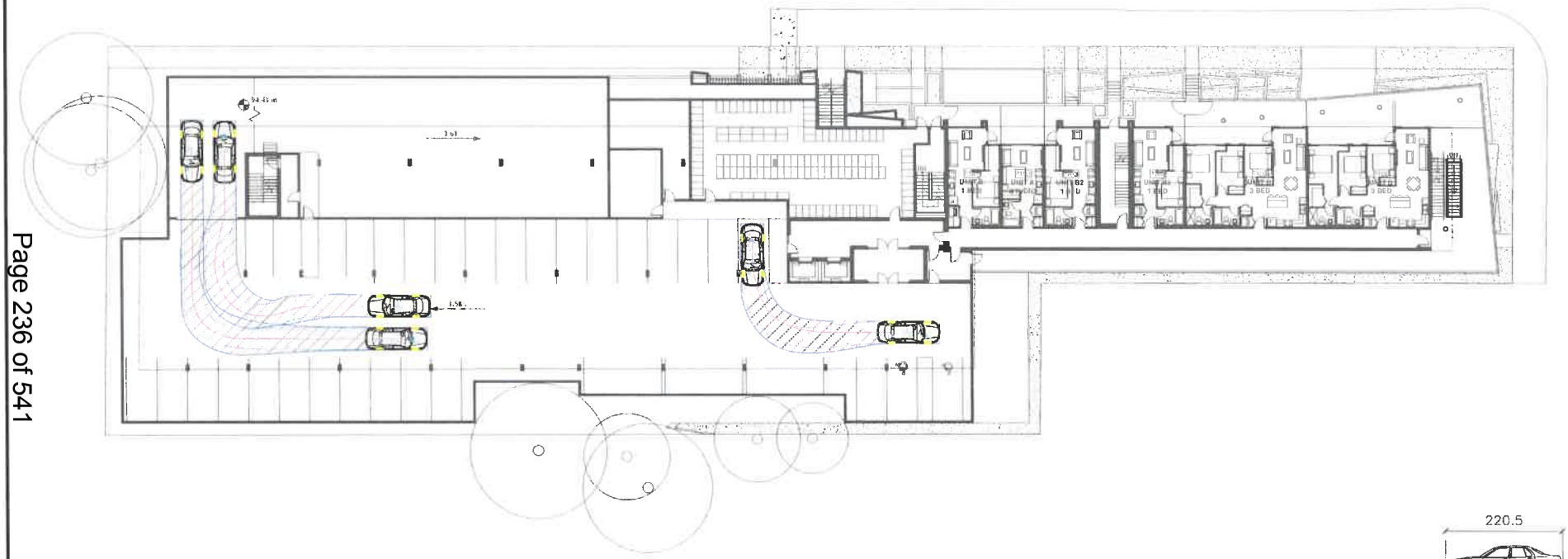
	VIDAL STREET DEVELOPMENT	**P2 LEVEL PLAN**		**ISSUED FOR DEVELOPMENT PERMIT**	WESTSTONE GROUP	**SD3.02**

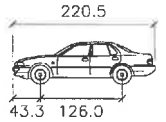


	VIDAL STREET DEVELOPMENT	**P1 LEVEL PLAN**		**ISSUED FOR DEVELOPMENT PERMIT**	WESTSTONE GROUP	**SD3.03**
		SCALE: 1/16" = 1'-0"				

APPENDIX B

AUTOTURN SITE CIRCULATION ANALYSIS





P

	inches
Width	: 78.7
Track	: 78.7
Lock to Lock Time	: 6.0
Steering Angle	: 35.9

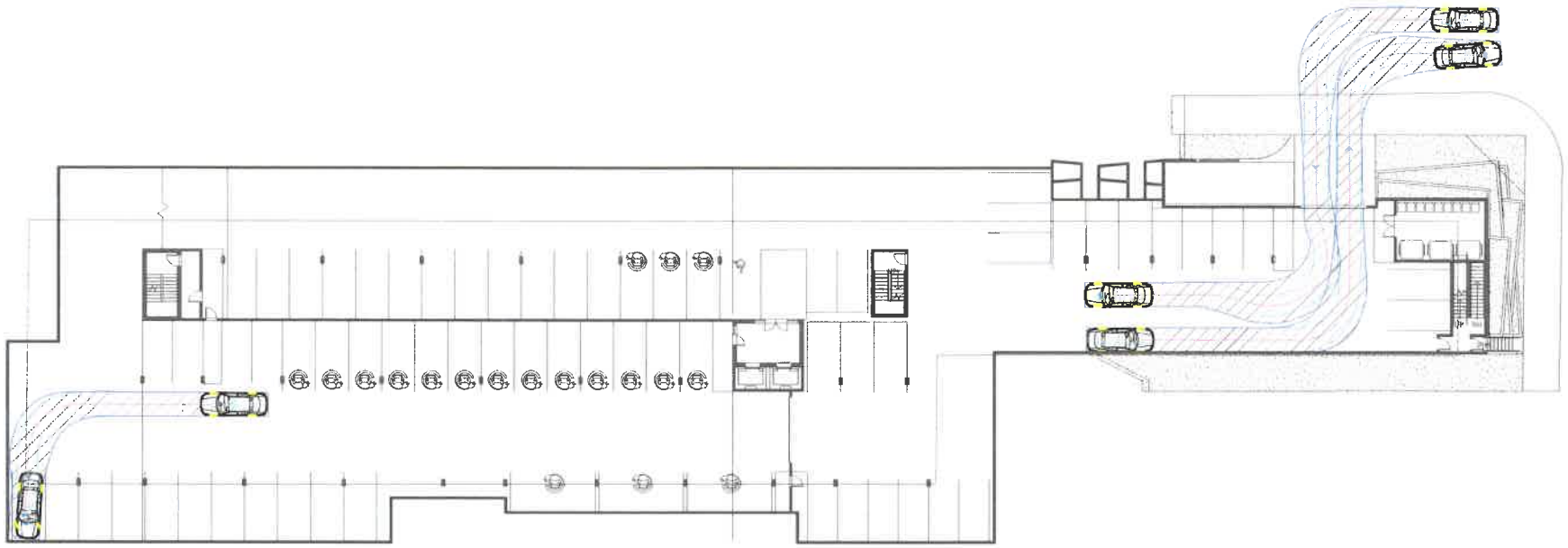
ACCOMMODATED

CONFLICT

BINNIE
The people behind your infrastructure.

TITLE
PARKADE CIRCULATION LEVEL P1
AUTOTURN ANALYSIS
VIDAL STREET DEVELOPMENT, WHITE ROCK

DATE	6/26/2020
DWG. No.	01
SCALE	NOT_TO_SCALE



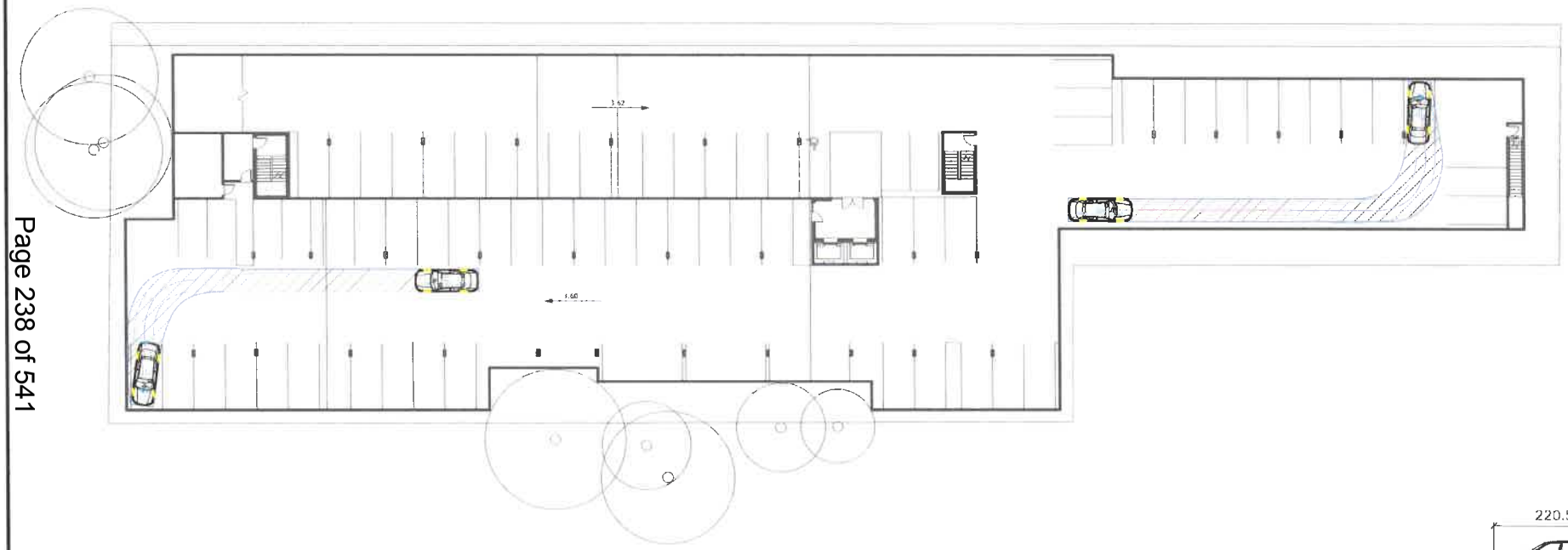
ACCOMMODATED

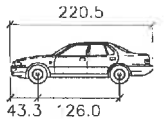
CONFLICT

BINNIE
The people behind your infrastructure.

TITLE:
PARKADE CIRCULATION LEVEL P2
AUTOTURN ANALYSIS
VIDAL STREET DEVELOPMENT, WHITE ROCK

DATE: 6/26/2020
DWG. No.: 02
SCALE: NOT_TO_SCALE





P

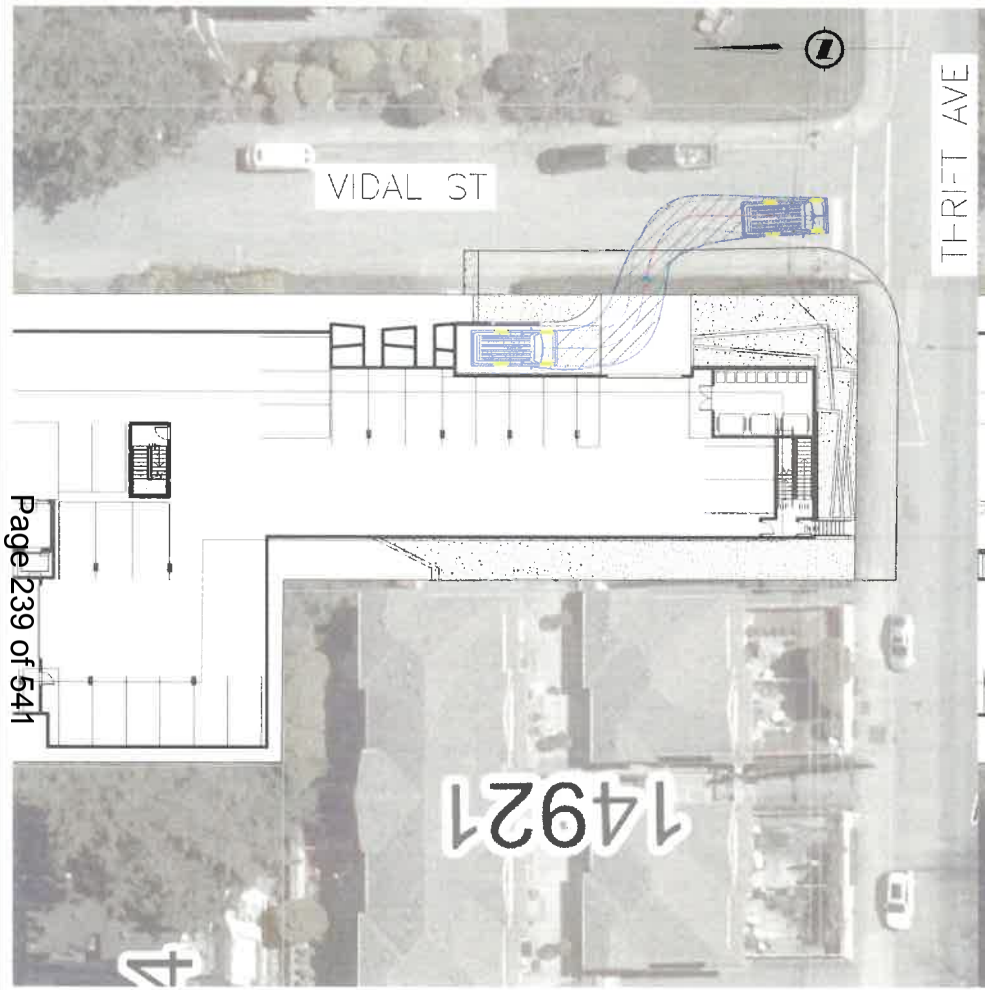
	inches
Width	: 78.7
Track	: 78.7
Lock to Lock Time	: 6.0
Steering Angle	: 35.9

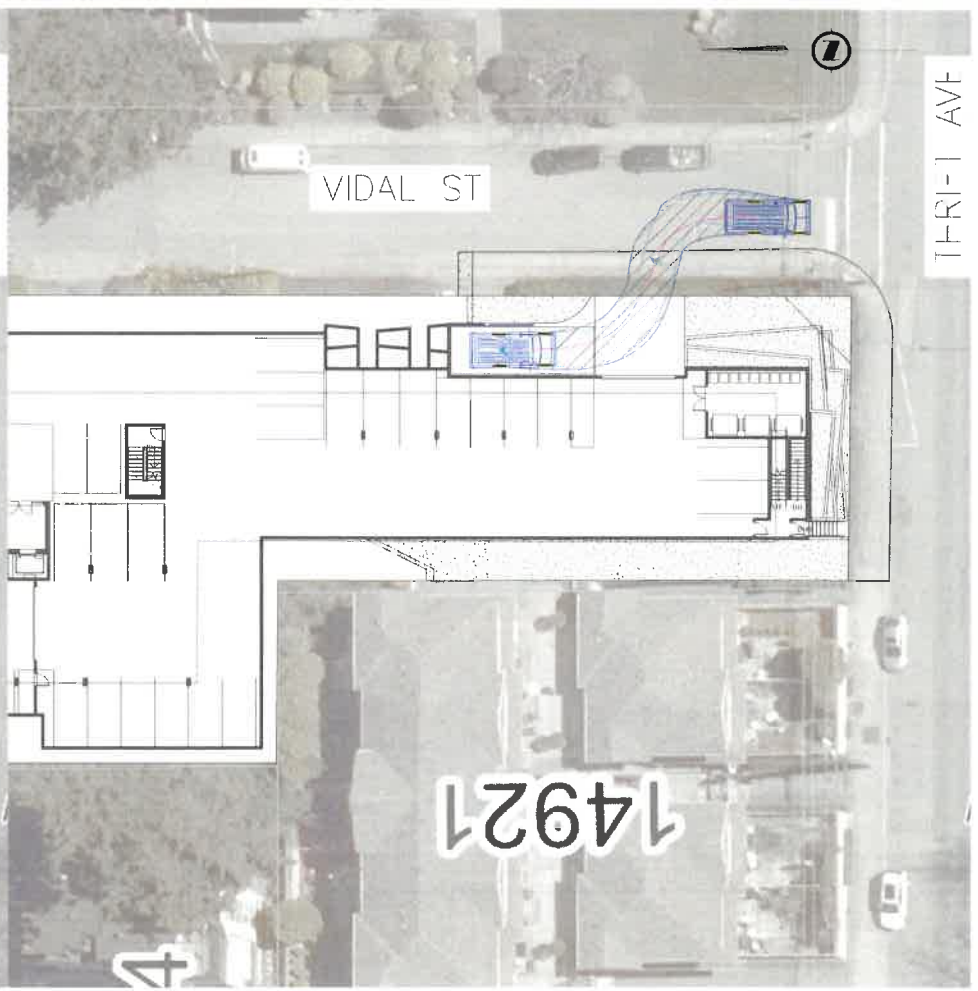
ACCOMMODATED CONFLICT

BINNIE
The people behind your infrastructure.

TITLE
PARKADE CIRCULATION LEVEL P3
AUTOTURN ANALYSIS
VIDAL STREET DEVELOPMENT, WHITE ROCK

DATE 6/26/2020
DWG. No. : 03
SCALE : NOT_TO_SCALE



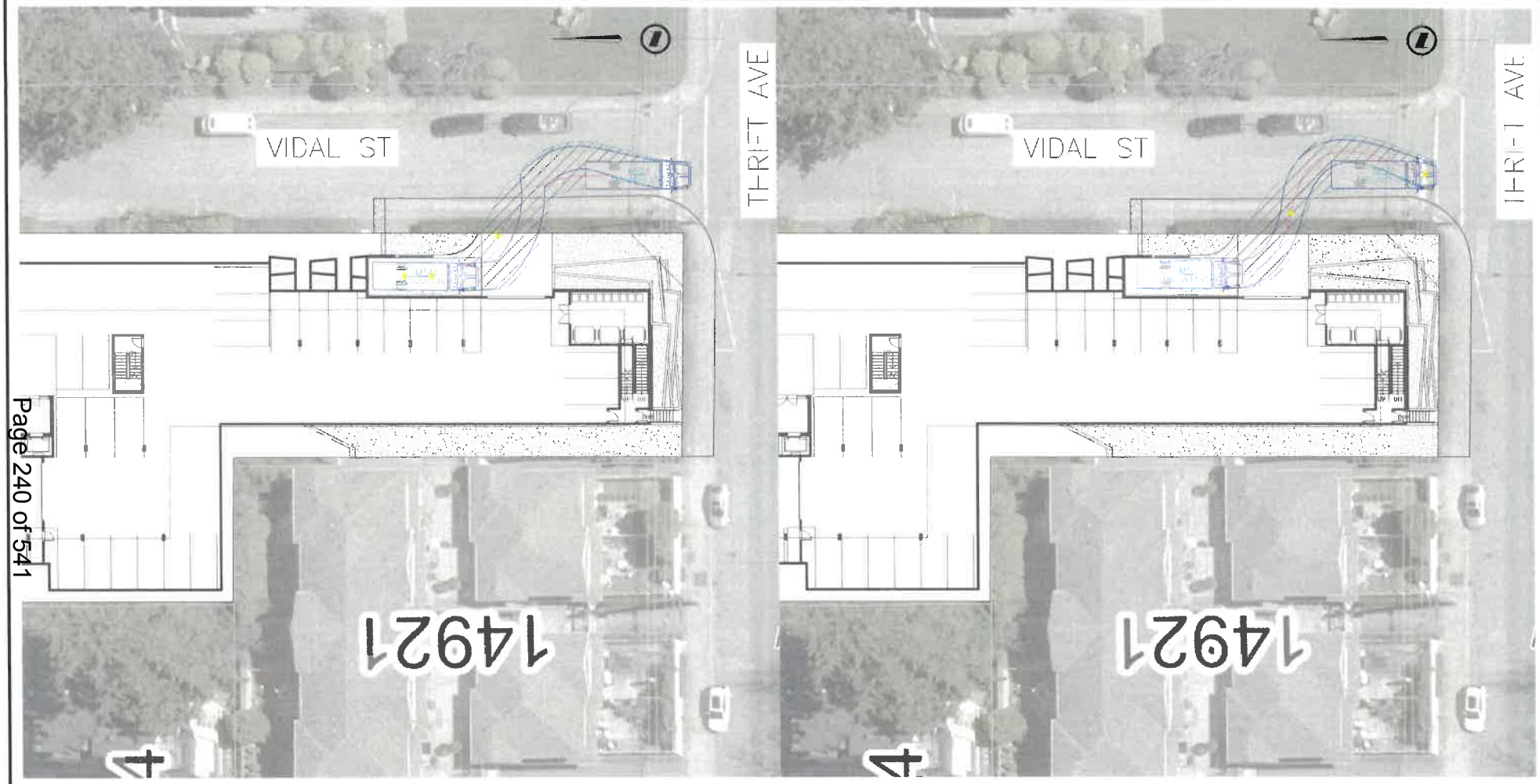


ACCOMMODATED CONFLICT

BINNIE
The people behind your infrastructure.

TITLE
LOADING BAY - LSU DESIGN VEHICLE
AUTOTURN ANALYSIS
VIDAL STREET DEVELOPMENT, WHITE ROCK

DATE :	6/26/2020
DWG. No. :	04
SCALE	NOT_TO_SCALE



ACCOMMODATED

CONFLICT

BINNIE
The people behind your infrastructure.

TITLE:
LOADING BAY - MSU DESIGN VEHICLE
AUTOTURN ANALYSIS
VIDAL STREET DEVELOPMENT, WHITE ROCK

DATE: 6/26/2020
DWG. No.: 05
SCALE: NOT_TO_SCALE

APPENDIX C

ITE TRIP GENERATION REFERENCE

Land Use: 221
Multifamily Housing (Mid-Rise)

Description

Mid-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have between three and 10 levels (floors). Multifamily housing (low-rise) (Land Use 220), multifamily housing (high-rise) (Land Use 222), off-campus student apartment (Land Use 225), and mid-rise residential with 1st-floor commercial (Land Use 231) are related land uses.

Additional Data

In prior editions of *Trip Generation Manual*, the mid-rise multifamily housing sites were further divided into rental and condominium categories. An investigation of vehicle trip data found no clear differences in trip making patterns between the rental and condominium sites within the ITE database. As more data are compiled for future editions, this land use classification can be reinvestigated.

For the six sites for which both the number of residents and the number of occupied dwelling units were available, there were an average of 2.46 residents per occupied dwelling unit.

For the five sites for which the numbers of both total dwelling units and occupied dwelling units were available, an average of 95.7 percent of the total dwelling units were occupied.

Time-of-day distribution data for this land use are presented in Appendix A. For the eight general urban/suburban sites with data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 7:00 and 8:00 a.m. and 4:45 and 5:45 p.m., respectively.

For the four dense multi-use urban sites with 24-hour count data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 7:15 and 8:15 a.m. and 4:15 and 5:15 p.m., respectively. For the three center city core sites with 24-hour count data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 6:45 and 7:45 a.m. and 5:00 and 6:00 p.m., respectively.

For the six sites for which data were provided for both occupied dwelling units and residents, there was an average of 2.46 residents per occupied dwelling unit.

For the five sites for which data were provided for both occupied dwelling units and total dwelling units, an average of 95.7 percent of the units were occupied.

The average numbers of person trips per vehicle trip at the five center city core sites at which both person trip and vehicle trip data were collected were as follows:

- 1.84 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 7 and 9 a.m.
- 1.94 during Weekday, AM Peak Hour of Generator
- 2.07 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 4 and 6 p.m.
- 2.59 during Weekday, PM Peak Hour of Generator

The average numbers of person trips per vehicle trip at the 32 dense multi-use urban sites at which both person trip and vehicle trip data were collected were as follows:

- 1.90 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 7 and 9 a.m.
- 1.90 during Weekday, AM Peak Hour of Generator
- 2.00 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 4 and 6 p.m.
- 2.08 during Weekday, PM Peak Hour of Generator

The average numbers of person trips per vehicle trip at the 13 general urban/suburban sites at which both person trip and vehicle trip data were collected were as follows:

- 1.56 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 7 and 9 a.m.
- 1.88 during Weekday, AM Peak Hour of Generator
- 1.70 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 4 and 6 p.m.
- 2.07 during Weekday, PM Peak Hour of Generator

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Alberta (CAN), British Columbia (CAN), California, Delaware, District of Columbia, Florida, Georgia, Illinois, Maryland, Massachusetts, Minnesota, New Hampshire, New Jersey, Ontario, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Utah, Virginia, and Wisconsin.

Source Numbers

168, 188, 204, 305, 306, 321, 357, 390, 436, 525, 530, 579, 638, 818, 857, 866, 901, 904, 910, 912, 918, 934, 936, 939, 944, 947, 948, 949, 959, 963, 964, 966, 967, 969, 970

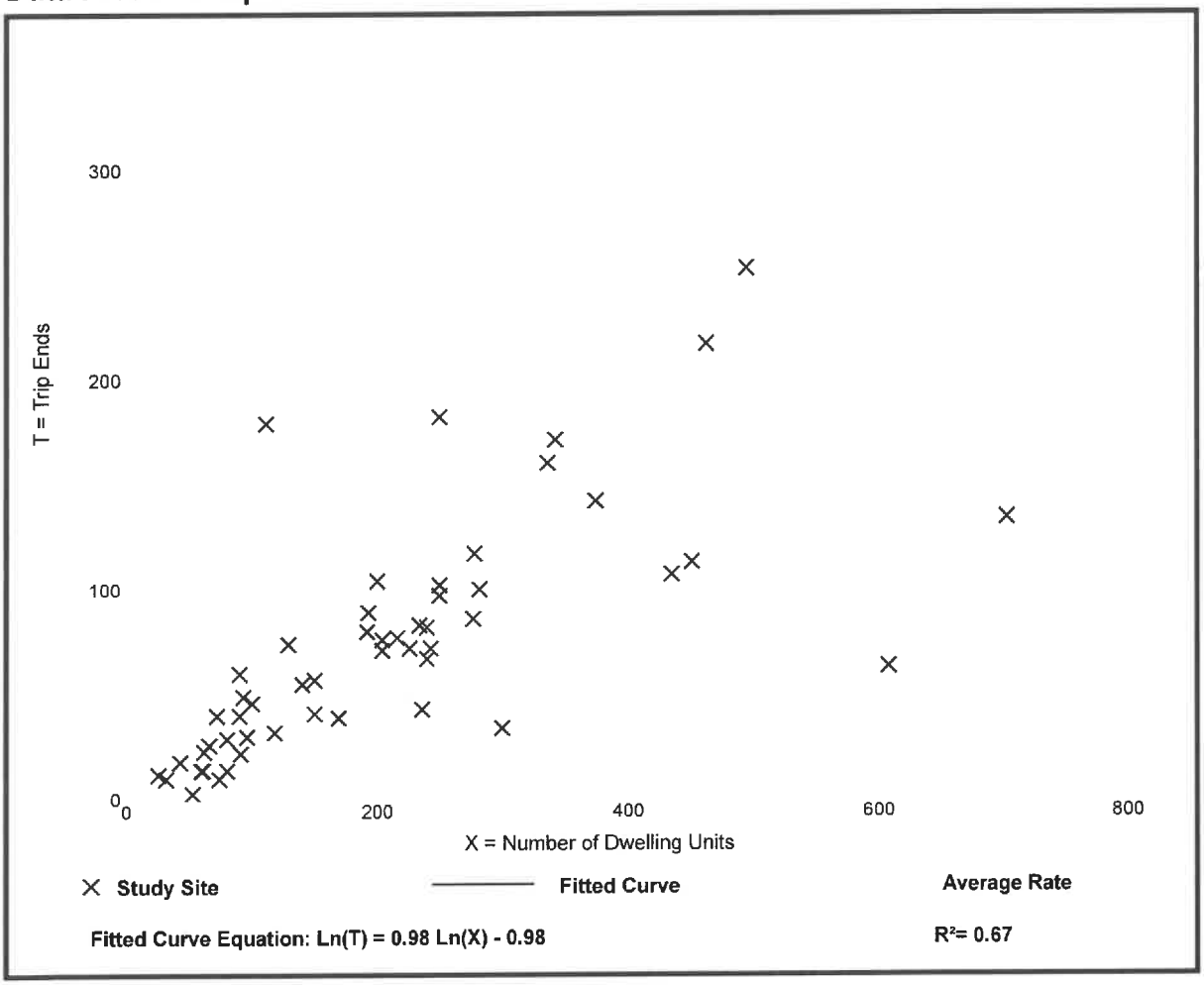
Multifamily Housing (Mid-Rise)
(221)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 53
Avg. Num. of Dwelling Units: 207
Directional Distribution: 26% entering, 74% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.36	0.06 - 1.61	0.19

Data Plot and Equation



Trip Generation Manual, 10th Edition • Institute of Transportation Engineers

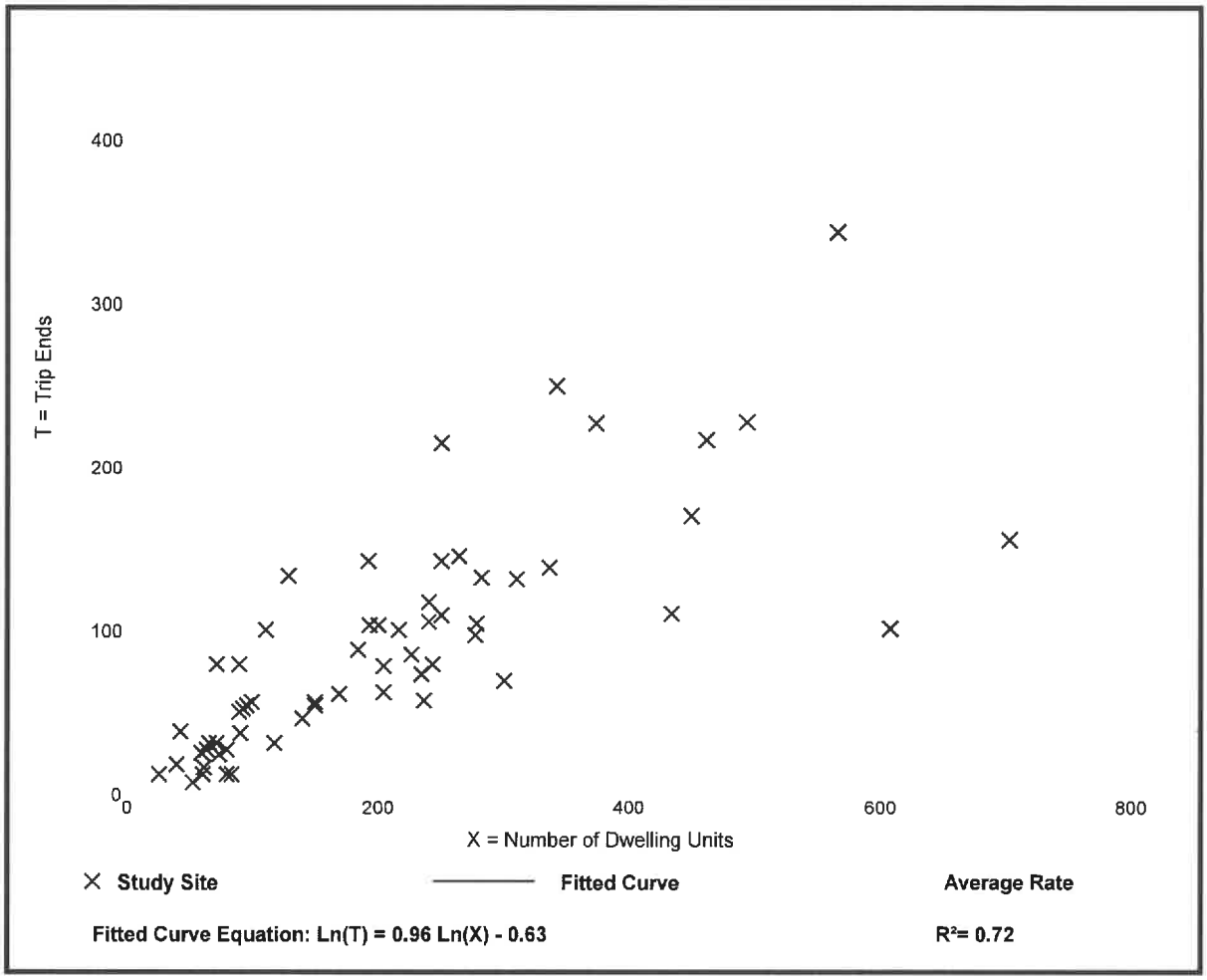
Multifamily Housing (Mid-Rise)
(221)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 60
Avg. Num. of Dwelling Units: 208
Directional Distribution: 61% entering, 39% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.44	0.15 - 1.11	0.19

Data Plot and Equation



Trip Generation Manual, 10th Edition • Institute of Transportation Engineers

APPENDIX D

SYNCHRO ANALYSIS RESULTS

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	11	201	76	22	152	55
Future Volume (Veh/h)	11	201	76	22	152	55
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	218	83	24	165	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)						
pX, platoon unblocked						
vC, conflicting volume	485	95			107	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	485	95			107	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	77			89	
cM capacity (veh/h)	481	962			1484	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	230	107	225
Volume Left	12	0	165
Volume Right	218	24	0
cSH	914	1700	1484
Volume to Capacity	0.25	0.06	0.11
Queue Length 95th (m)	7.6	0.0	2.8
Control Delay (s)	10.3	0.0	5.9
Lane LOS	B		A
Approach Delay (s)	10.3	0.0	5.9
Approach LOS	B		

Intersection Summary			
Average Delay	6.6		
Intersection Capacity Utilization	37.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	2	171	1	7	200	19	2	0	7	12	2	10
Future Volume (Veh/h)	2	171	1	7	200	19	2	0	7	12	2	10
Sign Control		Free			Free			Stop			Stop	
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)	2	186	1	8	217	21	2	0	8	13	2	11
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	238			187			446	444	186	442	434	228
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	238			187			446	444	186	442	434	228
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	100	99	97	100	99
cM capacity (veh/h)	1329			1387			511	504	856	518	511	812

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	189	246	10	26
Volume Left	2	8	2	13
Volume Right	1	21	8	11
cSH	1329	1387	754	611
Volume to Capacity	0.00	0.01	0.01	0.04
Queue Length 95th (m)	0.0	0.1	0.3	1.0
Control Delay (s)	0.1	0.3	9.8	11.2
Lane LOS	A	A	A	B
Approach Delay (s)	0.1	0.3	9.8	11.2
Approach LOS			A	B

Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	26.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	190	0	1	204	6	10	0	12	10	2	12
Future Volume (Veh/h)	0	190	0	1	204	6	10	0	12	10	2	12
Sign Control		Free			Free			Stop			Stop	
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)	0	207	0	1	222	7	11	0	13	11	2	13
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	229			207			448	438	207	448	434	226
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	229			207			448	438	207	448	434	226
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			98	100	98	98	100	98
cM capacity (veh/h)	1339			1364			510	512	833	513	514	814

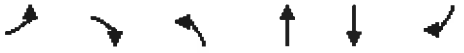
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	207	230	24	26
Volume Left	0	1	11	11
Volume Right	0	7	13	13
cSH	1339	1364	646	629
Volume to Capacity	0.00	0.00	0.04	0.04
Queue Length 95th (m)	0.0	0.0	0.9	1.0
Control Delay (s)	0.0	0.0	10.8	11.0
Lane LOS		A	B	B
Approach Delay (s)	0.0	0.0	10.8	11.0
Approach LOS			B	B

Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	21.9%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	200	8	2	197	4	7	6	6	12	2	7
Future Volume (Veh/h)	4	200	8	2	197	4	7	6	6	12	2	7
Sign Control		Free			Free			Stop			Stop	
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)	4	217	9	2	214	4	8	7	7	13	2	8
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	218			226			458	452	222	460	454	216
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	218			226			458	452	222	460	454	216
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			98	99	99	97	100	99
cM capacity (veh/h)	1352			1342			504	501	818	500	500	824

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	230	220	22	23
Volume Left	4	2	8	13
Volume Right	9	4	7	8
cSH	1352	1342	573	579
Volume to Capacity	0.00	0.00	0.04	0.04
Queue Length 95th (m)	0.1	0.0	0.9	0.9
Control Delay (s)	0.2	0.1	11.5	11.5
Lane LOS	A	A	B	B
Approach Delay (s)	0.2	0.1	11.5	11.5
Approach LOS			B	B

Intersection Summary				
Average Delay	1.2			
Intersection Capacity Utilization	23.5%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	12	3	5	272	203	4
Future Volume (Veh/h)	12	3	5	272	203	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	3	5	296	221	4
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	529	223	225			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu. unblocked vol	529	223	225			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	100	100			
cM capacity (veh/h)	508	817	1344			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	16	301	225
Volume Left	13	5	0
Volume Right	3	0	4
cSH	547	1344	1700
Volume to Capacity	0.03	0.00	0.13
Queue Length 95th (m)	0.7	0.1	0.0
Control Delay (s)	11.8	0.2	0.0
Lane LOS	B	A	
Approach Delay (s)	11.8	0.2	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	28.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	21	211	61	8	162	104
Future Volume (Veh/h)	21	211	61	8	162	104
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	229	66	9	176	113
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	536	70			75	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	536	70			75	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	77			88	
cM capacity (veh/h)	447	992			1524	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	252	75	289
Volume Left	23	0	176
Volume Right	229	9	0
cSH	893	1700	1524
Volume to Capacity	0.28	0.04	0.12
Queue Length 95th (m)	8.8	0.0	3.0
Control Delay (s)	10.6	0.0	5.0
Lane LOS	B		A
Approach Delay (s)	10.6	0.0	5.0
Approach LOS	B		

Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	42.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	166	2	9	224	19	0	2	4	8	0	8
Future Volume (Veh/h)	2	166	2	9	224	19	0	2	4	8	0	8
Sign Control		Free			Free			Stop			Stop	
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)	2	180	2	10	243	21	0	2	4	9	0	9
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	264			182			468	469	181	464	460	254
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	264			182			468	469	181	464	460	254
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	100	100	98	100	99
cM capacity (veh/h)	1300			1393			497	488	862	501	494	785

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	184	274	6	18
Volume Left	2	10	0	9
Volume Right	2	21	4	9
cSH	1300	1393	686	612
Volume to Capacity	0.00	0.01	0.01	0.03
Queue Length 95th (m)	0.0	0.2	0.2	0.7
Control Delay (s)	0.1	0.3	10.3	11.1
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	0.3	10.3	11.1
Approach LOS			B	B

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	32.7%	ICU Level of Service	A	
Analysis Period (min)	15			

3: Vidal Street & Thrift Avenue

06/24/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	168	6	10	232	8	6	2	6	8	0	14
Future Volume (Veh/h)	4	168	6	10	232	8	6	2	6	8	0	14
Sign Control		Free			Free			Stop			Stop	
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)	4	183	7	11	252	9	7	2	7	9	0	15
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	261			190			488	478	186	481	476	256
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	261			190			488	478	186	481	476	256
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			99	100	99	98	100	98
cM capacity (veh/h)	1303			1384			477	481	856	486	482	782

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	194	272	16	24
Volume Left	4	11	7	9
Volume Right	7	9	7	15
cSH	1303	1384	592	636
Volume to Capacity	0.00	0.01	0.03	0.04
Queue Length 95th (m)	0.1	0.2	0.6	0.9
Control Delay (s)	0.2	0.4	11.2	10.9
Lane LOS	A	A	B	B
Approach Delay (s)	0.2	0.4	11.2	10.9
Approach LOS			B	B

Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	27.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	180	0	8	236	8	0	2	0	20	8	14
Future Volume (Veh/h)	2	180	0	8	236	8	0	2	0	20	8	14
Sign Control		Free			Free			Stop			Stop	
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)	2	196	0	9	257	9	0	2	0	22	9	15
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	266			196			499	484	196	480	480	262
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	266			196			499	484	196	480	480	262
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	100	100	96	98	98
cM capacity (veh/h)	1298			1377			463	479	845	491	482	777

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	198	275	2	46
Volume Left	2	9	0	22
Volume Right	0	9	0	15
cSH	1298	1377	479	556
Volume to Capacity	0.00	0.01	0.00	0.08
Queue Length 95th (m)	0.0	0.2	0.1	2.0
Control Delay (s)	0.1	0.3	12.6	12.1
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	0.3	12.6	12.1
Approach LOS			B	B

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	33.5%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	3	6	266	263	8
Future Volume (Veh/h)	11	3	6	266	263	8
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	3	7	289	286	9
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	594	290	295			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	594	290	295			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	100	99			
cM capacity (veh/h)	465	749	1266			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	15	296	295
Volume Left	12	7	0
Volume Right	3	0	9
cSH	503	1266	1700
Volume to Capacity	0.03	0.01	0.17
Queue Length 95th (m)	0.7	0.1	0.0
Control Delay (s)	12.4	0.2	0.0
Lane LOS	B	A	
Approach Delay (s)	12.4	0.2	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		0.4	
Intersection Capacity Utilization		28.8%	ICU Level of Service A
Analysis Period (min)		15	

1: Oxford Street & Thrift Avenue

06/24/2020

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	18	269	98	28	203	71
Future Volume (Veh/h)	18	269	98	28	203	71
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	292	107	30	221	77
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	641	122			137	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	641	122			137	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	69			85	
cM capacity (veh/h)	372	929			1447	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	312	137	298
Volume Left	20	0	221
Volume Right	292	30	0
cSH	848	1700	1447
Volume to Capacity	0.37	0.08	0.15
Queue Length 95th (m)	12.9	0.0	4.1
Control Delay (s)	11.7	0.0	6.2
Lane LOS	B		A
Approach Delay (s)	11.7	0.0	6.2
Approach LOS	B		

Intersection Summary			
Average Delay	7.4		
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	231	1	9	263	25	3	0	9	16	3	13
Future Volume (Veh/h)	3	231	1	9	263	25	3	0	9	16	3	13
Sign Control		Free			Free			Stop			Stop	
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)	3	251	1	10	286	27	3	0	10	17	3	14
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	313			252			592	590	252	587	578	300
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	313			252			592	590	252	587	578	300
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			99	100	99	96	99	98
cM capacity (veh/h)	1247			1313			404	416	787	413	423	740

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	255	323	13	34
Volume Left	3	10	3	17
Volume Right	1	27	10	14
cSH	1247	1313	646	506
Volume to Capacity	0.00	0.01	0.02	0.07
Queue Length 95th (m)	0.1	0.2	0.5	1.6
Control Delay (s)	0.1	0.3	10.7	12.6
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	0.3	10.7	12.6
Approach LOS			B	B

Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	30.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	256	0	1	268	8	13	0	16	13	3	16
Future Volume (Veh/h)	0	256	0	1	268	8	13	0	16	13	3	16
Sign Control		Free			Free			Stop			Stop	
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)	0	278	0	1	291	9	14	0	17	14	3	17
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	300			278			594	580	278	592	576	296
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	300			278			594	580	278	592	576	296
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			97	100	98	97	99	98
cM capacity (veh/h)	1261			1285			405	425	761	408	428	744

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	278	301	31	34
Volume Left	0	1	14	14
Volume Right	0	9	17	17
cSH	1261	1285	544	530
Volume to Capacity	0.00	0.00	0.06	0.06
Queue Length 95th (m)	0.0	0.0	1.4	1.6
Control Delay (s)	0.0	0.0	12.0	12.3
Lane LOS		A	B	B
Approach Delay (s)	0.0	0.0	12.0	12.3
Approach LOS			B	B

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	25.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	269	10	3	259	5	9	8	8	16	3	9
Future Volume (Veh/h)	5	269	10	3	259	5	9	8	8	16	3	9
Sign Control		Free			Free			Stop			Stop	
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)	5	292	11	3	282	5	10	9	9	17	3	10
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	287			303			610	600	298	612	604	284
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	287			303			610	600	298	612	604	284
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			97	98	99	96	99	99
cM capacity (veh/h)	1275			1258			397	412	742	392	410	754

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	308	290	28	30
Volume Left	5	3	10	17
Volume Right	11	5	9	10
cSH	1275	1258	473	469
Volume to Capacity	0.00	0.00	0.06	0.06
Queue Length 95th (m)	0.1	0.1	1.4	1.6
Control Delay (s)	0.2	0.1	13.1	13.2
Lane LOS	A	A	B	B
Approach Delay (s)	0.2	0.1	13.1	13.2
Approach LOS			B	B

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	27.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	5	6	361	169	5
Future Volume (Veh/h)	8	5	6	361	169	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	5	7	392	184	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	592	186	189			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	592	186	189			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	99	99			
cM capacity (veh/h)	466	856	1385			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	14	399	189
Volume Left	9	7	0
Volume Right	5	0	5
cSH	557	1385	1700
Volume to Capacity	0.03	0.01	0.11
Queue Length 95th (m)	0.6	0.1	0.0
Control Delay (s)	11.6	0.2	0.0
Lane LOS	B	A	
Approach Delay (s)	11.6	0.2	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	33.8%	ICU Level of Service	A
Analysis Period (min)	15		

1: Oxford Street & Thrift Avenue

06/24/2020

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	27	279	79	10	216	135
Future Volume (Veh/h)	27	279	79	10	216	135
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	303	86	11	235	147
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	708	92			97	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	708	92			97	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	91	69			84	
cM capacity (veh/h)	338	966			1496	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	332	97	382
Volume Left	29	0	235
Volume Right	303	11	0
cSH	831	1700	1496
Volume to Capacity	0.40	0.06	0.16
Queue Length 95th (m)	14.7	0.0	4.2
Control Delay (s)	12.2	0.0	5.4
Lane LOS	B		A
Approach Delay (s)	12.2	0.0	5.4
Approach LOS	B		

Intersection Summary			
Average Delay	7.5		
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	221	3	12	299	25	0	3	5	10	0	10
Future Volume (Veh/h)	3	221	3	12	299	25	0	3	5	10	0	10
Sign Control		Free			Free			Stop			Stop	
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)	3	240	3	13	325	27	0	3	5	11	0	11
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	352			243			623	626	242	618	614	338
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	352			243			623	626	242	618	614	338
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	99	99	97	100	98
cM capacity (veh/h)	1207			1323			389	396	797	393	402	704

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	246	365	8	22
Volume Left	3	13	0	11
Volume Right	3	27	5	11
cSH	1207	1323	578	504
Volume to Capacity	0.00	0.01	0.01	0.04
Queue Length 95th (m)	0.1	0.2	0.3	1.0
Control Delay (s)	0.1	0.4	11.3	12.5
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	0.4	11.3	12.5
Approach LOS			B	B

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	38.9%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	223	8	13	309	10	8	3	8	10	0	18
Future Volume (Veh/h)	5	223	8	13	309	10	8	3	8	10	0	18
Sign Control		Free			Free			Stop			Stop	
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)	5	242	9	14	336	11	9	3	9	11	0	20
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	347			251			646	632	246	636	630	342
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	347			251			646	632	246	636	630	342
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			98	99	99	97	100	97
cM capacity (veh/h)	1212			1314			369	392	792	379	392	701

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	256	361	21	31
Volume Left	5	14	9	11
Volume Right	9	11	9	20
cSH	1212	1314	484	539
Volume to Capacity	0.00	0.01	0.04	0.06
Queue Length 95th (m)	0.1	0.2	1.0	1.4
Control Delay (s)	0.2	0.4	12.8	12.1
Lane LOS	A	A	B	B
Approach Delay (s)	0.2	0.4	12.8	12.1
Approach LOS			B	B

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	33.4%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	239	0	10	314	10	0	3	0	26	10	18
Future Volume (Veh/h)	3	239	0	10	314	10	0	3	0	26	10	18
Sign Control		Free			Free			Stop			Stop	
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)	3	260	0	11	341	11	0	3	0	28	11	20
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	352			260			660	640	260	636	634	346
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu. unblocked vol	352			260			660	640	260	636	634	346
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	99	100	93	97	97
cM capacity (veh/h)	1207			1304			355	389	779	385	392	697

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	263	363	3	59
Volume Left	3	11	0	28
Volume Right	0	11	0	20
cSH	1207	1304	389	456
Volume to Capacity	0.00	0.01	0.01	0.13
Queue Length 95th (m)	0.1	0.2	0.2	3.4
Control Delay (s)	0.1	0.3	14.3	14.1
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	0.3	14.3	14.1
Approach LOS			B	B

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	14	4	8	350	347	10
Future Volume (Veh/h)	14	4	8	350	347	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	4	9	380	377	11
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	780	382	388			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	780	382	388			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	99	99			
cM capacity (veh/h)	361	665	1170			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	19	389	388
Volume Left	15	9	0
Volume Right	4	0	11
cSH	399	1170	1700
Volume to Capacity	0.05	0.01	0.23
Queue Length 95th (m)	1.1	0.2	0.0
Control Delay (s)	14.5	0.3	0.0
Lane LOS	B	A	
Approach Delay (s)	14.5	0.3	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization		34.8%	ICU Level of Service A
Analysis Period (min)		15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	12	220	81	23	167	58
Future Volume (Veh/h)	12	220	81	23	167	58
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	239	88	25	182	63
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	528	100			113	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	528	100			113	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	75			88	
cM capacity (veh/h)	448	955			1476	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	252	113	245
Volume Left	13	0	182
Volume Right	239	25	0
cSH	902	1700	1476
Volume to Capacity	0.28	0.07	0.12
Queue Length 95th (m)	8.7	0.0	3.2
Control Delay (s)	10.5	0.0	6.0
Lane LOS	B		A
Approach Delay (s)	10.5	0.0	6.0
Approach LOS	B		

Intersection Summary			
Average Delay	6.8		
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		

2: Evrall Street & Thrift Avenue

06/24/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	191	1	7	216	20	2	0	7	13	2	11
Future Volume (Veh/h)	2	191	1	7	216	20	2	0	7	13	2	11
Sign Control		Free			Free			Stop			Stop	
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)	2	208	1	8	235	22	2	0	8	14	2	12
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	257			209			488	486	208	482	475	246
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	257			209			488	486	208	482	475	246
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	100	99	97	100	98
cM capacity (veh/h)	1308			1362			479	478	832	487	485	793

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	211	265	10	28
Volume Left	2	8	2	14
Volume Right	1	22	8	12
cSH	1308	1362	725	583
Volume to Capacity	0.00	0.01	0.01	0.05
Queue Length 95th (m)	0.0	0.1	0.3	1.1
Control Delay (s)	0.1	0.3	10.0	11.5
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	0.3	10.0	11.5
Approach LOS			B	B

Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	27.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	212	0	1	220	6	11	0	13	11	2	13
Future Volume (Veh/h)	0	212	0	1	220	6	11	0	13	11	2	13
Sign Control		Free			Free			Stop			Stop	
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)	0	230	0	1	239	7	12	0	14	12	2	14
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	246			230			490	478	230	488	474	242
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	246			230			490	478	230	488	474	242
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			97	100	98	98	100	98
cM capacity (veh/h)	1320			1338			479	486	809	481	488	796

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	230	247	26	28
Volume Left	0	1	12	12
Volume Right	0	7	14	14
cSH	1320	1338	614	601
Volume to Capacity	0.00	0.00	0.04	0.05
Queue Length 95th (m)	0.0	0.0	1.0	1.1
Control Delay (s)	0.0	0.0	11.1	11.3
Lane LOS		A	B	B
Approach Delay (s)	0.0	0.0	11.1	11.3
Approach LOS			B	B

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	22.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	222	8	2	213	4	7	6	6	13	2	7
Future Volume (Veh/h)	4	222	8	2	213	4	7	6	6	13	2	7
Sign Control		Free			Free			Stop			Stop	
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)	4	241	9	2	232	4	8	7	7	14	2	8
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	236			250			500	494	246	502	496	234
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	236			250			500	494	246	502	496	234
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			98	99	99	97	100	99
cM capacity (veh/h)	1331			1316			473	475	793	469	473	805

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	254	238	22	24
Volume Left	4	2	8	14
Volume Right	9	4	7	8
cSH	1331	1316	543	545
Volume to Capacity	0.00	0.00	0.04	0.04
Queue Length 95th (m)	0.1	0.0	1.0	1.0
Control Delay (s)	0.1	0.1	11.9	11.9
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	0.1	11.9	11.9
Approach LOS			B	B

Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	24.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	4	5	298	221	4
Future Volume (Veh/h)	6	4	5	298	221	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	4	5	324	240	4
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	576	242	244			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	576	242	244			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	100			
cM capacity (veh/h)	477	797	1322			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	11	329	244
Volume Left	7	5	0
Volume Right	4	0	4
cSH	559	1322	1700
Volume to Capacity	0.02	0.00	0.14
Queue Length 95th (m)	0.5	0.1	0.0
Control Delay (s)	11.6	0.2	0.0
Lane LOS	B	A	
Approach Delay (s)	11.6	0.2	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	29.7%	ICU Level of Service	A
Analysis Period (min)	15		

EXISTING 2032 PM

1: Oxford Street & Thrift Avenue

06/24/2020

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	22	230	65	8	179	110
Future Volume (Veh/h)	22	230	65	8	179	110
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	250	71	9	195	120
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	586	76			80	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	586	76			80	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	75			87	
cM capacity (veh/h)	412	986			1518	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	274	80	315
Volume Left	24	0	195
Volume Right	250	9	0
cSH	879	1700	1518
Volume to Capacity	0.31	0.05	0.13
Queue Length 95th (m)	10.2	0.0	3.4
Control Delay (s)	10.9	0.0	5.2
Lane LOS	B		A
Approach Delay (s)	10.9	0.0	5.2
Approach LOS	B		

Intersection Summary			
Average Delay		6.9	
Intersection Capacity Utilization		44.5%	ICU Level of Service A
Analysis Period (min)		15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	182	2	10	247	20	0	2	4	8	0	8
Future Volume (Veh/h)	2	182	2	10	247	20	0	2	4	8	0	8
Sign Control		Free			Free			Stop			Stop	
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)	2	198	2	11	268	22	0	2	4	9	0	9
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	290			200			513	515	199	509	505	279
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	290			200			513	515	199	509	505	279
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	100	100	98	100	99
cM capacity (veh/h)	1272			1372			463	459	842	467	465	760

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	202	301	6	18
Volume Left	2	11	0	9
Volume Right	2	22	4	9
cSH	1272	1372	659	579
Volume to Capacity	0.00	0.01	0.01	0.03
Queue Length 95th (m)	0.0	0.2	0.2	0.7
Control Delay (s)	0.1	0.4	10.5	11.4
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	0.4	10.5	11.4
Approach LOS			B	B

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	34.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	184	6	11	255	8	6	2	6	8	0	15
Future Volume (Veh/h)	4	184	6	11	255	8	6	2	6	8	0	15
Sign Control		Free			Free			Stop			Stop	
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)	4	200	7	12	277	9	7	2	7	9	0	16
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	286			207			533	522	204	525	520	282
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	286			207			533	522	204	525	520	282
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			98	100	99	98	100	98
cM capacity (veh/h)	1276			1364			444	454	837	454	455	757

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	211	298	16	25
Volume Left	4	12	7	9
Volume Right	7	9	7	16
cSH	1276	1364	561	610
Volume to Capacity	0.00	0.01	0.03	0.04
Queue Length 95th (m)	0.1	0.2	0.7	1.0
Control Delay (s)	0.2	0.4	11.6	11.2
Lane LOS	A	A	B	B
Approach Delay (s)	0.2	0.4	11.6	11.2
Approach LOS			B	B

Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	29.5%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	197	0	8	259	8	0	2	0	21	8	15
Future Volume (Veh/h)	2	197	0	8	259	8	0	2	0	21	8	15
Sign Control		Free			Free			Stop			Stop	
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)	2	214	0	9	282	9	0	2	0	23	9	16
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	291			214			543	527	214	524	522	286
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	291			214			543	527	214	524	522	286
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	100	100	95	98	98
cM capacity (veh/h)	1271			1356			432	453	826	460	455	753

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	216	300	2	48
Volume Left	2	9	0	23
Volume Right	0	9	0	16
cSH	1271	1356	453	527
Volume to Capacity	0.00	0.01	0.00	0.09
Queue Length 95th (m)	0.0	0.2	0.1	2.3
Control Delay (s)	0.1	0.3	13.0	12.5
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	0.3	13.0	12.5
Approach LOS			B	B

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	35.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	12	3	6	289	286	8
Future Volume (Veh/h)	12	3	6	289	286	8
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	3	7	314	311	9
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	644	316	320			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	644	316	320			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	100	99			
cM capacity (veh/h)	435	725	1240			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	16	321	320
Volume Left	13	7	0
Volume Right	3	0	9
cSH	470	1240	1700
Volume to Capacity	0.03	0.01	0.19
Queue Length 95th (m)	0.8	0.1	0.0
Control Delay (s)	12.9	0.2	0.0
Lane LOS	B	A	
Approach Delay (s)	12.9	0.2	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		0.4	
Intersection Capacity Utilization		30.0%	ICU Level of Service A
Analysis Period (min)		15	

1: Oxford Street & Thrift Avenue

06/24/2020

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	18	346	128	37	260	90
Future Volume (Veh/h)	18	346	128	37	260	90
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	376	139	40	283	98
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	823	159			179	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	823	159			179	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	58			80	
cM capacity (veh/h)	274	886			1397	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	396	179	381
Volume Left	20	0	283
Volume Right	376	40	0
cSH	796	1700	1397
Volume to Capacity	0.50	0.11	0.20
Queue Length 95th (m)	21.4	0.0	5.8
Control Delay (s)	13.9	0.0	6.6
Lane LOS	B		A
Approach Delay (s)	13.9	0.0	6.6
Approach LOS	B		

Intersection Summary			
Average Delay	8.4		
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	296	2	12	339	32	3	0	12	20	3	17
Future Volume (Veh/h)	3	296	2	12	339	32	3	0	12	20	3	17
Sign Control		Free			Free			Stop			Stop	
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)	3	322	2	13	368	35	3	0	13	22	3	18
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	403			324			760	758	323	754	742	386
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	403			324			760	758	323	754	742	386
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			99	100	98	93	99	97
cM capacity (veh/h)	1156			1236			309	332	718	317	339	662

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	327	416	16	43
Volume Left	3	13	3	22
Volume Right	2	35	13	18
cSH	1156	1236	575	408
Volume to Capacity	0.00	0.01	0.03	0.11
Queue Length 95th (m)	0.1	0.2	0.7	2.7
Control Delay (s)	0.1	0.4	11.4	14.9
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	0.4	11.4	14.9
Approach LOS			B	B

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	39.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	328	0	2	345	10	17	0	20	17	3	20
Future Volume (Veh/h)	0	328	0	2	345	10	17	0	20	17	3	20
Sign Control		Free			Free			Stop			Stop	
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)	0	357	0	2	375	11	18	0	22	18	3	22
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	386			357			765	747	357	764	742	380
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	386			357			765	747	357	764	742	380
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			94	100	97	94	99	97
cM capacity (veh/h)	1172			1202			307	341	687	310	343	667

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	357	388	40	43
Volume Left	0	2	18	18
Volume Right	0	11	22	22
cSH	1172	1202	441	431
Volume to Capacity	0.00	0.00	0.09	0.10
Queue Length 95th (m)	0.0	0.0	2.3	2.5
Control Delay (s)	0.0	0.1	14.0	14.3
Lane LOS		A	B	B
Approach Delay (s)	0.0	0.1	14.0	14.3
Approach LOS			B	B

Intersection Summary				
Average Delay	1.4			
Intersection Capacity Utilization	30.4%	ICU Level of Service	A	
Analysis Period (min)	15			

4: Blackwood Street & Thrift Avenue

06/24/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	345	13	3	334	7	12	10	10	20	3	12
Future Volume (Veh/h)	7	345	13	3	334	7	12	10	10	20	3	12
Sign Control		Free			Free			Stop			Stop	
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)	8	375	14	3	363	8	13	11	11	22	3	13
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	371			389			786	775	382	788	778	367
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	371			389			786	775	382	788	778	367
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			96	97	98	93	99	98
cM capacity (veh/h)	1188			1170			300	326	665	294	325	678

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	397	374	35	38
Volume Left	8	3	13	22
Volume Right	14	8	11	13
cSH	1188	1170	374	368
Volume to Capacity	0.01	0.00	0.09	0.10
Queue Length 95th (m)	0.2	0.1	2.3	2.6
Control Delay (s)	0.2	0.1	15.6	15.9
Lane LOS	A	A	C	C
Approach Delay (s)	0.2	0.1	15.6	15.9
Approach LOS			C	C

Intersection Summary				
Average Delay	1.5			
Intersection Capacity Utilization	33.4%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	7	9	474	345	7
Future Volume (Veh/h)	10	7	9	474	345	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	8	10	515	375	8
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	914	379	383			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	914	379	383			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	99	99			
cM capacity (veh/h)	301	668	1175			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	19	525	383
Volume Left	11	10	0
Volume Right	8	0	8
cSH	391	1175	1700
Volume to Capacity	0.05	0.01	0.23
Queue Length 95th (m)	1.2	0.2	0.0
Control Delay (s)	14.7	0.3	0.0
Lane LOS	B	A	
Approach Delay (s)	14.7	0.3	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		

EXISTING 2045 PM

1: Oxford Street & Thrift Avenue

06/24/2020

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	35	362	97	13	275	171
Future Volume (Veh/h)	35	362	97	13	275	171
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	393	105	14	299	186
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	896	112			119	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	896	112			119	
tC, single (s)	6.4	6.2			4.1	
tC. 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	85	58			80	
cM capacity (veh/h)	247	941			1469	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	431	119	485
Volume Left	38	0	299
Volume Right	393	14	0
cSH	755	1700	1469
Volume to Capacity	0.57	0.07	0.20
Queue Length 95th (m)	27.8	0.0	5.8
Control Delay (s)	15.9	0.0	5.7
Lane LOS	C		A
Approach Delay (s)	15.9	0.0	5.7
Approach LOS	C		

Intersection Summary			
Average Delay	9.3		
Intersection Capacity Utilization	61.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	288	3	15	379	32	3	3	7	13	0	13
Future Volume (Veh/h)	3	288	3	15	379	32	3	3	7	13	0	13
Sign Control		Free			Free			Stop			Stop	
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)	3	313	3	16	412	35	3	3	8	14	0	14
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	447			316			796	800	314	792	784	430
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	447			316			796	800	314	792	784	430
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			99	99	99	95	100	98
cM capacity (veh/h)	1113			1244			295	313	726	298	320	626

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	319	463	14	28
Volume Left	3	16	3	14
Volume Right	3	35	8	14
cSH	1113	1244	455	404
Volume to Capacity	0.00	0.01	0.03	0.07
Queue Length 95th (m)	0.1	0.3	0.7	1.7
Control Delay (s)	0.1	0.4	13.2	14.6
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	0.4	13.2	14.6
Approach LOS			B	B

Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	41.4%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	291	10	17	392	13	10	3	10	13	0	23
Future Volume (Veh/h)	7	291	10	17	392	13	10	3	10	13	0	23
Sign Control		Free			Free			Stop			Stop	
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)	8	316	11	18	426	14	11	3	11	14	0	25
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	440			327			832	814	322	819	812	433
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	440			327			832	814	322	819	812	433
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			96	99	98	95	100	96
cM capacity (veh/h)	1120			1233			272	306	719	283	306	623

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	335	458	25	39
Volume Left	8	18	11	14
Volume Right	11	14	11	25
cSH	1120	1233	382	435
Volume to Capacity	0.01	0.01	0.07	0.09
Queue Length 95th (m)	0.2	0.3	1.6	2.2
Control Delay (s)	0.3	0.5	15.1	14.1
Lane LOS	A	A	C	B
Approach Delay (s)	0.3	0.5	15.1	14.1
Approach LOS			C	B

Intersection Summary				
Average Delay	1.4			
Intersection Capacity Utilization	39.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	311	0	13	399	13	0	3	0	33	13	23
Future Volume (Veh/h)	3	311	0	13	399	13	0	3	0	33	13	23
Sign Control		Free			Free			Stop			Stop	
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)	3	338	0	14	434	14	0	3	0	36	14	25
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	448			338			845	820	338	814	813	441
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	448			338			845	820	338	814	813	441
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	99	100	88	95	96
cM capacity (veh/h)	1112			1221			259	305	704	291	308	616

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	341	462	3	75
Volume Left	3	14	0	36
Volume Right	0	14	0	25
cSH	1112	1221	305	358
Volume to Capacity	0.00	0.01	0.01	0.21
Queue Length 95th (m)	0.1	0.3	0.2	5.9
Control Delay (s)	0.1	0.4	16.9	17.7
Lane LOS	A	A	C	C
Approach Delay (s)	0.1	0.4	16.9	17.7
Approach LOS			C	C

Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	47.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	18	5	10	467	446	13
Future Volume (Veh/h)	18	5	10	467	446	13
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	5	11	508	485	14
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	1022	492	499			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1022	492	499			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	99	99			
cM capacity (veh/h)	259	577	1065			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	25	519	499
Volume Left	20	11	0
Volume Right	5	0	14
cSH	291	1065	1700
Volume to Capacity	0.09	0.01	0.29
Queue Length 95th (m)	2.1	0.2	0.0
Control Delay (s)	18.5	0.3	0.0
Lane LOS	C	A	
Approach Delay (s)	18.5	0.3	0.0
Approach LOS	C		

Intersection Summary			
Average Delay		0.6	
Intersection Capacity Utilization		42.6%	ICU Level of Service A
Analysis Period (min)		15	

1: Oxford Street & Thrift Avenue

06/24/2020

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	13	237	81	24	171	58
Future Volume (Veh/h)	13	237	81	24	171	58
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	258	88	26	186	63
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	536	101			114	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	536	101			114	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	73			87	
cM capacity (veh/h)	442	954			1475	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	272	114	249
Volume Left	14	0	186
Volume Right	258	26	0
cSH	901	1700	1475
Volume to Capacity	0.30	0.07	0.13
Queue Length 95th (m)	9.7	0.0	3.3
Control Delay (s)	10.7	0.0	6.1
Lane LOS	B		A
Approach Delay (s)	10.7	0.0	6.1
Approach LOS	B		

Intersection Summary			
Average Delay	7.0		
Intersection Capacity Utilization	41.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	196	1	8	232	22	2	0	7	13	2	11
Future Volume (Veh/h)	2	196	1	8	232	22	2	0	7	13	2	11
Sign Control		Free			Free			Stop			Stop	
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)	2	213	1	9	252	24	2	0	8	14	2	12
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	276			214			512	512	214	508	500	264
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	276			214			512	512	214	508	500	264
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	100	99	97	100	98
cM capacity (veh/h)	1287			1356			460	462	827	468	469	775

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	216	285	10	28
Volume Left	2	9	2	14
Volume Right	1	24	8	12
cSH	1287	1356	713	564
Volume to Capacity	0.00	0.01	0.01	0.05
Queue Length 95th (m)	0.0	0.2	0.3	1.2
Control Delay (s)	0.1	0.3	10.1	11.7
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	0.3	10.1	11.7
Approach LOS			B	B

Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	28.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	212	0	1	220	13	11	0	13	27	2	32
Future Volume (Veh/h)	5	212	0	1	220	13	11	0	13	27	2	32
Sign Control		Free			Free			Stop			Stop	
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)	5	230	0	1	239	14	12	0	14	29	2	35
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	253			230			524	495	230	502	488	246
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	253			230			524	495	230	502	488	246
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			97	100	98	94	100	96
cM capacity (veh/h)	1312			1338			440	474	809	470	478	793

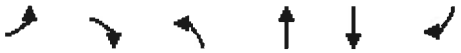
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	235	254	26	66
Volume Left	5	1	12	29
Volume Right	0	14	14	35
cSH	1312	1338	584	600
Volume to Capacity	0.00	0.00	0.04	0.11
Queue Length 95th (m)	0.1	0.0	1.1	2.8
Control Delay (s)	0.2	0.0	11.5	11.7
Lane LOS	A	A	B	B
Approach Delay (s)	0.2	0.0	11.5	11.7
Approach LOS			B	B

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	25.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	237	9	2	220	4	7	6	6	13	2	7
Future Volume (Veh/h)	4	237	9	2	220	4	7	6	6	13	2	7
Sign Control		Free			Free			Stop			Stop	
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)	4	258	10	2	239	4	8	7	7	14	2	8
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	243			268			525	518	263	526	521	241
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	243			268			525	518	263	526	521	241
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			98	98	99	97	100	99
cM capacity (veh/h)	1323			1296			455	460	776	451	458	798

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	272	245	22	24
Volume Left	4	2	8	14
Volume Right	10	4	7	8
cSH	1323	1296	526	528
Volume to Capacity	0.00	0.00	0.04	0.05
Queue Length 95th (m)	0.1	0.0	1.0	1.1
Control Delay (s)	0.1	0.1	12.1	12.1
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	0.1	12.1	12.1
Approach LOS			B	B

Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	25.6%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	35	12	6	26	0
Future Volume (Veh/h)	0	35	12	6	26	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	38	13	7	28	0
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	61	28	28			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	61	28	28			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	96	99			
cM capacity (veh/h)	938	1047	1585			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	38	20	28
Volume Left	0	13	0
Volume Right	38	0	0
cSH	1047	1585	1700
Volume to Capacity	0.04	0.01	0.02
Queue Length 95th (m)	0.9	0.2	0.0
Control Delay (s)	8.6	4.8	0.0
Lane LOS	A	A	
Approach Delay (s)	8.6	4.8	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	17.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	4	5	313	225	4
Future Volume (Veh/h)	6	4	5	313	225	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	4	5	340	245	4
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	597	247	249			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	597	247	249			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	99	100			
cM capacity (veh/h)	464	792	1317			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	11	345	249
Volume Left	7	5	0
Volume Right	4	0	4
cSH	546	1317	1700
Volume to Capacity	0.02	0.00	0.15
Queue Length 95th (m)	0.5	0.1	0.0
Control Delay (s)	11.7	0.1	0.0
Lane LOS	B	A	
Approach Delay (s)	11.7	0.1	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	30.5%	ICU Level of Service	A
Analysis Period (min)	15		

1: Oxford Street & Thrift Avenue

06/24/2020

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	19	372	479	11	230	135
Future Volume (Veh/h)	19	372	479	11	230	135
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	404	521	12	250	147
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	1174	527			533	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1174	527			533	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	87	27			76	
cM capacity (veh/h)	161	551			1035	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	425	533	397
Volume Left	21	0	250
Volume Right	404	12	0
cSH	492	1700	1035
Volume to Capacity	0.86	0.31	0.24
Queue Length 95th (m)	69.2	0.0	7.2
Control Delay (s)	43.2	0.0	7.0
Lane LOS	E		A
Approach Delay (s)	43.2	0.0	7.0
Approach LOS	E		

Intersection Summary			
Average Delay	15.6		
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		

2: Evrall Street & Thrift Avenue

06/24/2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	236	3	12	310	26	0	3	5	11	0	10
Future Volume (Veh/h)	3	236	3	12	310	26	0	3	5	11	0	10
Sign Control		Free			Free			Stop			Stop	
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)	3	257	3	13	337	28	0	3	5	12	0	11
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	365			260			652	656	258	648	643	351
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	365			260			652	656	258	648	643	351
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	99	99	97	100	98
cM capacity (veh/h)	1194			1304			371	381	780	375	387	692

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	263	378	8	23
Volume Left	3	13	0	12
Volume Right	3	28	5	11
cSH	1194	1304	560	480
Volume to Capacity	0.00	0.01	0.01	0.05
Queue Length 95th (m)	0.1	0.2	0.3	1.1
Control Delay (s)	0.1	0.4	11.5	12.9
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	0.4	11.5	12.9
Approach LOS			B	B

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	39.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	184	6	11	255	26	6	2	6	18	0	27
Future Volume (Veh/h)	20	184	6	11	255	26	6	2	6	18	0	27
Sign Control		Free			Free			Stop			Stop	
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)	22	200	7	12	277	28	7	2	7	20	0	29
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	305			207			592	576	204	570	566	291
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	305			207			592	576	204	570	566	291
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			98	100	99	95	100	96
cM capacity (veh/h)	1256			1364			394	416	837	418	422	748

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	229	317	16	49
Volume Left	22	12	7	20
Volume Right	7	28	7	29
cSH	1256	1364	517	566
Volume to Capacity	0.02	0.01	0.03	0.09
Queue Length 95th (m)	0.4	0.2	0.7	2.2
Control Delay (s)	0.9	0.4	12.2	12.0
Lane LOS	A	A	B	B
Approach Delay (s)	0.9	0.4	12.2	12.0
Approach LOS			B	B

Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	28.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	249	0	10	332	10	0	3	0	26	10	18
Future Volume (Veh/h)	3	249	0	10	332	10	0	3	0	26	10	18
Sign Control		Free			Free			Stop			Stop	
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)	3	271	0	11	361	11	0	3	0	28	11	20
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	372			271			691	671	271	667	666	366
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	372			271			691	671	271	667	666	366
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	99	100	92	97	97
cM capacity (veh/h)	1186			1292			338	373	768	367	376	679

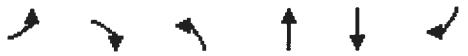
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	274	383	3	59
Volume Left	3	11	0	28
Volume Right	0	11	0	20
cSH	1186	1292	373	437
Volume to Capacity	0.00	0.01	0.01	0.14
Queue Length 95th (m)	0.1	0.2	0.2	3.5
Control Delay (s)	0.1	0.3	14.7	14.5
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	0.3	14.7	14.5
Approach LOS			B	B

Intersection Summary				
Average Delay	1.5			
Intersection Capacity Utilization	40.5%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	22	34	14	23	1
Future Volume (Veh/h)	0	22	34	14	23	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	24	37	15	25	1
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	114	26	26			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	114	26	26			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	98			
cM capacity (veh/h)	861	1050	1588			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	24	52	26
Volume Left	0	37	0
Volume Right	24	0	1
cSH	1050	1588	1700
Volume to Capacity	0.02	0.02	0.02
Queue Length 95th (m)	0.5	0.5	0.0
Control Delay (s)	8.5	5.3	0.0
Lane LOS	A	A	
Approach Delay (s)	8.5	5.3	0.0
Approach LOS	A		

Intersection Summary				
Average Delay	4.7			
Intersection Capacity Utilization	19.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	14	4	8	360	361	10
Future Volume (Veh/h)	14	4	8	360	361	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	4	9	391	392	11
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	806	398	403			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	806	398	403			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	99	99			
cM capacity (veh/h)	348	652	1156			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	19	400	403
Volume Left	15	9	0
Volume Right	4	0	11
cSH	386	1156	1700
Volume to Capacity	0.05	0.01	0.24
Queue Length 95th (m)	1.2	0.2	0.0
Control Delay (s)	14.8	0.3	0.0
Lane LOS	B	A	
Approach Delay (s)	14.8	0.3	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization		35.4%	ICU Level of Service A
Analysis Period (min)		15	

1: Oxford Street & Thrift Avenue

06/26/2020

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	15	284	98	29	207	71
Future Volume (Veh/h)	15	284	98	29	207	71
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	309	107	32	225	77
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	650	123			139	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	650	123			139	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	67			84	
cM capacity (veh/h)	366	928			1445	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	325	139	302
Volume Left	16	0	225
Volume Right	309	32	0
cSH	863	1700	1445
Volume to Capacity	0.38	0.08	0.16
Queue Length 95th (m)	13.4	0.0	4.2
Control Delay (s)	11.7	0.0	6.3
Lane LOS	B		A
Approach Delay (s)	11.7	0.0	6.3
Approach LOS	B		

Intersection Summary			
Average Delay	7.4		
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	236	1	10	379	27	3	0	9	16	3	13
Future Volume (Veh/h)	3	236	1	10	379	27	3	0	9	16	3	13
Sign Control		Free			Free			Stop			Stop	
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)	3	257	1	11	412	29	3	0	10	17	3	14
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	441			258			728	726	258	722	712	426
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	441			258			728	726	258	722	712	426
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			99	100	99	95	99	98
cM capacity (veh/h)	1119			1307			327	347	781	335	353	628

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	261	452	13	34
Volume Left	3	11	3	17
Volume Right	1	29	10	14
cSH	1119	1307	591	417
Volume to Capacity	0.00	0.01	0.02	0.08
Queue Length 95th (m)	0.1	0.2	0.5	2.0
Control Delay (s)	0.1	0.3	11.2	14.4
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	0.3	11.2	14.4
Approach LOS			B	B

Intersection Summary				
Average Delay			1.0	
Intersection Capacity Utilization			37.6%	ICU Level of Service
Analysis Period (min)			15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	256	0	1	268	15	13	0	16	29	3	35
Future Volume (Veh/h)	5	256	0	1	268	15	13	0	16	29	3	35
Sign Control		Free			Free			Stop			Stop	
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)	5	278	0	1	291	16	14	0	17	32	3	38
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	307			278			628	597	278	606	589	299
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	307			278			628	597	278	606	589	299
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			96	100	98	92	99	95
cM capacity (veh/h)	1254			1285			371	414	761	398	419	741

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	283	308	31	73
Volume Left	5	1	14	32
Volume Right	0	16	17	38
cSH	1254	1285	516	526
Volume to Capacity	0.00	0.00	0.06	0.14
Queue Length 95th (m)	0.1	0.0	1.5	3.6
Control Delay (s)	0.2	0.0	12.4	12.9
Lane LOS	A	A	B	B
Approach Delay (s)	0.2	0.0	12.4	12.9
Approach LOS			B	B

Intersection Summary				
Average Delay	2.0			
Intersection Capacity Utilization	28.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	284	11	3	266	5	9	8	8	16	3	9
Future Volume (Veh/h)	5	284	11	3	266	5	9	8	8	16	3	9
Sign Control		Free			Free			Stop			Stop	
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)	5	309	12	3	289	5	10	9	9	17	3	10
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	294			321			634	625	315	636	628	292
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	294			321			634	625	315	636	628	292
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			97	98	99	95	99	99
cM capacity (veh/h)	1268			1239			382	399	725	377	397	748

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	326	297	28	30
Volume Left	5	3	10	17
Volume Right	12	5	9	10
cSH	1268	1239	458	455
Volume to Capacity	0.00	0.00	0.06	0.07
Queue Length 95th (m)	0.1	0.1	1.5	1.6
Control Delay (s)	0.2	0.1	13.4	13.5
Lane LOS	A	A	B	B
Approach Delay (s)	0.2	0.1	13.4	13.5
Approach LOS			B	B

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	28.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	35	12	8	32	0
Future Volume (Veh/h)	0	35	12	8	32	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	38	13	9	35	0
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	70	35	35			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	70	35	35			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	96	99			
cM capacity (veh/h)	927	1038	1576			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	38	22	35
Volume Left	0	13	0
Volume Right	38	0	0
cSH	1038	1576	1700
Volume to Capacity	0.04	0.01	0.02
Queue Length 95th (m)	0.9	0.2	0.0
Control Delay (s)	8.6	4.3	0.0
Lane LOS	A	A	
Approach Delay (s)	8.6	4.3	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	17.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	5	9	376	273	5
Future Volume (Veh/h)	8	5	9	376	273	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	5	10	409	297	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	728	300	302			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	728	300	302			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	99	99			
cM capacity (veh/h)	387	740	1259			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	14	419	302
Volume Left	9	10	0
Volume Right	5	0	5
cSH	467	1259	1700
Volume to Capacity	0.03	0.01	0.18
Queue Length 95th (m)	0.7	0.2	0.0
Control Delay (s)	13.0	0.3	0.0
Lane LOS	B	A	
Approach Delay (s)	13.0	0.3	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		0.4	
Intersection Capacity Utilization		37.0%	ICU Level of Service A
Analysis Period (min)		15	

1: Oxford Street & Thrift Avenue

06/26/2020

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	19	372	79	11	230	135
Future Volume (Veh/h)	19	372	79	11	230	135
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	404	86	12	250	147
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	739	92			98	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	739	92			98	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	58			83	
cM capacity (veh/h)	320	965			1495	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	425	98	397
Volume Left	21	0	250
Volume Right	404	12	0
cSH	878	1700	1495
Volume to Capacity	0.48	0.06	0.17
Queue Length 95th (m)	20.4	0.0	4.6
Control Delay (s)	12.9	0.0	5.5
Lane LOS	B		A
Approach Delay (s)	12.9	0.0	5.5
Approach LOS	B		

Intersection Summary			
Average Delay	8.3		
Intersection Capacity Utilization	57.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	236	3	12	310	26	0	3	5	11	0	10
Future Volume (Veh/h)	3	236	3	12	310	26	0	3	5	11	0	10
Sign Control		Free			Free			Stop			Stop	
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)	3	257	3	13	337	28	0	3	5	12	0	11
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	365			260			652	656	258	648	643	351
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	365			260			652	656	258	648	643	351
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	99	99	97	100	98
cM capacity (veh/h)	1194			1304			371	381	780	375	387	692

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	263	378	8	23
Volume Left	3	13	0	12
Volume Right	3	28	5	11
cSH	1194	1304	560	480
Volume to Capacity	0.00	0.01	0.01	0.05
Queue Length 95th (m)	0.1	0.2	0.3	1.1
Control Delay (s)	0.1	0.4	11.5	12.9
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	0.4	11.5	12.9
Approach LOS			B	B

Intersection Summary				
Average Delay			0.8	
Intersection Capacity Utilization			39.7%	ICU Level of Service
Analysis Period (min)			15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	223	8	13	309	28	8	3	8	20	0	30
Future Volume (Veh/h)	21	223	8	13	309	28	8	3	8	20	0	30
Sign Control		Free			Free			Stop			Stop	
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)	23	242	9	14	336	30	9	3	9	22	0	33
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	366			251			704	686	246	682	676	351
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	366			251			704	686	246	682	676	351
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			97	99	99	94	100	95
cM capacity (veh/h)	1193			1314			327	359	792	349	364	692

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	274	380	21	55
Volume Left	23	14	9	22
Volume Right	9	30	9	33
cSH	1193	1314	445	497
Volume to Capacity	0.02	0.01	0.05	0.11
Queue Length 95th (m)	0.4	0.2	1.1	2.8
Control Delay (s)	0.8	0.4	13.5	13.1
Lane LOS	A	A	B	B
Approach Delay (s)	0.8	0.4	13.5	13.1
Approach LOS			B	B

Intersection Summary				
Average Delay	1.9			
Intersection Capacity Utilization	31.5%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	249	0	10	332	10	0	3	0	26	10	18
Future Volume (Veh/h)	3	249	0	10	332	10	0	3	0	26	10	18
Sign Control		Free			Free			Stop			Stop	
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)	3	271	0	11	361	11	0	3	0	28	11	20
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	372			271			691	671	271	667	666	366
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	372			271			691	671	271	667	666	366
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	99	100	92	97	97
cM capacity (veh/h)	1186			1292			338	373	768	367	376	679

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	274	383	3	59
Volume Left	3	11	0	28
Volume Right	0	11	0	20
cSH	1186	1292	373	437
Volume to Capacity	0.00	0.01	0.01	0.14
Queue Length 95th (m)	0.1	0.2	0.2	3.5
Control Delay (s)	0.1	0.3	14.7	14.5
Lane LOS	A	A	B	B
Approach Delay (s)	0.1	0.3	14.7	14.5
Approach LOS			B	B

Intersection Summary				
Average Delay	1.5			
Intersection Capacity Utilization	40.5%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	22	34	18	28	1
Future Volume (Veh/h)	0	22	34	18	28	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	24	37	20	30	1
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	124	30	31			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	124	30	31			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	98			
cM capacity (veh/h)	850	1044	1582			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	24	57	31
Volume Left	0	37	0
Volume Right	24	0	1
cSH	1044	1582	1700
Volume to Capacity	0.02	0.02	0.02
Queue Length 95th (m)	0.5	0.5	0.0
Control Delay (s)	8.5	4.8	0.0
Lane LOS	A	A	
Approach Delay (s)	8.5	4.8	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	4.3		
Intersection Capacity Utilization	19.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	14	4	8	360	361	10
Future Volume (Veh/h)	14	4	8	360	361	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	4	9	391	392	11
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	806	398	403			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	806	398	403			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	99	99			
cM capacity (veh/h)	348	652	1156			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	19	400	403
Volume Left	15	9	0
Volume Right	4	0	11
cSH	386	1156	1700
Volume to Capacity	0.05	0.01	0.24
Queue Length 95th (m)	1.2	0.2	0.0
Control Delay (s)	14.8	0.3	0.0
Lane LOS	B	A	
Approach Delay (s)	14.8	0.3	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	35.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	19	361	128	38	264	92
Future Volume (Veh/h)	19	361	128	38	264	92
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	392	139	41	287	100
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	834	160			180	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	834	160			180	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	56			79	
cM capacity (veh/h)	269	886			1396	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	413	180	387
Volume Left	21	0	287
Volume Right	392	41	0
cSH	793	1700	1396
Volume to Capacity	0.52	0.11	0.21
Queue Length 95th (m)	23.3	0.0	5.9
Control Delay (s)	14.4	0.0	6.6
Lane LOS	B		A
Approach Delay (s)	14.4	0.0	6.6
Approach LOS	B		

Intersection Summary			
Average Delay	8.7		
Intersection Capacity Utilization	61.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	301	2	13	355	34	3	0	12	20	3	17
Future Volume (Veh/h)	3	301	2	13	355	34	3	0	12	20	3	17
Sign Control		Free			Free			Stop			Stop	
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)	3	327	2	14	386	37	3	0	13	22	3	18
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	423			329			786	785	328	780	768	404
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	423			329			786	785	328	780	768	404
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			99	100	98	93	99	97
cM capacity (veh/h)	1136			1231			296	320	713	304	328	646

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	332	437	16	43
Volume Left	3	14	3	22
Volume Right	2	37	13	18
cSH	1136	1231	564	393
Volume to Capacity	0.00	0.01	0.03	0.11
Queue Length 95th (m)	0.1	0.3	0.7	2.8
Control Delay (s)	0.1	0.4	11.6	15.3
Lane LOS	A	A	B	C
Approach Delay (s)	0.1	0.4	11.6	15.3
Approach LOS			B	C

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	40.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	328	0	2	345	17	17	0	20	33	3	39
Future Volume (Veh/h)	5	328	0	2	345	17	17	0	20	33	3	39
Sign Control		Free			Free			Stop			Stop	
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)	5	357	0	2	375	18	18	0	22	36	3	42
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	393			357			798	764	357	777	755	384
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	393			357			798	764	357	777	755	384
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			94	100	97	88	99	94
cM capacity (veh/h)	1166			1202			281	332	687	303	336	664

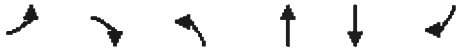
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	362	395	40	81
Volume Left	5	2	18	36
Volume Right	0	18	22	42
cSH	1166	1202	417	424
Volume to Capacity	0.00	0.00	0.10	0.19
Queue Length 95th (m)	0.1	0.0	2.4	5.3
Control Delay (s)	0.2	0.1	14.6	15.5
Lane LOS	A	A	B	C
Approach Delay (s)	0.2	0.1	14.6	15.5
Approach LOS			B	C

Intersection Summary				
Average Delay	2.2			
Intersection Capacity Utilization	32.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	360	14	3	341	7	12	10	10	20	3	12
Future Volume (Veh/h)	7	360	14	3	341	7	12	10	10	20	3	12
Sign Control		Free			Free			Stop			Stop	
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)	8	391	15	3	371	8	13	11	11	22	3	13
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	379			406			810	800	398	812	803	375
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	379			406			810	800	398	812	803	375
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			95	97	98	92	99	98
cM capacity (veh/h)	1179			1153			288	315	651	283	314	671

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	414	382	35	38
Volume Left	8	3	13	22
Volume Right	15	8	11	13
cSH	1179	1153	361	356
Volume to Capacity	0.01	0.00	0.10	0.11
Queue Length 95th (m)	0.2	0.1	2.4	2.7
Control Delay (s)	0.2	0.1	16.0	16.3
Lane LOS	A	A	C	C
Approach Delay (s)	0.2	0.1	16.0	16.3
Approach LOS			C	C

Intersection Summary				
Average Delay	1.5			
Intersection Capacity Utilization	34.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	35	12	10	40	0
Future Volume (Veh/h)	0	35	12	10	40	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	38	13	11	43	0
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	80	43	43			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	80	43	43			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	96	99			
cM capacity (veh/h)	915	1027	1566			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	38	24	43
Volume Left	0	13	0
Volume Right	38	0	0
cSH	1027	1566	1700
Volume to Capacity	0.04	0.01	0.03
Queue Length 95th (m)	0.9	0.2	0.0
Control Delay (s)	8.6	4.0	0.0
Lane LOS	A	A	
Approach Delay (s)	8.6	4.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	17.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	7	9	480	349	7
Future Volume (Veh/h)	10	7	9	480	349	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	8	10	522	379	8
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	925	383	387			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	925	383	387			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	99	99			
cM capacity (veh/h)	296	664	1171			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	19	532	387
Volume Left	11	10	0
Volume Right	8	0	8
cSH	386	1171	1700
Volume to Capacity	0.05	0.01	0.23
Queue Length 95th (m)	1.2	0.2	0.0
Control Delay (s)	14.8	0.3	0.0
Lane LOS	B	A	
Approach Delay (s)	14.8	0.3	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	42.5%	ICU Level of Service	A
Analysis Period (min)	15		

1: Oxford Street & Thrift Avenue

06/26/2020

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	19	361	128	38	264	92
Future Volume (Veh/h)	19	361	128	38	264	92
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	392	139	41	287	100
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	834	160			180	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	834	160			180	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	56			79	
cM capacity (veh/h)	269	886			1396	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	413	180	387
Volume Left	21	0	287
Volume Right	392	41	0
cSH	793	1700	1396
Volume to Capacity	0.52	0.11	0.21
Queue Length 95th (m)	23.3	0.0	5.9
Control Delay (s)	14.4	0.0	6.6
Lane LOS	B		A
Approach Delay (s)	14.4	0.0	6.6
Approach LOS	B		

Intersection Summary			
Average Delay	8.7		
Intersection Capacity Utilization	61.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	301	2	13	355	34	3	0	12	20	3	17
Future Volume (Veh/h)	3	301	2	13	355	34	3	0	12	20	3	17
Sign Control		Free			Free			Stop			Stop	
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)	3	327	2	14	386	37	3	0	13	22	3	18
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	423			329			786	785	328	780	768	404
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	423			329			786	785	328	780	768	404
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			99	100	98	93	99	97
cM capacity (veh/h)	1136			1231			296	320	713	304	328	646

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	332	437	16	43
Volume Left	3	14	3	22
Volume Right	2	37	13	18
cSH	1136	1231	564	393
Volume to Capacity	0.00	0.01	0.03	0.11
Queue Length 95th (m)	0.1	0.3	0.7	2.8
Control Delay (s)	0.1	0.4	11.6	15.3
Lane LOS	A	A	B	C
Approach Delay (s)	0.1	0.4	11.6	15.3
Approach LOS			B	C

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	40.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	291	10	17	392	31	10	3	10	23	0	35
Future Volume (Veh/h)	23	291	10	17	392	31	10	3	10	23	0	35
Sign Control		Free			Free			Stop			Stop	
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)	25	316	11	18	426	34	11	3	11	25	0	38
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	460			327			888	868	322	863	856	443
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	460			327			888	868	322	863	856	443
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			95	99	98	90	100	94
cM capacity (veh/h)	1101			1233			241	280	719	261	284	615

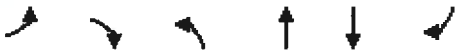
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	352	478	25	63
Volume Left	25	18	11	25
Volume Right	11	34	11	38
cSH	1101	1233	349	400
Volume to Capacity	0.02	0.01	0.07	0.16
Queue Length 95th (m)	0.5	0.3	1.8	4.2
Control Delay (s)	0.8	0.5	16.1	15.7
Lane LOS	A	A	C	C
Approach Delay (s)	0.8	0.5	16.1	15.7
Approach LOS			C	C

Intersection Summary				
Average Delay	2.1			
Intersection Capacity Utilization	38.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	360	14	3	341	7	12	10	10	20	3	12
Future Volume (Veh/h)	7	360	14	3	341	7	12	10	10	20	3	12
Sign Control		Free			Free			Stop			Stop	
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)	8	391	15	3	371	8	13	11	11	22	3	13
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	379			406			810	800	398	812	803	375
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	379			406			810	800	398	812	803	375
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			95	97	98	92	99	98
cM capacity (veh/h)	1179			1153			288	315	651	283	314	671

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	414	382	35	38
Volume Left	8	3	13	22
Volume Right	15	8	11	13
cSH	1179	1153	361	356
Volume to Capacity	0.01	0.00	0.10	0.11
Queue Length 95th (m)	0.2	0.1	2.4	2.7
Control Delay (s)	0.2	0.1	16.0	16.3
Lane LOS	A	A	C	C
Approach Delay (s)	0.2	0.1	16.0	16.3
Approach LOS			C	C

Intersection Summary				
Average Delay	1.5			
Intersection Capacity Utilization	34.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	22	34	23	36	1
Future Volume (Veh/h)	0	22	34	23	36	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	24	37	25	39	1
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	138	40	40			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	138	40	40			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	98			
cM capacity (veh/h)	835	1032	1570			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	24	62	40
Volume Left	0	37	0
Volume Right	24	0	1
cSH	1032	1570	1700
Volume to Capacity	0.02	0.02	0.02
Queue Length 95th (m)	0.5	0.6	0.0
Control Delay (s)	8.6	4.5	0.0
Lane LOS	A	A	
Approach Delay (s)	8.6	4.5	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	19.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	7	9	480	349	7
Future Volume (Veh/h)	10	7	9	480	349	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	8	10	522	379	8
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	925	383	387			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	925	383	387			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	99	99			
cM capacity (veh/h)	296	664	1171			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	19	532	387
Volume Left	11	10	0
Volume Right	8	0	8
cSH	386	1171	1700
Volume to Capacity	0.05	0.01	0.23
Queue Length 95th (m)	1.2	0.2	0.0
Control Delay (s)	14.8	0.3	0.0
Lane LOS	B	A	
Approach Delay (s)	14.8	0.3	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	42.5%	ICU Level of Service	A
Analysis Period (min)	15		

VAN DER ZALM + ASSOCIATES

ARBORIST REPORT

11 July 2022

PROJECT:	**VIDAL STREET DEVELOPMENT**
SITE ADDRESS:	14937 Thrift Ave & 1441/1443-45/1465 Vidal Street, White Rock, BC
CLIENT:	**WESTSTONE GROUP** 10090 152ND St. Surrey, BC, V3R 8X8
VDZ PROJECT #	DP2018-59
SITE REVIEW DATE(s):	October 16, 2018 September 15, 2020 July 8, 2022
PREPARED BY:	**VDZ+A Consulting Ltd.** 102 – 355 Kingsway Vancouver, BC V5T 3J7
PROJECT ARBORIST:	**D. Glyn Romaine** ISA Certified Arborist PN 7929A TRAQ
FORMER PROJECT ARBORIST:	**KELLY KOOME** ISA Certified Arborist PN 5962A ISA Tree Risk Assessment Qualified Certified Wildlife Danger Tree Assessor #P2546

Original Report	**November 5, 2018**
Revision 1	**May 8, 2019**
Revision 2	**September 23, 2020 – A.L.**
Revision 3	**July 11, 2022 – D.G.R. - Updated Survey.**

FORT LANGLEY STUDIO
102 – 9181 Church Street
Fort Langley, BC
V1M 2R8

MOUNT PLEASANT STUDIO
102 – 355 Kingsway
Vancouver, BC
V5T 3J7

www.vdz.ca
604.882.0024

TABLE OF CONTENTS

INTRODUCTION

ASSIGNMENT

VDZ + A Consulting Inc. (VDZ) have been retained by the client to prepare an arborist report to assess the tree(s) located at 14937 Thrift Avenue & 1441 / 1443-45 / 1465 Vidal Street, White Rock, BC. VDZ arborists performed site reviews entailing identification and visual assessment of the tree(s) on-site. A tree survey of all off-site trees was completed by the client or representative(s).

The Project Arborist will provide recommendations for the retention of tree(s) based on the existing site conditions and the proposed use of the site. Mitigation of development impact on the tree(s) has been considered as part of the tree assessment process.

LIMITS OF THE ASSIGNMENT

VDZ's observations were limited to site visits on October 16, 2018, September 15, 2020, and July 8, 2022. No tissue or soil samples were sent to a lab for identification or analysis. VDZ + A Consulting Inc. located the trees using existing landmarks and onsite navigation.

TESTING AND ANALYSIS

VDZ arborists used visual tree assessment and mallet sounding to test the trees' health, condition, and risk level.

PURPOSE AND USE OF REPORT

The purpose of this report is to assist the property owner in compliance with the White Rock Tree Protection Bylaw, 2021 No. 2407.

SITE REVIEW

Fig. 1 – Aerial view of property (WROMS)

PROPOSED SITE DEVELOPMENT

The demolition of existing structure and the development of midrise multi-family residential building.

ENVIRONMENTAL DESCRIPTION

ISA Certified Arborist Austin Peterson of VDZ + A Consulting Inc. conducted a site review and evaluation of the trees located at the above referenced property on October 16, 2018. A site review was also conducted September 15th, 2020 by Kelly Koome and on July 8, 2022 by Glyn Romaine

The site consists of four residential lots, three of which have existing houses. All four lots have established landscapes composed of mature trees and shrubs. The southernmost lot is a single-

family residential home that fronts onto Thrift Avenue. It is joined via the north property line to the first three lots proceeding up the west side of Vidal Street. From Thrift Avenue, Vidal Street inclines north. To the west lay an assortment of low-rise multifamily residences and to the north is a newer high-rise development.

There are no seasonal creeks that transect the property.

There is no evidence of raptors nests, osprey nests or heron colonies on the site. Removal of trees however between March 15 – August 15 (date subject to change depending on seasonal nesting behavior and therefore must be confirmed with City of Maple Ridge) will require a bird nesting survey. This is as prescribed by the federal Migratory Birds Convention Act (MBCA), 1994 and Section 34 of the BC Wildlife Act. It is the responsibility of the owner/developer to ensure they are in compliance with the city's regulations governing nesting birds on sites where development is occurring.

Off-site Trees – There are private off-site trees associated with this project.

Municipal Trees – There are City of White Rock trees associated with this project.

Trees Straddling the Property Line – There are trees straddling the property line associated with this project

TREE PRESERVATION SUMMARY

All the Trees identified on the Tree Retention/Removal Plan and within the Tree Assessment Data Table have been given their Retention/Removal recommendation on a preliminary basis. Final recommendations will be based upon design/construction and grading details.

Long-term tree preservation success is dependent on minimizing the impact caused during pre-construction clearing operations, construction, and post construction activities. Best efforts must be made to ensure the Tree Protection Zone remains undisturbed.

Ongoing monitoring of retained trees through the development process and implementation of mitigating works (watering, mulching, etc.) is essential for success. Once excavation starts, the consulting arborist needs to be contacted to monitor the work that is done near the trees.

TREE HEALTH CARE PLAN DURING CONSTRUCTION

To ensure continued health of the protected trees during construction, the following is recommended:

1. Remove dead, dying, and diseased branches prior to the start of construction.
2. Install tree protection barriers per bylaw specifications.

3. Regular weekly watering of trees between June 1 – October 1.
4. Application of wood chips within the tree protection zone (1-3 inches).
5. Monthly monitoring of protected trees by assigned Arborist.

Retained protected trees will require supplemental watering on a weekly basis (weather dependent), as well as the application of wood chips or mulch to the tree protection zone within the tree protection barriers. Wood chips are preferred to ensure porous movement through soil and protection from compaction during construction. The mulch or wood chip height should not exceed the root collar (not to exceed 10cm) to avoid moisture retention concentrated on the stem. In addition to the City's requirements, recommendations include the pruning of dead or dying limbs, if applicable, prior to construction for worker safety, as well as monthly monitoring of the trees by an Arborist to ensure the health and well-being of the protected trees.

As there are off-site trees with driplines that extend into the subject property, there may be interconnected root systems within the grouping (OS9-OS11) which likely extend onto the property. BC Plant Health Care Root Radar results determined the roots of tree 06 has poor structure and multiple trunks with decay. In addition, OS2-OS6 have feeder or structural roots which grow towards the property. Any work done within the critical root zone will need to be monitored by the arborist. Any retention wall should be maintained to avoid root disruption and destabilization.

SUMMARY OF FINDINGS

- Tree 03, grows adjacent to foundation of the existing house
- Tree 04, noticeable pruning completed prior to visit. Potentially for utility clearance.
- Tree 06 noticeable decay on single stem of the multi-stemmed tree.
- OS 02-OS 08, dripline extends to/over subject property line. Root radar used to assess root systems. Will need an arborist present to monitor excavation on the property line, and during installation of the proposed retaining wall / landscape features.
- Tree 05 suffered a failed limb prior to September 15th,2020 visit.
- Tree protection fencing requires repairs and placing for all protected trees prior to any land clearing activities.
- Knotweed was observed at 1441 Vidal. This should be managed, and all plant parts must be disposed of separately.
- Significant amount of Scots broom onsite – to be kept separate from other vegetation debris upon removal.
- Hypodermic needles were observed at 1445 Vidal.

TABLE 1

TREE #	TAG #	COMMON NAME *BOTANICAL NAME*	LOCATED ON THE SURVEY	DBH (cm)	Crown Radius (m)	LCR (%)	COMMENTS	RETAIN / REMOVE
Comments written for 376 and OS2-OS8, in italics, have been transferred from the *BC Plant Health Care Inc. Arborist Report for Tree Root Mapping*, dated March 18, 2019.								
The following trees are located on 14937 Thrift Avenue.								
01	370	English holly *Ilex aquifolium*	Yes	-	-	-	Listed as an invasive species by City of White Rock. Dash ("-") indicates the arborist was not required to measure this species. WITHIN BUILDING FOOTPRINT	Remove
02	371	English holly *Ilex aquifolium*	Yes	-	-	-	Listed as an invasive species by City of White Rock. Dash ("-") indicates the arborist was not required to measure this species. WITHIN BUILDING FOOTPRINT	Remove
The following trees are located on 1441 Vidal Street.								
03	373	Threadleaf false-cypress *Chamaecyparis pisifera* 'Filifera'	Yes	54 (17,18, 19)	3.0	60	Fair form and structure. TRUNK – Growing directly adjacent to the foundation of the existing house. WITHIN BUILDING FOOTPRINT	Remove
The following trees are located on 1465 Vidal Street.								
04	374	Crimson King Norway maple *Acer platanoides* 'Crimson King'	Yes	44	5.1	80	DBH measured at 1 m. Fair form and structure. CROWN – Previously side pruned for utility line clearance. Previously topped. WITHIN PARKADE FOOTPRINT	Remove

TREE #	TAG #	COMMON NAME *BOTANICAL NAME*	LOCATED ON THE SURVEY	DBH (cm)	Crown Radius (m)	LCR (%)	COMMENTS	RETAIN / REMOVE
05	375	Common lilac *Syringa vulgaris*	No	31 (10,10, 11)	3.0	30	HANDPLOTTED Poor form and structure. TRUNK – Multi-stem from base. Single limb failure since original visit. WITHIN PARKADE FOOTPRINT	Remove
06	376	Red alder *Alnus rubra*	Yes	114 (42, 41, 31)	9.4	80	Fair form and structure. TRUNK – 3stems from base. Decay present in one stem (0.5 meters in length). Rope girdling eastern trunk, previous tear-out on western trunk. Natural lean east. *BC Plant Health Care root radar results:* *Poor structure with multiple trunks and decay. Conflict with proposed development.* WITHIN PARKADE FOOTPRINT	Remove
07	377	Flowering plum *Prunus cerasifera*	No	62 (15,18, 29)	5.8	80	HANDPLOTTED Fair form and structure. CROWN: Heavy ivy up trunk into crown. Some dieback at branch ends. WITHIN PARKADE FOOTPRINT	Remove
08	378	Mountain ash *Sorbus aucuparia*	No	38 (11, 12, 15)	4.5	80	HANDPLOTTED Fair form and structure. CROWN: Heavy ivy up trunk into crown. Some dieback at branch ends. WITHIN BUILDING FOOTPRINT	Remove

TREE #	TAG #	COMMON NAME *BOTANICAL NAME*	LOCATED ON THE SURVEY	DBH (cm)	Crown Radius (m)	LCR (%)	COMMENTS	RETAIN / REMOVE
09	379	Japanese maple *Acer palmatum*	No	36 (10, 13, 13)	5.6	75	HANDPLOTTED Fair form and structure. TRUNK: Ivy up trunk. WITHIN LIKELY EXCAVATION ZONE	Remove
10	380	Mountain ash *Sorbus aucuparia*	No	37 (11, 13, 13)	4.5	40	HANDPLOTTED Fair form and structure. CROWN – Shade suppressed on north and east sides. TRUNK: Ivy up trunk. WITHIN PARKADE FOOTPRINT	Remove
11	381	Vine maple *Acer circinatum*	No	51 (15, 16, 20)	4.0	80	HANDPLOTTED Fair form and structure. TRUNK: Multi-stemmed. Ivy up trunk. WITHIN LIKELY EXCAVATION ZONE	Remove
12	382	Bitter cherry *Prunus emarginata*	No	54 (16, 16, 22)	4.5	80	HANDPLOTTED Fair form and structure. Multi-stemmed. CROWN: Dieback on one stem. WITHIN LIKELY EXCAVATION ZONE	Remove
13	435	Fruiting cherry. *Prunus* sp.	No	31	4.3	50	Good form and structure TRUNK: Ivy up trunk. WITHIN LIKELY EXCAVATION ZONE	Remove

TREE #	TAG #	COMMON NAME *BOTANICAL NAME*	LOCATED ON THE SURVEY	DBH (cm)	Crown Radius (m)	LCR (%)	COMMENTS	RETAIN / REMOVE
14	300	Crimson King Norway maple *Acer platanoides* 'Crimson King'	No	23	5.5	60	Good form and structure TRUNK: Ivy up trunk. WITHIN LIKELY EXCAVATION ZONE	Remove
The following trees are located offsite.								
Trees OS 1 – OS 8 were inspected visually from a distance. DBH figures have been estimated by the Project Arborist.								
OS 01	No tag	Douglas-fir *Pseudotsuga menziesii*	Yes	25	3.5	90	Good form and structure. TRUNK – Located within (0.25 meters) of retaining wall on two sides. Tree Protection Barrier (TPB) required. Arborist supervision required during excavation and any construction activities within 1.5 m of the dripline.	Retain
OS 02	No tag	Paper birch *Betula papyrifera*	Yes	55	8.0	50	Good form and structure. CROWN – Dripline extends 3.0 meters onto subject property. *BC Plant Health Care root radar results:* *Feeder roots detected in the 0-20 cm depth range. The tree is about 6 meters from the proposed development. Critical Root Zone does not enter the subject lot. Arborist oversight recommended for the excavation at Property Line for the installation of the proposed retaining wall / landscape feature.* Tree Protection Barrier (TPB) required. Arborist supervision required during excavation and any construction activities within 1.5 m of the dripline.	Retain

TREE #	TAG #	COMMON NAME *BOTANICAL NAME*	LOCATED ON THE SURVEY	DBH (cm)	Crown Radius (m)	LCR (%)	COMMENTS	RETAIN / REMOVE
OS 03	No tag	Douglas-fir *Pseudotsuga menziesii*	Yes	95	6.0	75	Good form and structure. OS 03 – OS 05 are part of a larger grouping of trees with approximately 6.0 meter dripline(s) that extend to subject property line. ROOTS – Interconnected within grouping and likely extending onto subject property. *BC Plant Health Care root radar results:* *Feeder roots detected in the 0 – 20 cm depth range. The tree is about 8 meters from the proposed development. Critical Root Zone does not enter the subject lot. Arborist oversight recommended for the excavation at Property Line for the installation of the proposed retaining wall / landscape feature.* Tree Protection Barrier (TPB) required. Arborist supervision required during excavation and any construction activities within 1.5 m of the dripline.	Retain
OS 04	No tag	Douglas-fir *Pseudotsuga menziesii*	Yes	50	5.8	75	Good form and structure. OS 03 – OS 05 are part of a larger grouping of trees with approximately 6.0 meter dripline(s) that extend to subject property line. ROOTS – Interconnected within grouping and likely extending onto subject property. *BC Plant Health Care root radar results:* *Assessment blocked by a shed. Roots may grow towards the shed. About 24% of Critical Root Zone will be impacted. Retain with no cut at Property Line. Design a point-footing retaining wall with suspended beams. Arborist oversight recommended for the excavation at Property Line for the installation of the proposed retaining wall / landscape feature.* Tree Protection Barrier (TPB) required. Arborist supervision required during excavation and any construction activities within 1.5 m of the dripline.	Retain

TREE #	TAG #	COMMON NAME *BOTANICAL NAME*	LOCATED ON THE SURVEY	DBH (cm)	Crown Radius (m)	LCR (%)	COMMENTS	RETAIN / REMOVE
OS 05	No tag	Douglas-fir *Pseudotsuga menziesii*	Yes	60	8.0	60	Good form and structure. OS 03 – OS 05 are part of a larger grouping of trees with approximately 6.0 meters dripline(s) that extend to subject property line. ROOTS – Interconnected within grouping and likely extending onto subject property. *BC Plant Health Care root radar results:* *May have structural, lateral, and feeder roots growing towards the east in the 0 – 20 cm depth range. About 27% of Critical Root Zone will be impacted. Retain with no cut at Property Line. Design a point-footing retaining wall with suspended beams. Arborist oversight recommended for the excavation at Property Line for the installation of the proposed retaining wall / landscape feature.* Tree Protection Barrier (TPB) required. Arborist supervision required during excavation and any construction activities within 1.5 m of the dripline.	Retain
OS 06	No tag	Douglas-fir *Pseudotsuga menziesii*	Yes	90	8.8	75	Good form and structure. CROWN – Dripline extends 3.5 meters onto subject property. *BC Plant Health Care root radar results:* *The tree is about 6 meters from the proposed development. Critical Root Zone does not enter the subject lot. Arborist oversight recommended for the excavation at Property Line for the installation of the proposed retaining wall / landscape feature.* Tree Protection Barrier (TPB) required. Arborist supervision required during excavation and any construction activities within 1.5 m of the dripline.	Retain

TREE #	TAG #	COMMON NAME *BOTANICAL NAME*	LOCATED ON THE SURVEY	DBH (cm)	Crown Radius (m)	LCR (%)	COMMENTS	RETAIN / REMOVE
OS 07	No tag	Western redcedar *Thuja plicata*	Yes	60	6.2	60	Good form and structure. CROWN – Dripline extends 3.8 meters onto subject property. *BC Plant Health Care root radar results:* *May have structural, lateral, and feeder roots growing towards its southeast in the 0 – 20 cm depth range. About 6% of Critical Root Zone may be impacted. Arborist oversight recommended for the excavation at Property Line for the installation of the proposed retaining wall / landscape feature.* Tree Protection Barrier (TPB) required. Arborist supervision required during excavation and any construction activities within 1.5 m of the dripline.	Retain
OS 08	No tag	Douglas-fir *Pseudotsuga menziesii*	Yes	95	9.1	50	Good form and structure. CROWN – Dripline extends 7.0 meters onto subject property. *BC Plant Health Care root radar results:* *Assessment blocked by Tree 376 and shrubs. About 25% of Critical Root Zone will be impacted. Retain with no cut at Property Line. Design a point-footing retaining wall with suspended beams. Arborist oversight recommended for the excavation at Property Line for the installation of the proposed retaining wall / landscape feature.* Tree Protection Barrier (TPB) required. Arborist supervision required during excavation and any construction activities within 1.5 m of the dripline.	Retain
Trees OS 9 – OS 13 form the edge of a larger grouping of private off-site trees.								
OS 9	6346	Douglas-fir *Pseudotsuga menziesii*	Yes	67	6.0	50	Good form and structure. TRUNK: Crook at 16 m. Tree Protection Barrier (TPB) required. Arborist supervision required during excavation and any construction activities within 1.5 m of the dripline.	Retain

TREE #	TAG #	COMMON NAME *BOTANICAL NAME*	LOCATED ON THE SURVEY	DBH (cm)	Crown Radius (m)	LCR (%)	COMMENTS	RETAIN / REMOVE
OS 10	6411	Western redcedar *Thuja plicata*	Yes	38	4.7	80	Fair form and structure. CROWN: Sheared on south side. TRUNK – Previously topped. Tree Protection Barrier (TPB) required. Arborist supervision required during excavation and any construction activities within 1.5 m of the dripline.	Retain
OS 11	6336	Western redcedar *Thuja plicata*	Yes	38	4.7	80	Fair form and structure. CROWN: Sheared on south side. TRUNK – Previously topped. Tree Protection Barrier (TPB) required. Arborist supervision required during excavation and any construction activities within 1.5 m of the dripline.	Retain
OS12	6332	Douglas-fir *Pseudotsuga menziesii*	Yes	41	6.9	80	Good form and structure. Crown: Previous shearing or clearance pruning on south side. Minor flagging. ROOTS: Large exposed roots. Tree Protection Barrier (TPB) required. Arborist supervision required during excavation and any construction activities within 1.5 m of the dripline.	Retain
OS13	6334	Douglas-fir *Pseudotsuga menziesii*	Yes	71	7.1	80	Good form and structure. Trunk: Resinosis. Tree Protection Barrier (TPB) required. Arborist supervision required during excavation and any construction activities within 1.5 m of the dripline.	Retain

TREE #	TAG #	COMMON NAME *BOTANICAL NAME*	LOCATED ON THE SURVEY	DBH (cm)	Crown Radius (m)	LCR (%)	COMMENTS	RETAIN / REMOVE
The following trees are straddling the City of White Rock property.								
SH 01	No tag	Common privet hedge *Ligustrum vulgare*	Yes	-	1.3	100	Height = 2.2M Shared with 14937 Thrift Ave. Indirect conflict with civil sidewalk upgrades and proposed street trees. Written permission required from City to remove.	Remove
SH 02	No tag	Boxwood hedge *Buxus Sempervirens*	Yes	-	1.0	100	Height = 2.0M Shared with 14937 Thrift Ave. Indirect conflict with civil sidewalk upgrades and proposed street trees. Written permission required from City to remove.	Remove
SH 03	No tag	Common privet hedge *Ligustrum vulgare*	Yes	-	1.5	100	Height = 2.5M Shared with 14937 Thrift Ave. Indirect conflict with civil sidewalk upgrades and proposed street trees. Written permission required from City to remove.	Remove
SH 04	No tag	English laurel *Prunus laurocerasus*	Yes	-	2.2	100	Height = 5.0M Shared with 1441 Vidal St. Indirect conflict with civil sidewalk upgrades and proposed street trees. Written permission required from City to remove.	Remove

TREE #	TAG #	COMMON NAME *BOTANICAL NAME*	LOCATED ON THE SURVEY	DBH (cm)	Crown Radius (m)	LCR (%)	COMMENTS	RETAIN / REMOVE
SH 05	No tag	English laurel *Prunus laurocerasus*	Yes	-	1.8	100	Height = 3.5M Shared with 1443-45 Vidal St. Indirect conflict with civil sidewalk upgrades and proposed street trees. Written permission required from City to remove.	Remove
SH 06	372	Cherry *Prunus spp*.	Yes	59	5.5	30	Growing within the SH 04 hedge. Fair condition. CROWN: Some dieback. Shared with 1441 Vidal St. Indirect conflict with civil sidewalk upgrades and proposed street trees. Written permission required from City to remove.	Remove
The following trees belong to the City of White Rock.								
C 1	No tag	Pyramidalis hedge *Thuja occidentalis 'Pyramidalis'*	Yes	-	1.0	100	HANDPLOTTED Height = 6.0M Indirect conflict with civil sidewalk upgrades and proposed street trees. Written permission required from City to remove.	Remove
C 2	No tag	Mixed hedge	No	-	2.5	100	HANDPLOTTED Height = 6.0M Indirect conflict with civil sidewalk upgrades and proposed street trees. Written permission required from City to remove.	Remove

TREE REPLACEMENT SUMMARY

Onsite & Straddling:

Size	To be Removed	Replacement Trees Required
Undersized (<20cm dbh), (hedges, invasive holly)	5	0
≤ 50cm dbh	7	14
51-65cm dbh	5	15
66-75cm dbh	0	0
76-85cm dbh	0	0
>85cm dbh	1	6
Total	**20**	**35**

Offsite City:

Size	To be Removed	Replacement Trees
(<30cm dbh) (hedges)	2	0
≤ 50cm dbh	0	0
51-65cm dbh	0	0
66-75cm dbh	0	0
76-85cm dbh	0	0
>85cm dbh	0	0
Total	**2**	**0**

TREE PROTECTION AND REPLACEMENT SECURITIES

Tree Protection securities:

Size of Tree Retained	Securities
Dbh ≤ 50cm	$3,000.00 per retained tree
Dbh of 51-65cm	$4,500.00 per retained tree
Dbh > 65cm	$10,000 per retained tree

Tree Replacement securities:

Size Tree Removed*	Replacement Ratio	Securities / Cash-in-lieu ($1,500 per replacement tree)
≤ 50cm dbh	2:1	$3,000
51-65cm dbh	3:1	$4,500
66-75cm dbh	4:1	$6,000
76-85cm dbh	5:1	$7,500
>85cm dbh	6:1	$9,000

PHOTOS

Fig. 2 - View facing south along Vidal Street to Thrift Avenue.

Fig. 3 – Off-site Douglas-fir tree

Fig. 4 – Tree 03 growing within S4

Fig. 5 – View of Trees OS2 – OS8

Fig. 6 – Stand of off-site conifers located directly west of 1441/1443-45/1465 Vidal Street.

Fig. 7 – View facing north/northwest. OS 9 – 0S 11 make up part of the edge of a larger grouping of conifers.

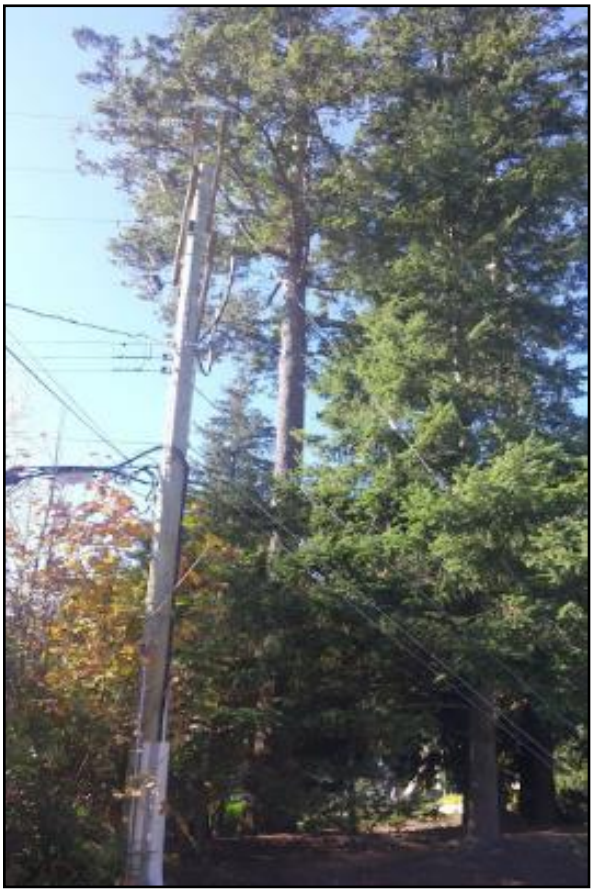


Fig. 8 – Alternate view of Trees OS 9 – OS 11

Fig. 9 – Red alder (376) located on 1465 Vidal Street.

PHOTOS – September 15, 2020

Fig. 9 – View facing east on 1465 Vidal st, tree protection fencing damaged. Needs repair.

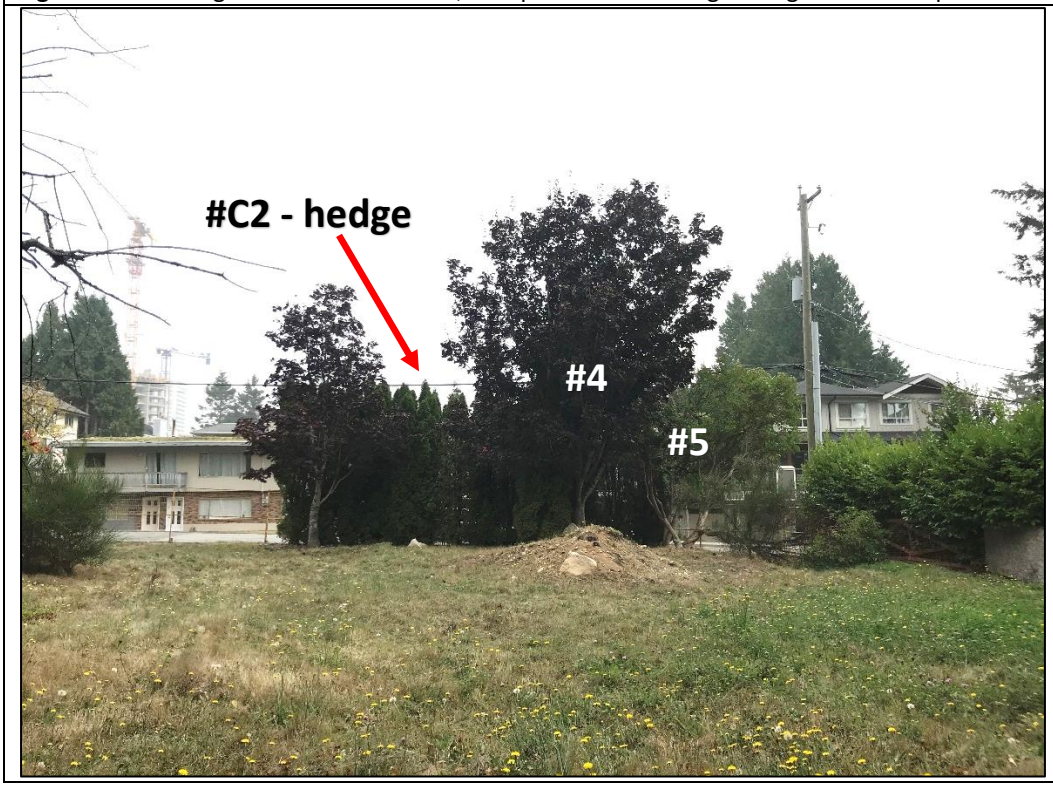


Fig. 10 – View facing east. Southeast corner of 1445 Vidal st. C2 hedge, #4 norway maple, and #5 lilac.

Fig. 11 – Northwest corner of 1465 Vidal.

Fig. 12 – Looking south from 1443-45 Vidal St.

Fig. 13 – Tree #5, failed limb.

Fig. 14 – Pruning of tree branches along east property line, 1465, 1443-45.

Fig. 15 – North property line of 1441 Vidal St, east corner.

Fig. 16 – North property line of 1441 Vidal St, west corner.

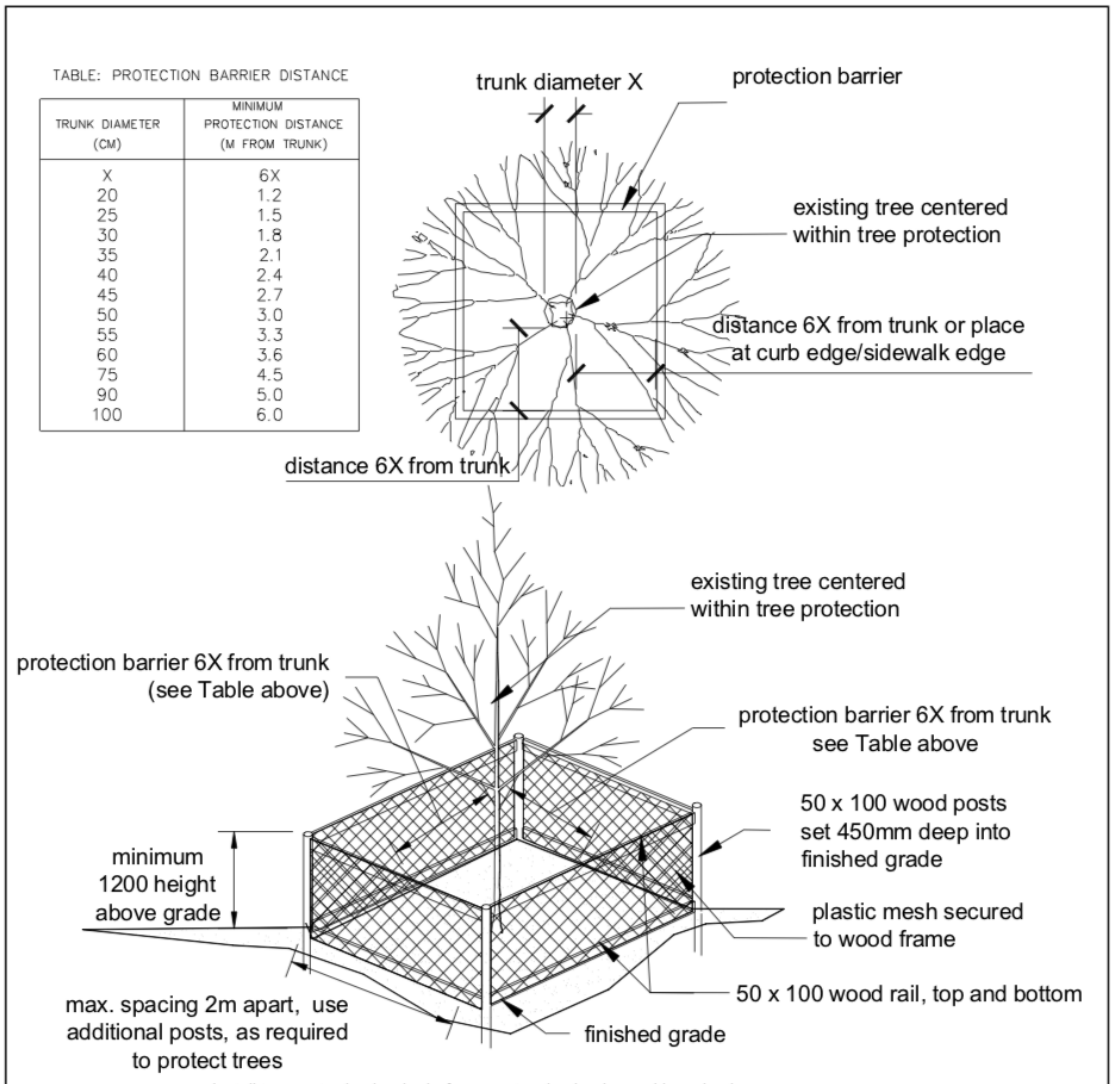
CONSTRUCTION ACTIVITY AROUND TREE PROTECTION ZONE

TREE PROTECTION FENCING

Specifications for Tree Protection Barriers

TABLE: PROTECTION BARRIER DISTANCE

TRUNK DIAMETER (CM)	MINIMUM PROTECTION DISTANCE (M FROM TRUNK)
X	6X
20	1.2
25	1.5
30	1.8
35	2.1
40	2.4
45	2.7
50	3.0
55	3.3
60	3.6
75	4.5
90	5.0
100	6.0



NOTES

Install tree protection barrier before construction begins and keep in place until landscape installation is complete.

Storage of building materials & litter within or against protection barrier is prohibited. Developer/Owner responsible for maintenance within Tree Protection Barrier.

Damaged trees will be replaced at Developer/Owner's cost.

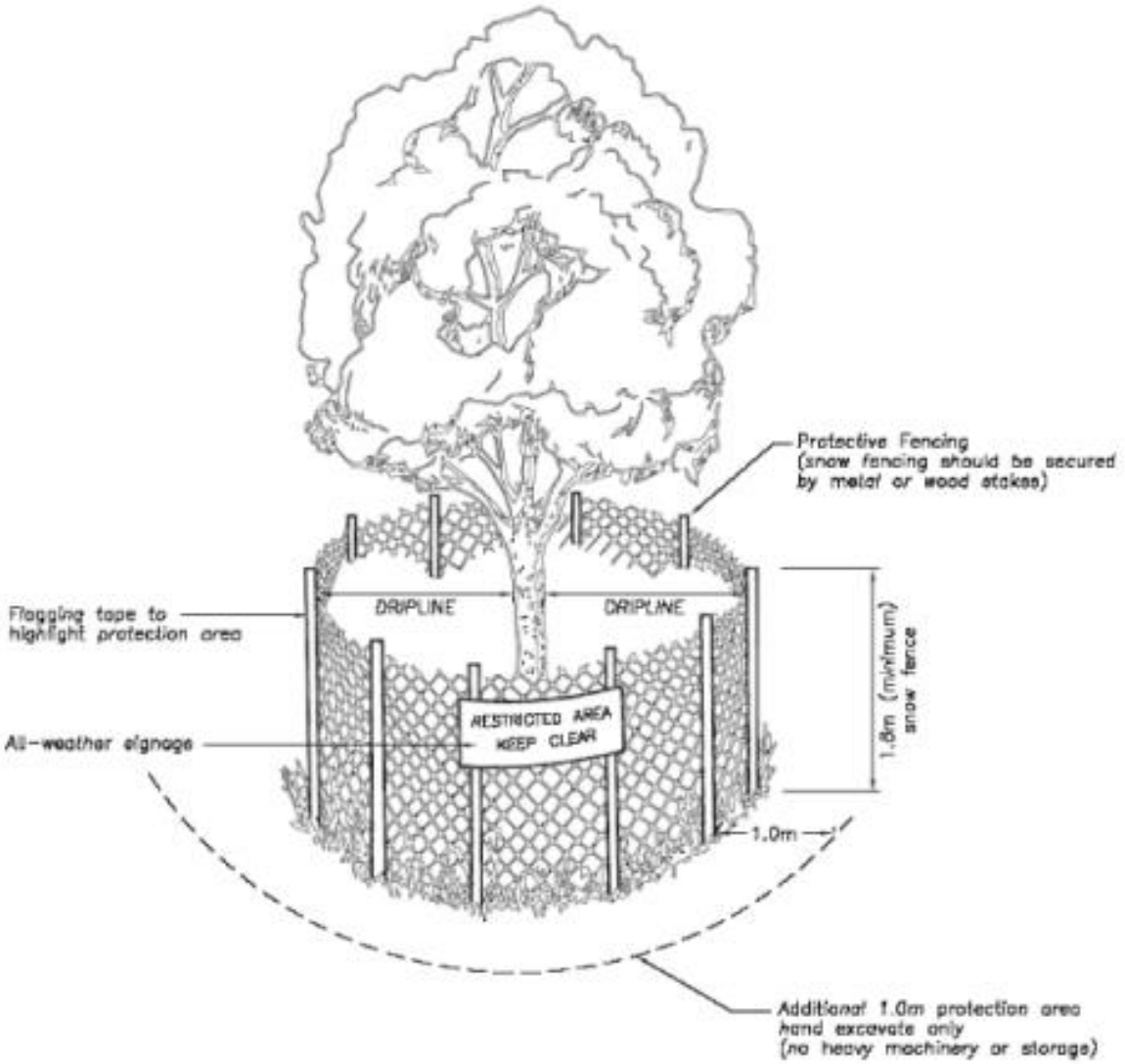
Maintain existing grades at protection barrier for all protected retained and existing trees.

Regrading outside of protection barrier should not adversely compromise protected retained and existing trees.

TREE PROTECTION

How do I safely retain trees on, or adjacent to, the property?

Prior to construction activity you should erect temporary fencing at the dripline of the tree to protect the roots and canopy.



GENERAL REQUIREMENTS AND LIMITATIONS FOR OPERATIONS WITHIN THE TREE PROTECTION ZONE

- The Contractor shall not engage in any construction activity within the Tree Protection Zone (TPZ) without the approval of the Project Arborist including: operating, moving or storing equipment; storing supplies or materials; locating temporary facilities including trailers or portable toilets and shall not permit employees to traverse the area to access adjacent areas of the project or use the area for lunch or any other work breaks. Permitted activity, if any, within the Tree Protection Zone maybe indicated on the drawings along with any required remedial activity as listed below.
- If construction activity is unavoidable within the Tree Protection Zone, notify the Project Arborist and submit a detailed written plan of action for approval. The plan shall include: a statement detailing the reason for the activity including why other areas are not suited; a description of the proposed activity; the time period for the activity, and a list of remedial actions that will reduce the impact on the Tree Protection Zone from the activity. Remedial actions shall include but shall not be limited to the following:
- In general, demolition and excavation within the drip line of trees and shrubs shall proceed with extreme care either using hand tools, directional boring and/or Air Spade. If any excavation work is required within the Tree Protection Zone (TPZ), the Project Arborist must be present during excavation, and a trench should be 'hand dug' to a depth of 60 cm outside the Drip Line, to uncover any potential roots. The Project Arborist should cleanly prune roots and recommend the appropriate treatment for any structural roots encountered.
- Knife excavation where indicated or with other low impact equipment that will not cause damage to the tree, roots soil.
- When encountered, exposed roots, 1 inches and larger in diameter shall be worked around in a manner that does not break the outer layer of the root surface (bark). These roots shall be covered in Wood Chips and shall be maintained above permanent wilt point at all times. Roots one inch and larger in diameter shall not be cut without the approval of the Project Arborist. Excavation shall be tunnelled under these roots without cutting them. In the areas where roots are encountered, work shall be performed and scheduled to close excavations as quickly as possible over exposed roots.
- Tree branches that interfere with the construction may be tied back or pruned to clear only to the point necessary to complete the work. Other branches shall only be RETAINED when specifically indicated by the Project Arborist. Tying back or trimming of all branches and the cutting of roots shall be in accordance with accepted arboriculture practices (ANSI A300, part 8) and be performed under supervision of the Project Arborist.
- Do not permit foot traffic, scaffolding or the storage of materials within the Tree Protection Zone.
- Protect the Tree Protection Zone at all times from compaction of the soil; damage of any kind to trunks, bark, branches, leaves and roots of all plants; and contamination of the soil, bark or leaves with construction materials, debris, silt, fuels, oils, and any chemicals substance. Notify the Project Arborist of any spills, compaction or damage and take corrective action immediately using methods approved by the Project Arborist

GLOSSARY OF KEY TERMS

Abutment: A structure built to support the lateral pressure of an arch or span, e.g., at the ends of a bridge.

Adapted Trunk Diameter Method: This method uses the trees age and tolerance to construction damage to determine the factor that will be multiplied by the diameter to provide a sufficient tree protection zone given these factors.

Age: The relative age (young, intermediate, mature) within the particular stand of trees or forest.

Algae: Is a simple, nonflowering plant (includes seaweeds and many single-celled forms). They do contain chlorophyll (but lack true stems, roots, and vascular tissue)

ALR: The Agricultural Land Reserve in which agriculture is recognized as the priority.

Bole: The stem or trunk of a tree.

Chlorotic: Yellowing of plant tissues caused by nutrient deficiency &/or pathogen.

Co-dominant Leaders: Forked dominant stems nearly the same size in diameter, arising from a common junction.

Co-dominant Within Stand: Individual tree whose height is generally equal to trees (regardless of species) within the same stand.

Compaction: Compression of the soil that breaks down soil aggregates and reduces soil volume and total pore space, especially macropore space.

Conk: A fungal fruiting structure typically found on trunks and indicating internal decay.

Dead Standing: A tree that has died but is still standing erect.

DBH: The Diameter of the tree at 1.40 meters above the ground.

Dominant Within Stand: Individual tree whose height is significantly greater than adjacent trees (regardless of species) within the same stand.

C-rad: Crown radius, is the dripline measured from the edge of the trunk to the outermost branches of the crown.

CRZ: Critical Root Zone - means the area of land surrounding the trunk of a tree contained within a radius equal to the DBH of the tree multiplied by six (6), or one (1) metre beyond the drip line of the tree, whichever is greater.

Fair: Healthy but has some defects such as co-dominant trunk, dead branches.

Feeder Roots: The smaller roots responsible for water and nutrient absorption and gas exchange. These roots can extend far beyond the Drip Line (or outer canopy) of the tree.

Fungus (singular) / Fungi (plural): Unicellular, multicellular or syncytial spore-producing organisms that feed on organic matter (including molds, yeast, mushrooms and toadstools)

Girdling Root: Root that encircles all or part of the trunk of a tree or other roots and constricts the vascular tissue and inhibits secondary growth and the movement of water.

Good: Good form and structure, healthy with no defects.

Hazardous: Significant hazard exists with a high risk of immediate failure; which could result in serious damage to property or person(s).

Height: Height of tree is approximate.

LCR: Live Crown Ratio – The ratio of crown length to total tree length.

Level 1 Limited Visual Assessment: Limited visual assessment looking for obvious defects such as, but not limited to dead trees, large cavity openings, large dead or broken branches, fungal fruiting structures, large cracks, and severe leans.

Level 2 Basic Visual Assessment: Detailed visual inspection (aboveground roots, trunk, canopy) of tree(s) may include the use of simple tools to perform assessment (i.e. sounding mallet, trowel, measuring tape, binoculars). The assessment does not include advanced resistance drilling of trunk.

Level 3 Advanced Assessment: To provide detailed information about specific tree parts, defects, targets, or side conditions. May included aerial inspection, resistance drilling of tree parts, laboratory diagnosis of fungal or plant tissue.

Mildew: Is a minute powdery or web-like fungi (of different colours) that is found on diseased or decaying substances.

Moss: A small, green, seedless plant that grows on stones, trees or ground.

No Disturbance Zone: (Trunk Diameter x 6) + Trunk Radius + (60 cm excavation zone). For example, a 50-cm diameter tree would have a No Disturbance Zone = 3.85 meters measured from the edge of the trunk.

Poor: multiple defects, disease, poor structure and or form, root and or canopy damage.

Phloem: Plant vascular tissue that transports sugar and growth regulators. Situated on the inside of the bark, just outside the cambium. Is bidirectional (transports up and down). Contrast with xylem.

Phototropic: Growth toward light source or stimulant.

Retain & Monitor: Monitor health and condition of tree every 12 months for signs of deterioration.

Root Crown: Also, called the root collar, it includes the flare at the base of the trunk and the initial roots that develop below the trunk. These roots generally taper and subdivide rapidly to form the root system of the tree.

SPEA: Streamside Protection and Enhancement Area

Spiral Decline: The health and condition of the tree is deteriorating.

Sub-dominant Within Stand: Individual tree whose height is significantly less than adjacent trees (regardless of species) within the same stand.

Suppressed: Individual tree whose growth, health and condition are negatively impacted by adjacent tree(s).

TPZ: Tree Protection Zone - The area between the trunk and the Tree Protection Barrier.

Wildlife Tree: A tree or a group of trees that are identified to be retained to provide future wildlife habitat. Wildlife habitat can exist in tree risks (cavities, dead snags, broken tops). Often times the tree risk to potential targets (people & property) is reduced by removing that part of the tree posing the risk of failure, but the tree (or portion of) is retained to provide future habitat.

Witches Broom: A dense mass of shoots growing from a single point, with the resulting structure resembling a broom or a bird's nest.

Xylem: Thin overlapping cells that helps provide support and that conducts water and nutrients upward from the roots all the way to the leaves.

LIMITATIONS

This report is valid for the day the trees were reviewed. This report is not to be re-printed, copied, published, or distributed without prior approval by VDZ + A Consulting Inc.

Sketches, diagrams, and photographs contained in this report being intended as visual aids, should not be construed as engineering reports or legal surveys.

Only the subject tree(s) was inspected and no others. This report does not imply or in any other way infer that other trees on this site or near this site are sound and healthy.

The tendency of trees or parts of trees to fall due to environmental conditions and internal problems are unpredictable. Defects are often hidden within the tree or underground. The project arborist has endeavored to use his skill, education, and judgment to assess the potential for failure, with reasonable methods and detail. It is the owner's responsibility to maintain the trees and inspect the trees to reasonable standards and to carry out recommendations for mitigation suggested in this report.

REFERENCES

Bond, Jerry & Buchanan, Beth (2006) Best Management Practices: Tree Inventories, International Society of Arboriculture, Champaign, IL.

Dunster, Dr. Julian (2003) *Preliminary Species Profiles for Tree Failure Assessment*. ISA Pacific Northwest Chapter, Silverton, OR, USA

Dunster, Dr. Julian & Edmonds, Dr. R. (2014) Common Fungi Affecting Pacific Northwest Trees, ISA Pacific Northwest Chapter, Silverton, OR, USA

Fite, Kelby & Smiley, E. Thomas (2016) Best Management Practices: Managing Trees During Construction, International Society of Arboriculture, Champaign, IL.

Sibley, David Allen (2009) *The Sibley Guide to Trees*. Alfred A. Knopf, New York, NY

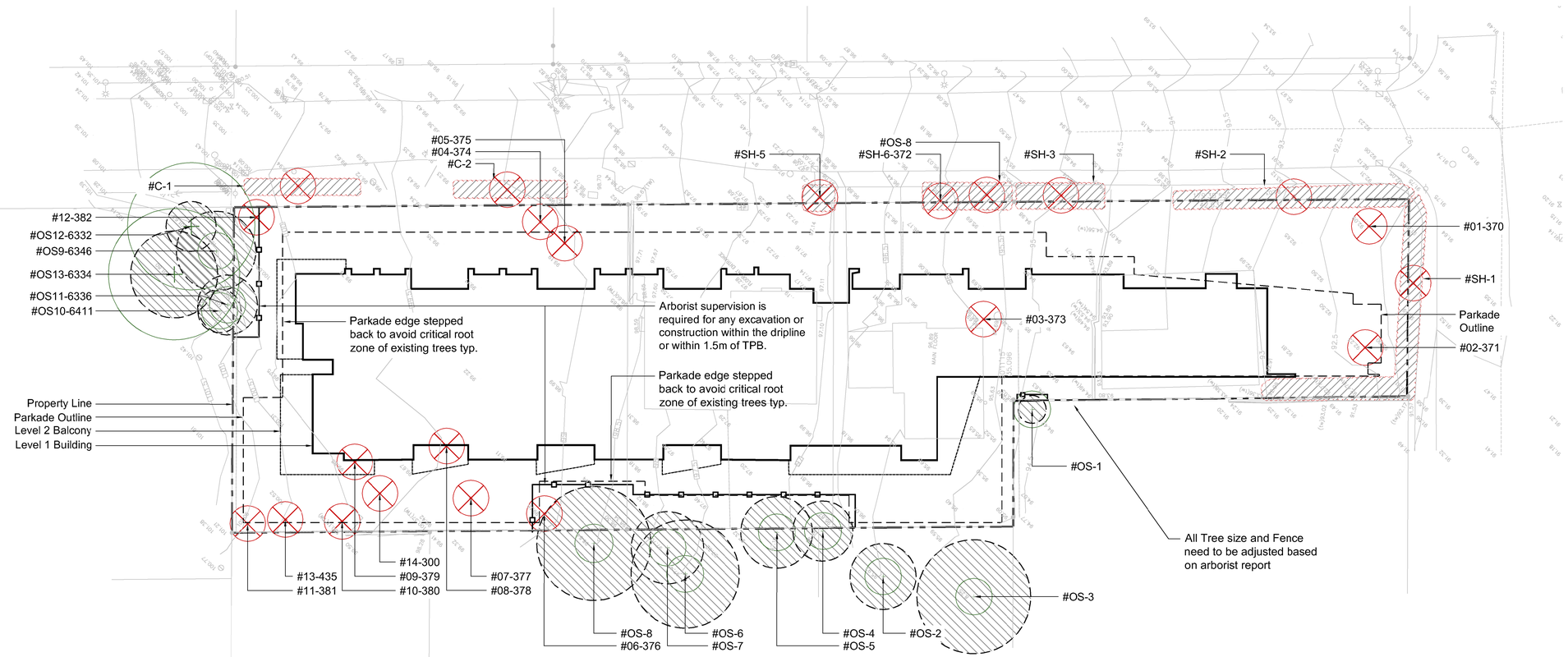
Smiley, E.T., Matheny, N., Lilly, S. (2011) Best Management Practises: Tree Risk Assessment. International Society of Arboriculture, Champaign, IL.

TREE MANAGEMENT PLAN

See attached Tree Mangement Plan

Original size: 24x36

Print as 11x17 for foldout



1 TREE PROTECTION AND REMOVAL PLAN
Scale 1:250

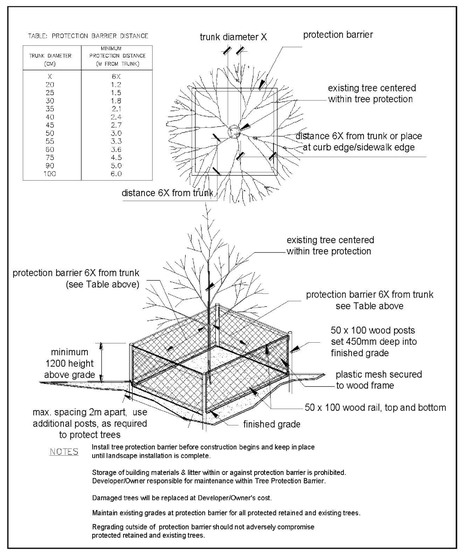
LEGEND

Tag # / CRZ CR		
Existing Tree to be Retained CRZ: Critical Root Zone CR: Crown Radius	Existing Tree to be Removed	Tree Protection Fencing

Tree Tag Legend
XX - Tag number
C-XX - Municiple tree
OS-XX - Off-site tree
SH-XX - Straddling tree. Written permission required from owner to remove trees.

SCHEDULE "A"

Specifications for Tree Protection Barriers



2 TREE PROTECTION FENCE
Scale NTS

Note:
1. Contact Arborist (Glyn Romaine, 604 841 9977, glyn@vdz.ca) for inspection 72 hrs prior to any grading or excavation within the tree protection zone. (typ) If during excavation it is found that it cannot be completed without severing roots that are critical to the trees health or stability it may be necessary to remove additional trees.
2. Read this plan together with the arborist report prepared by VDZ+A.
3. An additional 1m setback is shown for all hand-plotted trees to be retained
4.If Stump Grinding is to occur in close proximity to trees which are to be retained then it is requested stumps to be removed under Arborist supervision.
5. It is the responsibility of the client or his/her representative to contact the project arborist for the purpose of:
*Locating TPZ Fencing
*Locating Work Zone and Machine access corridors where required
*Reviewing the Report with the project foreman or site supervisor.

VDZ+A
LANDSCAPE ARCHITECTURE | CIVIL ENGINEERING | URBAN FORESTRY
FORT LANGLEY STUDIO | 102-9181 Church St | Fort Langley, BC | V1M 2R8
MOUNT PLEASANT STUDIO | 102-355 Kingsway | Vancouver, BC | V5T 3J7
www.vdz.ca 604-882-0024

No.	By:	Description	Date
12	SH	Issued for Planning Review	May 31, 2022
11	SH	Issued for DP	Oct 18, 2021
10	SH	Response to ADP Comments	July 23, 2021
9	ET	Re-Issued for ADP	June 4, 2021
8	LJ	Issued for ADP	March 9, 2021
7	SH	Issued for Coordination	Feb. 26, 2021
6	SH	Issued for Coordination	Dec. 23, 2020
5	SH	Issued for Coordination	Oct. 6, 2020
4	SH	Issued for DP	June 25, 2020
3	SH	Issued for DP	March 6, 2020
2	SH	Issued for DP	May 24, 2019
1	JW	Issued for DP Review	Nov 16, 2018

REVISIONS TABLE FOR DRAWINGS

No.	By:	Description	Date
4	KM	Arborist Report Revision	Sept 23rd, 2020
3	SH	Arborist Report Revision	Feb 4, 2020
2	SH	Arborist Report Revision	June 18, 2019
1	SH	Arborist Report Revision	May 15, 2019

REVISIONS TABLE FOR SHEET

Project:
Vidal Street Development

Location:
Vidal Street & Thrift Ave,
White Rock, BC

Drawn: FW
Checked: JW
Approved: MVDZ
Scale: 1:250
Stamp:
Original Sheet Size: 24"x36"

Drawing Title: TREE PROTECTION AND REMOVAL PLAN
NORTH
VDZ Project #: DP2018-59
Drawing #: L-02

Z:\PROJECTS\DEVELOPMENT PERMIT\ACTIVE\DP2018-59 VIDAL STREET\DWG\SHEETS\L-02 TREE PROTECTION AND REMOVAL PLAN.DWG